A Therapeutic Approach to Pelvic Floor Dysfunction

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Objectives
Upon completion of this continuing education seminar, participants will be able to:
- Identify the muscles of the pelvic floor and list their functions.
- Understand the musculoskeletal dysfunction underlying urinary incontinence and pelvic pain syndromes.
- Describe the components of a comprehensive pelvic floor evaluation.

Objectives (con’t.)
- Identify the various types of urinary incontinence and appropriate physical therapy interventions.
- Identify specific pelvic pain dysfunctions and appropriate physical therapy interventions.
- Develop evidence-based treatment plans for female pelvic floor dysfunction patients.

APTA Section on Women’s Health
February 1993
- “Internal examination of the pelvic floor is consistent with PT practice. It complies with the national PT policies requiring the performance of tests and measurements of neuromuscular function to aid in the evaluation and treatment of a specific medical condition.”
- Continuing education coursework required.
Pelvic Floor Function

- **Supportive**: to the pelvic/abdominal organs, intra-abdominal pressure.
- **Sphincteric**: relaxes and contracts the urethral, vaginal and rectal openings.
- **Sexual**: maintains clitoral erection, provides tone and proprioception to the vaginal wall.

Pelvic Floor Anatomy

- The pelvic floor consists of **five** layers:
  1. **Urogenital Diaphragm (Superficial)**:
     - 1. Urethral Sphincter:
         - Arises from the inferior pubic arch, blends with the walls of the vagina, attaches to the trigone of the urethra.
         - Assists in urinary continence.
         - Innervated by the perineal branch of the pudendal nerve (S2-S4)
     - 2. External Anal Sphincter:
     - 3. Urogenital Triangle:
         - a. Ischiocavernosus muscle
         - b. Bulbospongiosus muscle
         - c. Superficial transverse perineal mus.
Pelvic Floor Anatomy

1. Urogenital Diaphragm (Superficial):

3. Urogenital Triangle:
   a. Ischiocavernosus muscle
      - Runs from the ischial tub. to the clitoris/penis.
      - Maintains clitoral erection.
      - Innervated by the deep branch of the perineal n.

b. Bulbospongiosus muscle
   - Arise from the central perineal tendon, inserts at the clitoris/penis.
   - Strengthens the vaginal opening.
   - Assists in erection of clitoris.
   - Constricts urethra to fully expel urine.
   - Innervated by the perineal branch of the pudendal nerve (S2-S4)
Pelvic Floor Anatomy

I – Urogenital Diaphragm (Superficial):

3. Urogenital Triangle:
   c. Superficial Transverse Perineal muscle
   - Runs from the ischial tuberosity to central perineal tendon.
   - Stabilizes the perineal body.
   - Supports the vagina.
   - Innervated by the deep branch of the perineal nerve.

Pelvic Floor Anatomy

II – Deep Transverse Perineal Muscle (Middle) Layer:

- Broad muscle between the ischial tuberosity and vagina.
- Urethrovaginal sphincter, arising from vaginal wall to urethra.
- Voluntary control of urination.
- Innervated by the perineal branch of the pudendal nerve (S2-S4)
Pelvic Floor Anatomy

III – Leveator Ani Muscles (Deep):

1. Pubococcygeus:
   - Arises from the dorsal surface of the pubic bone and obturator internus fascia, inserts on the anococcygeal and perineal bodies, anal wall.
   - Forms a hammock to support the urethra, vagina, prostate and rectum.
   - Pulls the rectum toward the pubic bone.

2. Puborectalis
3. Iliococcygeus
4. Ischiococcygeus (Coccygeus)

**Pelvic Floor Anatomy**

III – Pelvic Diaphragm / Leveator Ani Muscles (Deep):

1. Pubococcygeus
2. Puborectalis
3. Iliococcygeus
4. Ischiococcygeus (Coccygeus)

- Acts with the muscles of the abdominal wall to increase intra-abdominal pressure.
- Innervated by the perineal branch of the pudendal nerve (S2-S4) and ventral rami of (S3,4).
Pelvic Floor Anatomy

III – Levator Ani Muscles (Deep):

2. Puborectalis:
   - Arises from the medio-lateral, dorsal surface of the pubic bone, blends with the lateral walls of the anus and rectum, and inserts at the external anal sphincter and anococcygeal body.
   - Controls descent of feces by elevating and constricting anal canal.

