Introduction to Rehabilitation of Pelvic Floor Dysfunction & Urinary Incontinence

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Course Objectives:

- Identify patients who may have pelvic floor muscles (PFM) dysfunction through screening questionnaire and external palpation
- Provide simple instructions for PFM exercises
- Identify when a patient should be referred to specialized pelvic PT
- List educational opportunities for specialization in pelvic PT for urinary incontinence (UI)
Outline

- Background of UI
- Pelvic floor muscle anatomy
- Underactive PFM and UI definition
- Screening questionnaires and external palpation for underactive PFM dysfunction
- How to instruct patients in PFM exercises
- Scope of practice in Pelvic PT for UI and Education for Pelvic PT specialization
- Questions and answers

Overall Prevalence of UI

Overall prevalence: women 51.1%, men 13.9% (Markland 2011)

![Bar chart showing UI prevalence]

UI Prevalence (Bo 2007)

![Bar chart showing UI prevalence by group]

Overall prevalence: women 51.1%, men 13.9% (Markland 2011)
Psychological Impact

Incontinent women have lower levels of emotional well being

Depressive symptoms are associated with UI

Can result in
- Decreased social activities outside the home or social isolation
- Change in interpersonal relationships and intimacy
- Limited work opportunities – unable to get to bathroom, stress
- Avoidance of exercise or social activities involving exercise activities (dancing and hiking)

Costs

In 2003 - estimated total economic cost of UI in the U.S. - $12.02 billion (Viktrup 2005)

In 2007 - estimated total national cost of OAB with UUI $65.9 billion (Coyne 2014)

Projected 2015 cost - $76.2 billion

Projected 2020 cost - $82.6 billion

Costs

Women with severe UI pay $900 annually for incontinence routine care

Annual direct cost of UI is similar to that for other chronic diseases, such as osteoporosis, Alzheimer’s disease and arthritis (Anger 2006)
Cost are related to

- Absorbent products
- Related medical conditions – UTI, skin, hip fracture
- Placement in nursing homes
- Lost wages
- Cleaning expenses – patient, cloths, rugs, chairs
- Diagnosis and treatment

Associated Muscles of the Pelvis

Synergistic muscles
- (Bo 1994, Jorde 2014)
  - Adductors
  - Transversus abdomenus
  - Gluteals
  - Hip external rotators

Inner core muscles
- (Lee 2011, Arab 2011, Hodges 2007)
  - Transversus abdominis
  - Deep lumbar multifidus
  - Pelvic floor muscles
  - Respiratory diaphragm

Muscles in close proximity / ER
- Piriformis, Obturator internus
External Female Structures

- Urethral meatus
- Intritous
- Perineal body

Layers of the PFM

A combination of slow twitch and fast twitch skeletal muscles
Superficial Genital Muscles

- Ischiocavernosus
- Bulbocavernosus
- Superficial transverse perineal
- Anal sphincters

Perineal Membrane and Sphincter Urethrae
Pelvic diaphragm (Kerney 2004)

Levator ani muscles
- Pubococcygeus (pubovisceral)
- Puborectalis
- Iliococcygeus
- Coccygeus (Ishiococcygeus)

PFM Layers
PFM Layers

Sphincter urethrae
Compressor urethrae
Iliococcygeus

PFM Layers

Urethrovaginal muscle
Puborectalis

PFM Layers

Pubococcygeus
Types of Urinary Incontinence (UI)

Definitions — International Continence Society standard terminology (Haylen 2010)

Urinary incontinence — the complaint of any involuntary leakage of urine

Nocturnal enuresis — the complaint of loss of urine occurring during sleep (this does not include loss of urine on the way to the bathroom).
Stress Urinary Incontinence (SUI)

Definition: Complaint of involuntary loss of urine on effort or physical exertion, or on sneezing or coughing. Occurs with increased intra-abdominal pressure.