   - Acts with the muscles of the abdominal wall to increase intra-abdominal pressure.
   - Innervated by the perineal branch of the pudendal nerve (S2-S4) and ventral rami of (S3,4).

3. Iliococcygeus:
   - Arises from the ischial spine and fascia of obturator internus, inserts at the anococcygeal body, anal wall and the coccyx.
   - Pulls the vagina and rectum toward the pubic bone.
   - Most widely recognized source of perianal referred pain to the sacrum, coccyx, rectum, vagina and lumbar spine.

   - Acts with the muscles of the abdominal wall to increase intra-abdominal pressure.
   - Supports pelvic organs.
   - Innervated by the perineal branch of the pudendal nerve (S2-S4) and ventral rami of (S3,4).
Pelvic Floor Anatomy

III – **Levator Ani Muscles (Deep):**

4. **Ischioccygeus (Coccygeus):**
   - Originates on the ischial spine and inserts on the caudal aspect of the sacrum and the coccyx.
   - Provides tension to the pelvic floor, but not truly part of levator ani.
   - Pulls the coccyx forward and stabilizes the sacroiliac joint.
   - Innervated by ventral rami S4-S5.

Pelvic Floor Anatomy

- Provides support for the bladder neck and aids in sexual stimulation.
- Elevates the pelvic floor, resisting increases in intra-abdominal pressure.
- 70% slow-twitch / 30% fast-twitch
- Innervated by:
  - S2-S4 pudendal n branches to perineal n
  - T12-L2 sympathetic n
Pelvic Floor Anatomy

IV – **Smooth Muscle Diaphragm:**
- Aids in storage and emptying of bladder

1. **Internal sphincter of the urethra:**
   - Located at the level of bladder neck.
   - Functions to keep proximal urethra closed.
   - Autonomic innervation.
   - *Involuntary* and cannot be trained with active exercise.
   - Commonly removed/damaged with prostate surgery.

2. **External sphincter of the urethra:**
   - Comprised of skeletal, slow-twitch muscle.
   - Well suited for maintaining constant tone.
   - *Voluntarily* relaxes to facilitate emptying of the bladder; contracts to prevent urine leakage.

Pelvic Floor Anatomy

V – **Endopelvic Fascial Diaphragm:**
- Fibromuscular tissue.
- Fascia surrounds the pelvic organs and helps suspend it from the pelvic ring.
- Stretching and tears cause loss of support to pelvic organs.
- Damage can contribute to the prolapse of pelvic organs.

PELVIC FLOOR DYSFUNCTION

Hypertonus vs. Supportive Dysfunctions
PELVIC FLOOR DYSFUNCTIONS

Four types of pelvic floor dysfunction:

I. Hypertonus (Pain) Dysfunctions
II. Supportive (Weakness) Dysfunctions
I. Pelvic Floor Incoordination
II. Pelvic Floor Disuse

Chronic Pelvic Pain

PELVIC FLOOR DYSFUNCTIONS

I. Pain (Hypertonus) Dysfunctions:

1. 14.7% of women have chronic pelvic pain.  
   -Matthias et al, 1996

2. 200,000 women in the U.S. have pain that greatly reduces their quality of life.  
   -University of Pennsylvania, 2006

3. "Persistent or recurrent pelvic pain assoc. with symptoms of lower urinary tract, sexual, bowel or gynecological dys. No proven infection or obvious pathology.”  
   -Fall et al, 2004

Etiology:
- Neuro-inflammatory model
- Pelvic floor dysfunction
- Visceral and somatic disorder
- Trauma
- Dermatologic
- Psychogenic
PELVIC FLOOR DYSFUNCTIONS

I. Pain (Hypertonus) Dysfunctions:

**Symptoms:** Primarily PAIN!!!
- Lumbar, perivaginal, perirectal, lower abdomen, coccygeal, posterior thigh.
- Vulvar/clitoral burning
- Dyspareunia
- Constipation

**Causes:**
1. Joint dysfunction of lumbar, SI, coccyx and pubic symphosis.
2. Pelvic fractures
3. Habitual postural dysfunction
4. Childbirth trauma
5. Surgical trauma
6. Sexual abuse/trauma
7. Pelvic disease
8. Hemorrhoids fissures
9. Bladder disorders

PELVIC FLOOR DYSFUNCTIONS: Associated Myofascial Structures

1. **Piriformis:**
   - Can compromise pudendal nerve.
   - Refers pain into SI region, laterally to buttocks/posterior hip, 2/3 posterior thigh.

2. **Obturator Internus:**
   - Tendinous attachment with levator ani.
   - Refers pain into the vagina, occasionally to posterior thigh, feeling of “fullness” of rectum.
PF Hypertonus Dysfunctions:  
Associated Myofascial Structures  

3. **Hip Adductors:**  
   
   I. **Adductor Magnus:**  
      - Refers pain deep into groin, pubis, vagina, rectum.  
      - Usually “sharp, shooting” pain.  

   II. **Pectineus:**  
      - Refers pain deep into groin, anterior hip joint, below inguinal ligament.
Supportive Dysfunctions

PELVIC FLOOR DYSFUNCTIONS

II. Supportive Dysfunctions:

- Loss of strength/integrity of connective tissue and muscles.

- Symptoms
  - May have bowel/bladder incontinence and/or difficulties.
  - “Falling out” feeling of pelvic floor.
  - Organ prolapse.
  - Low back pain.
  - Pelvic and suprapubic pressure.
  - Frequent UTI’s.

Causes:

1. Childbirth-
   a) Injury (denervation) of pudendal n.
   b) Stretch weakness from delivery.
   c) Episiotomy tears.
   d) Effects of hormonal imbalances on soft tissues during pregnancy and menopause.

2. Obesity
3. Chronic cough, smoking, asthma
4. Repetitive lifting
5. Chronic constipation (straining)
6. Hysterectomy
7. Pelvic fractures, malignancies
Episiotomy

1. An incision of the perineum performed to enlarge the vaginal opening.
2. 10% of women experienced fecal incontinence 3 months after delivery - Signorello et al., 2000
3. Midline episiotomy is associated with higher rates of 3rd & 4th degree tears.
   - Fitzpatrick, O’Herlihy, 2000

Pelvic Floor Tears

1. Grd I: Laceration extending from the vaginal mucosa to perineal skin.
2. Grd II: Laceration extending to the perineal muscles.
3. Grd III: Laceration involving the external anal sphincter.
4. Grd IV: Laceration affecting the external anal sphincter and anorectal mucosa.
   - Carriere, 2006

1st and 2nd Degree Tears

3rd and 4th Degree Tears
PELVIC FLOOR SUPPORTIVE DYSFUNCTIONS

Types of organ prolapse:
1. Cystocele – Bladder
2. Rectocele – Rectum
3. Uterocele - Uterus

Prolapse caused by:
- Obstetrical trauma.
- Congenital weakness of pelvic supports.
- Decreased estrogen.
- Increased intra-abdominal pressure.
- Most often in multiparous and post-menopausal women.

Cystocele
- Downward protrusion of bladder into the anterior vaginal canal.
- 1st degree - Minimal bladder descent.
- 2nd degree - Descent into introitus with bearing down stress.
- 3rd degree - Descent into introitus with rest.
- 4th degree - Descent beyond introitus.
PELVIC FLOOR SUPPORTIVE DYSFUNCTIONS

Uterocele
- Descent/herniation of uterus into the vaginal canal.
- 1st degree - Minimal bladder descent.
- 2nd degree - Descent beyond introitus.
- 3rd degree - Descent entirely outside introitus.