Symptoms: Loss of a small amount of urine with exertion — cough, sneeze, lift.

Cause: Pelvic floor muscle weakness or loss of ligamentous support.

Stress Incontinence

Urge Urinary Incontinence (UUI)

Definition: Complaint of involuntary loss of urine associated with urgency.

Symptoms: Loss of urine associated with a trigger — running water, walking by the bathroom, putting the key in the lock, nervousness.

Causes: Uninhibited bladder contractions.
Urge Urinary Incontinence (UUI)
Other names: Overactive Bladder (OAB), overactive bladder syndrome, urge syndrome, urgency-frequency syndrome
Frequency – urinating more than 7 times per 24 hours
Urgency – complaint of a sudden, compelling desire to pass urine which is difficult to defer

Mixed Urinary Incontinence (MUI)
Definition: Concurrent urge and stress incontinence
Symptoms: frequency, urgency, loss of urine with intra-abdominal pressure
Causes: pelvic floor muscle weakness and uninhibited bladder contractions
It appears that mixed incontinence may be a progression and represents more severity of symptoms and condition. (Bump 2003)
More complex types of UI (Haylen 2010)

- Coital UI – leakage during coitus
- Insensible UI – leakage that the individual is unaware of
- Continuous UI – always leaking – like an open faucet
- Leakage associated with urinary retention – previously called overflow UI

Functional Incontinence

Not officially a type of UI

Definition: Loss of urine due to decreased functional mobility and inability to reach the toilet in a timely manner. Usually these patients have some underlying bladder dysfunction also.

Symptoms: slow gait, difficulty with sit to stand transfers, inability to remove clothing quickly

Causes: environment not conducive to reaching the toilet easily, specific muscle weakness and physical disability, general deconditioning
Urinary Dysfunction

<table>
<thead>
<tr>
<th>Storage dysfunction</th>
<th>Overactive bladder – bladder will not store</th>
<th>PFM weakness – outlet too loose</th>
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<tbody>
<tr>
<td>Empting dysfunction</td>
<td>Atonic bladder – bladder will not contract</td>
<td>PFM spasms – outlet too tight</td>
</tr>
<tr>
<td>Retention</td>
<td></td>
<td>Urethral scar and prostate</td>
</tr>
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<td></td>
<td></td>
<td>growth - obstruct outlet</td>
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Pelvic Organ Prolapse (POP)

Cystocele

Rectocele
Pelvic Organ Prolapse (POP)

Normal PFM
PFM is able to contract and relax on command and in response to increased intra-abdominal pressure
Normal urinary, bowel and sexual functioning
Strong or normal PFM contraction with complete relaxation

Underactive PFM (Messelink 2005)
Description - PFM is unable to contract sufficiently and / or when needed.
Symptoms / DX - Urinary or fecal incontinence, pelvic organ prolapse
Signs / impairments – Absent or weak voluntary PFM contraction
Underactive PFM

Description - PFM is unable to relax and may contract during functions such as defecation or micturition

Symptoms / DX - Obstructive voiding or defecation, dyspareunia, pelvic pain

Signs / impairments - Absent or incomplete voluntary PFM relaxation

Overactive PFM (Messelink 2005)

Description - PFM is unable to relax and may contract during functions such as defecation or micturition

Symptoms / DX - Obstructive voiding or defecation, dyspareunia, pelvic pain

Signs / impairments - Absent or incomplete voluntary PFM relaxation

Trigger points of the Perineum (Simons 1998)
Independent Risk Factors for UI

- Vaginal delivery
- Chronic increased intra abdominal pressure
- Surgery
- Age

Look for these issues in patient history

Independent Risk Factors for UI

Vaginal delivery
- Instrument delivery – forceps
- Abnormal presentation (breech, occiput posterior)
- Prolonged active second stage – more than 1 hour pushing
- Birth weight over 8 pounds
- Higher maternal age on first baby
- 3 to 4 births or more than 2 c sections
- Weaker collagen, poorer connective tissue
- Third degree tear
- Episiotomy