Rectocele
- Herniation of rectum into the vaginal canal.
- 1st - Bulging of posterior vaginal wall.
- 2nd - Bulging of posterior vaginal wall to vulva.
- 3rd – Posterior vaginal wall exteriorized.

-Vaginal-Uterocele

Rectocele

-Carriere, 2006
III. Incoordination Dysfunctions:
- Faulty tissue contractility.
- Difficulty isolating PFM contraction and relaxation.

Symptoms
- Incontinence
- Organ prolapse.
- Tissue restrictions.

Causes:
1. Chronic straining with defecation.
3. Poor toileting habits (positional).
4. Myofascial adhesions/scar tissue.
5. CNS nerve damage (MS, SC lesions).
6. Peripheral nerve damage (trauma, DM).
7. Surgical trauma.

IV. Disuse Dysfunctions:
Causes:
1. Modesty
2. Lack of training
3. Muscle imbalance
Urinary Incontinence

Urinary System

- **Upper tract:**
  - Kidneys – where urine is formed.
  - Ureters – tubes that bring urine from the kidneys to the bladder.

- **Lower tract:**
  - Bladder – stores urine until voiding.
  - Urethra – opening where urine is passed from the body.
Male vs Female Urinary Lower Tract

Males
Bladder, urethra, prostate and PFM

- Male urethra averages 8 inches in length and passes through the prostate gland.
- The prostate, if enlarged, can affect continence by constricting the urethra.

Females
Bladder, urethra, PFM, uterus and vagina

- Female urethra averages 1.5 inches in length.
- Much more likely to be affected by changes in internal pressure, such as those caused by coughing, laughing, sneezing or straining.

Bladder Function

- Located behind the pubic symphysis.
- Held in place by ligaments attached to adjacent pelvic organs and bones.
- Fills to the size of a softball when full.
- During filling phase it relaxes to accommodate increasing volumes.
- Normal voiding patterns can range from every 3 to 6 hours.

Bladder Function

- Collects approximately 8 ounces of urine before sensation to urinate.
- Tolerates 9–15oz. without discomfort.
- Functional capacity @ 360-480 mls.
- Normal function involves the brain, spinal cord, urinary system and surrounding muscles.
- Disease to any of these tissues can cause urinary incontinence.
Bladder Neurophysiology

- Bladder distention → stretch receptors → activate parasympathetic fibers → detrusor muscle contraction.
- Contraction perceived as an urge to urinate.
- External urethral sphincter and pelvic floor muscles control the urge to urinate.

Bladder Neurophysiology

- Somatic branch of pudendal nerve causes voluntary relaxation of the pelvic floor muscles.
- Micturition reflex: detrusor muscle contraction → bladder neck descent → bladder neck opening.
- Following the micturition reflex, the detrusor resumes resting state under sympathetic control.

Bladder Neurophysiology

- Bladder contraction ceases, the bladder neck closes and urine stored.
- After voiding, voluntary contraction of the pelvic floor muscles.
- Involves 16 thoracic, lumbar and sacral spine reflexes; spinal cord tracts; and central micturition centers of the pons and sensory/motor cortex.

Urinary Incontinence

- (UI) the involuntary leakage of urine.
- 13 million cases in the US.
- 35% population of women >65 y/o.
- 10-20% seek medical intervention.
  - Obstetrics and Gynecology, 2001

- The total cost of UI and OAB was $19.5 billion and $12.6 billion respectively.
  - Urology, 2004
Urinary Incontinence


- National Health and Nutrition Examination Survey: N=4,229 women 49.6%(2,098) reported UI symptoms - J of Urology

- Overall, rates in men are approximately one-third those in women until age 80, when rates converge. - JAMA, 2008

Risk Factors:
- Female gender
- Childbirth
- Pelvic surgery
- Advancing age
- Diseases
- Smoking
- Obesity

Wanda Sykes - “I’ma Be Me”
Types of Urinary Incontinence

- Stress Incontinence
- Urge Incontinence
- Overflow Incontinence
- Functional Incontinence

**Stress Incontinence**
- Caused by an increase in intra-abdominal pressure with exertion.
- **Signs:** A small loss of urine during physical exertion.
  - Coughing
  - Sneezing
  - Laughing
  - Straining
  - Lifting
  - Exercising
  - Bending over
  - Jumping

It is often related to weakening in the pelvic floor muscles, which allows leakage at moments of stress.

Pelvic floor muscle exercises can strengthen these muscles and may correct the problem.
Urge Incontinence

- Involuntary bladder contractions create an uncontrolled loss of urine, which can vary from a small amount to complete emptying of the bladder.
- Also referred to as an “Overactive Bladder”.
- “Overactive bladder” is urgency and increased frequency, with or without urge incontinence.

Signs:
- Urine loss on the way to the bathroom.
- Strong urge to urinate.
- Frequent urinations (> 8x per day).
- Waking frequently at night to urinate.

Triggers:
- Environmental factors such as the sound of running water or cold weather.
- “Key-in-the-lock” or “Garage Door” syndrome.
- Treated with behavioral modifications, “bladder training”.

Overflow Incontinence

- Occurs when bladder pressure is greater than the urethral pressure, especially at very high bladder volume.
- It is usually caused by an obstruction in the urethra.
Overflow Incontinence

**Signs:**
- Bladder distention
- Reduced urine flow
- Dribbling incontinence
- Change in the urine stream
- Straining
- Frequent urination (> 8x per day)

Functional Incontinence

**Factors outside the urinary tract contributing to leakage:**
- People with insufficient mobility or impaired manual dexterity.
- Dementia.
- Elderly people in strange surroundings.
Treatment / Case Management

I. Bladder Training
II. Scheduled Toileting
III. Lifestyle Modifications
IV. Medical Treatment
V. Pelvic Floor Muscle Rehab

Bladder Diary

Case Management

I. - Bladder Training:
   - Drink at least 50 ounces (6 cups) / day
   - Drinking too little can cause constipation.
   - A full bladder is needed to activate a normal voiding reflex.
   - Fluid restriction causes urine to become more concentrated (more irritating).
   - Spread fluid intake throughout the day.
   - Regulate amount and timing of fluid intake.

Case Management

- Bladder Irritants: Foods/Drinks
  - Alcoholic beverages
  - Caffeine drinks (including chocolate)
  - Acidic fruits/juices
  - Tomatoes
  - Milk products
  - Spicy foods
  - Artificial sweeteners
Case Management

II. Bladder Irritants: Medications
- Antihistamines
- Antipsychotics
- Antispasmodics
- Anti-Parkinsons agents
- Ca+ channel blockers
- Diuretics
- Sedatives/sleeping pills
- Decongestants
- Antidepressants

III. Scheduled Toileting
- Schedule toilet visits to help increase the length of time between voids.
- During bladder retraining, the individual learns his or her bladder limits and when to urinate at the right time to avoid an incontinence episode.
- Learned relaxation with sudden urgency to void.

III. Lifestyle Modifications
- People often cope with incontinence by organizing their lives around the condition to minimize accidents and embarrassment.
- They adapt “just in case” behaviors.
1. Avoid travel and trips.
2. Reduce fluid intake.
3. Avoid exercise programs because they may leak urine on exertion.
4. They wear dark clothing to minimize detection if they have an episode.
5. They plan trips around known available bathrooms (toilet mapping).

Absorbent Products
- Protective underwear
- Pantiliners
- Pads
- Undergarments
- Fitted briefs

Bladder control products are specifically designed to:
- Absorb urine quickly.
- Lock in wetness.
- Keep skin drier.
- Reduce odor.

Treatment Options
- IV – Medical Intervention:
  - Catheterization
  - Collection devices
  - Intra-urethral devices
  - Intra-vaginal devices
  - Pessary
Uterocele with Pessary

Treatment
- IV – Medical Intervention: Meds
  - Prescription medication
  - Antimuscarinics - block muscarinic receptors at detrusor and non-detrusor sites to prevent symptoms and detrusor overactivity without depressing the contraction during voiding.
  - Effective with overactive bladder.
- Estrogen – topical creams

Treatment
- Sacral Nerve Stimulation
  - Urgency incontinence and overactive bladder.
  - Implantable nerve stimulation.
  - Affects afferents to inhibit sensory processing at spinal cord.
- Botox injections
  - Site - Bladder wall, not FDA approved

Treatment
- Burch colposuspension
  - Sutures placed lateral to bladder neck and periosteum of pubic symphysis.
  - 65-90% 1-yr cure rate, 70% 10-yr cure rate
- Vaginal sling procedures
  - 93% 1-2 yr cure rate
PT Intervention

- Pelvic Muscle Rehabilitation:
  - Pelvic muscle exercises (PME) or “Kegel” exercises
  - Biofeedback assisted
  - Vaginal weights (cones)

- Pelvic Muscle Rehabilitation:
  - Indications:
    - Urinary and fecal incontinence.
    - Irritable bladder / bowel syndrome.
    - Pelvic pain syndromes.
    - Pelvic descent or prolapse.
    - Low back and pelvic conditions.
    - Sexual dysfunction.
    - Pre/post partum women.
Evidence

- PFMT is more effective than no treatment, sham or placebo treatment for SUI.
- PFMT is recommended as a first line treatment for SUI.
- There is no evidence to support the addition of biofeedback, ES, or vaginal cones as being any more effective than PFMT alone.

(Bo, 2007)

Evidence

- Pelvic floor exercises are more effective than electrical stimulation or vaginal cone treatment, for women with urinary stress incontinence.
  - Improved PFM strength.
  - Reduced leakage.

Evidence

- Pelvic floor muscle exercises are an effective intervention for women with stress urinary incontinence.
  - 41% experienced 100% reduction in the # of SUI episodes per week.
  - 25% experienced 75% reduction in the # of SUI episodes per week.
  - No difference in exercise position (supine vs. upright supine)
Hypertonus Dysfunctions

1. Dyspareunia:
   - Painful sexual intercourse.
   - 46% women (18-45 y/o) - Jamieson, Steege, 1996

   **Causes:**
   1. Vaginal myofascial scarring/adhesions.
   2. Vaginal tissue atrophy following menopause.
   3. Recurrent vaginal infections.
   4. Cystitis (bladder infections and urethritis)

Hypertonus Dysfunctions

2. Vulvodynia:
   - General diagnosis for pain at the external genitalia and vestibule.
   - Chronic, painful inflammation of the vulva and vulvar vestibule.
   - Stabbing pain at the vagina and occasionally the rectum.

   **Causes:** Unknown etiology

Hypertonus Dysfunctions

1. Dyspareunia:
   - **Causes:**
     5. Vulvodynia (*see next)
     6. Endometriosis
     - Endometrial tissue develops outside uterus on ovaries, fallopian tubes, and throughout abdominal cavity.
     - Tissue undergoes hormonal changes with menstrual cycle.
     - Scar adhesions cause pain, infertility and bowel problems.

Hypertonus Dysfunctions

2. Vulvodynia:
   - **Symptoms**
     - Severe tenderness and pain with contact to the vestibular area.
     - Severe dyspareunia and intolerance for vaginal exams.
     - Significant urinary urgency and frequency.
     - Vaginal itching.
Hypertonus Dysfunctions

3. Interstitial Cystitis

- Severe, debilitating disease of gradual, insidious onset.
- Severe urinary urgency, frequency and pain.
- May void 20-40 times per day.
- **Cause:** Etiology unknown

Symptoms

- Bladder pain and heaviness.
- Pain in suprapubic region, vagina, perineum and low back.
- Progressively worsening nocturia.
- Sleep deprivation and depression.
- Exacerbations with menstruation and following sex.


- Manual treatment to internal muscle groups found effective.
- HEP: biofeedback, Kegels ex, hip strength and stretches, stress reduction techniques

**Evidence:** Effectiveness of intrarectal coccygeal manipulation in chronic coccydynia patients.

- Most effective with stable coccyx, recent onset, post-traumatic, and low psychosocial factors involved.
- Mildly effective.
Hypertonus Dysfunctions

**Pudendal Nerve:**
- Arises from sacral plexus
- Leaves the pelvis between piriformis and coccygeus
- Hooks around the sacrospinous ligament
- Lesser sciatic notch
- Splits into dorsal sensory (clitoris / penis), perineal and inferior dorsal nerves

**Hypertonus Dysfunctions**

5. Pudendal Nerve Entrapment
- Recent diagnosis, first described in 1987 as “Cyclist’s Syndrome”.
- Nerve pain → PFM dysfunction → urogenital organ dysfunction → local trigger points → diffuse referred pain
- Urinary hesitancy, urgency and frequency; IC; prostatodynia; anal, scrotal, and orgasmic pain; painful sitting.

**Pudendal Nerve**
- Motor innervation to most of the perineum except coccygeus, obturator internus, piriformis and internal anal sphincter.
- Motor innervation to the external anal sphincter.
- Sensory to external genitalia, penis and urethra.
5. Pudendal Nerve Entrapment

- Frequently treated *unsuccessfully* for prostatitis, vulvodynia, endometriosis, hysterectomy, levator ani syndrome, coccydynia, and proctalgia fugax.

Evaluation

- Assess lumbar spine, SI joint, hips
- Lower quarter muscle strength, tone, and length
- Lower quarter neuro screen
- Assess pelvic floor muscles
  - External and internal exam (bilaterally)
    - Sensation
    - Symmetry
    - Tone
    - Strength

Manual Examination

External

- Pelvic clock palpatory assessment.
- Pelvic floor and perineal movement.
- Lift up and in with contraction.
- Slight bulge with cough.
- Bulge and descent with bearing down.
- Clitoral and anal wink reflexes

Internal

- Digital internal palpation
Evaluation

Pelvic Floor Strength (MMT):

- No contraction
- Flicker, with quick stretch.
- Weak squeeze, 2 sec. hold.
- Fair squeeze with minimal lift.
- Good squeeze with minimal lift, repeated.
- Strong squeeze with good lift, repeatable.

Laycock Quantitative Assessment Scale (PERFECT Scale) - Laycock & Jerwood, 2001

- Power = MVC (MMT 0-5)
- Endurance = MVC sustained
- Repetition = # or reps of MVC
- Fast Twitch = # of quick contractions
- Every
- Contraction
- Timed

Evaluation

Biofeedback Assessment

- Baseline — resting for 1-2 minutes
- Endurance — series of 10s contractions, followed by 20s rest.
- Quick Flicks — series of max 1-2s, followed by 4s rest.
- Cough — 3 coughs
- Abdominals isolated from PFM
- Bulge — ability to relax below baseline
**Outcome Measures**

- **Incontinence Impact Questionnaire**
  - Four domains: physical activity, travel, social relationships and emotional health
  - 30-item questionnaire
  - Quality of life measure

- **1 Hour Pad Test**
  - Patient wears Depends, walk x 50 yds, climbing a step, coughing, heel bouncing, sit to stand (all repeated 5x) followed by running hand under running water x 1m.

**Outcome Measures**

- **Bladder Diary**
- **Pelvic Floor Muscle Strength Test**
  - Digital test
  - Graded 0-5
- **Functional Stop Test**
  - Stop the flow of urine.
  - Graded 0-3

**Treatment Goal**

- Normalization of pelvic floor muscles
  - Increase strength.
  - Increase endurance.
  - Increase coordination.
  - Increase patient awareness.
  - Decrease muscle spasm.

**Contraindications to Internal Vaginal Examination**

- Pregnancy
- Active infection (bladder or vagina).
- Up to 6 weeks post-partum.
- Up to 6 weeks post-vaginal surgery.
- Severe atrophic vaginitis.
- Absence of patient agreement and cognitive understanding of procedure.
- Patients less than 18 yrs. old
INTERVENTIONS

I. Manual Therapy & Therapeutic Exercise
   I. Joint Mobilization
   II. Soft Tissue Mobilization
   III. Visceral Mobilization
   IV. Exercise Program
      a. Lumbar stabilization
      b. Aerobic conditioning
      c. Muscle strengthening and flexibility
   V. Postural ed / body mechanics

PT Intervention: Exercise

Pelvic Muscle Rehabilitation:

Instructions:
- PFM isolation (avoid valsalva).
- Draw up and in, lift and tighten.
- “Lift up and in to pubic bone”.
- “Imagine you are lifting up in an elevator, higher and higher”.
- For training descent: “Let go and bulge out, as if passing gas”.

Types of contractions:
- Concentric - lifting perineum up.
- Eccentric - controlled descent.
- Isometric hold
- Bulge out (for hypertonus conditions, to facilitate childbirth and defecation)
- Prolonged hold and “quick flicks”.

General Exercise Recommendations
- Lifting contraction.
- Muscle isolation.
- 8-12 reps / 3x/day
- Teach functional use.
- Pre-contract/hold with coughing, laughing, sneezing and lifting.
PT Intervention: Exercise

Pelvic Muscle Rehabilitation:
Progression:
- Start in gravity eliminated positions.
- Progress to upright and functional positions.
- Overload principle applies!

INTERVENTIONS

II. Biofeedback
- Improved muscle contraction.
- Decreased resting tension, instability, and pain.
- 78% resumed intercourse.
- Results maintained at 6 months.

INTERVENTIONS

III. Electrical stimulation
a) Interferential
b) NMES
c) TENS

IV. Ultrasound
1. Scar pain or adhesions
2. Muscle spasms
3. Swelling (post-op, postpartum)

INTERVENTIONS

IV. Ultrasound
- Application
  - Condom filled with water, lubricated with gel.
  - Condom filled with gel draped over sound head, and lubricated with gel.
  - Detachable sound head, able to be sterilized-applied directly with gel.
  - Through sterile gel sheets.
INTerventions

V. Cryotherapy and moist heat
   "Mr. Frosty": condom filled with ½ ice / ½ alcohol.

VI. Diaphragmatic breathing

VII. Psychosocial support
   - Relaxation techniques/stress mgmnt
   - Psychotherapy / Sex therapy

VIII. Pharmacology and surgery

Case 1: Pro Softball Player

Chief Complaints:
- Constant, aching suprapubic and low back pain.
- Intermittent left LE radicular pain to calf.
- Intermittent vaginal pressure, severe cramping, painful defecation and increased urinary urgency.
- Worse with running and jogging.
- Pain Scale: 6/10 (rest) / 10/10 (activity)

History:
- While catching a football pass four years prior, the pt. felt a sudden sharp vaginal pain which persisted and progressed to the pubic and rectal regions.
- Symptoms have progressively worsened.

PMH:
- Long history of low back pain.
- Treated by chiropractor (x 3yrs), acupuncture and massage therapy with minimal benefit.

MRI:
- (+) L 4-5 HNP

Objective Findings
- Tenderness to palpation: (Severe) pubic symphysis, lower abdom, pirif, levator ani mus. (Mod) lumbar L3-5, sacrotuberous lig, obturator int, sacrococcygeal region.
- ROM: Minimal limitation in trunk ext.
- MMT: R LE – 5/5; L LE – 4/5
- Neural: ANTT L sciatic nerve, myotomal weakness L4-S1, Diminished L DTR
- Structural: R/L Backward sacral torsion
  Left posterior innominate, lumbar rot. right