Birth Trauma
Birth Trauma

Compression and distraction
- Pudendal nerve – compression at the pudendal canal, stretch injury with pushing
- PFM compression at the pubic arch, over stretching and elongation with pushing
Independent Risk Factors for UI

Chronic increased intra abdominal pressure
- Obesity – BMI over 30, weight reduction is assoc with improved sx in morbidly obese women (Bump 1992)
- Chronic cough, asthma, smoking increases UI sx (Bump 1994)
- Repetitive lifting
- Chronic constipation/straining – fecal impaction is assoc with UI, clearing impaction helps decrease UI
- Exercise routines - high impact may contribute to supportive dysfunction and UI even in fit young women (Nygaard 1994)

Independent Risk Factors for UI

Surgery
- Surgical removal of supportive ligaments during hysterectomy
- Surgery resulting in prolapse in another location

Age Changes of the Urinary System

Bladder capacity - Decreased
Bladder urgency - Increased
Nocturnal urine production - Increased
Total urine production - No change
Skeletal sphincter fiber count - Decreased
Smooth muscle sphincter fiber count - No change
Functional mobility - Decreased
Abdominals and PFM

Anticipatory Control of the Local System - Activation of the local system before the load to prepare the vertebral column and pelvis
- Transversus abdominis (Arab 2011)
- Pelvic floor muscles (Bo 1994, Sapsford 2001)
- Deep multifidus
- Respiratory diaphragm (Hodges 2007)

The Relationship between PFM and Abdominal Muscle Function

Co-activation of pelvic floor and abdominal muscles appears to be the normal recruitment pattern (Sapsford 2001)
Transversus abdominis (TrA) contraction is preceded and enhanced by active PFM contraction (Critchley 2002)
Instructing PFM contraction facilitates TrA thickness increase during low-abdominal hollowing (Critchley 2002)

PFM and Abdominal Muscles in Dysfunction

Pelvic joint pain, LBP and hip pain may adversely affect contraction of PFM resulting in higher incidences of UI (Pool-Goudzwaard 2005)
UI is associated with LBP in both sexes (Finkelstein 2002)
38% of women with SUI have LBP (Kjohede 1997)
66% of women with recurrent UI after bladder suspension surgery present with LBP (Kjohede 1997)
Screening for PFM dysfunction

3 questions to ask all PT patients
- 1. Do you ever leak urine or feces?
- 2. Do you ever wear a pad because of leaking urine?
- 3. Do you have pain during intercourse?

Look for risk factors listed above
- Vaginal delivery
- Chronic increased intra-abdominal pressure
- Surgery
- Age
- LBP or CPP

Incontinence Severity Index
(Murphy 2006)

How often do you experience urinary leakage?
- 0. Never, I do not leak urine
- 1. Less than once a month
- 2. A few times a month
- 3. A few times a week
- 4. Every day and/or night

How much urine do you lose each time?
- 0. None, I do not leak urine
- 1. Drops
- 2. Small Splashes
- 3. More

Multiply scores: slight = 1-2, moderate = 3-6, severe = 8-9, very severe = 10-12

Verbal Instruction of PFM Contraction

Is ineffective in generating urethral closure force in 51% percent of patients (Bump 1991)

Results in adverse bearing down in approximately 15% of patients (Bo 1988)

Approx 80% can do a PFM contraction (Henderson 2013)
Feedback on PFM Contraction

- From the pelvic PT or other specialist
- From a machine – EMG, US
- Self assessment and feedback techniques
- Therapist palpating PFM contraction externally

Instructing the patient in self-assessment

Look
Feel external
Feel internal
Intercourse

Perineal tissue should go in toward the head
Stop is tissue is going down toward the feet

Instructing the patient in self-assessment

Look: Using a mirror, watch the perineal body move into the body during a contraction. A correct contraction occurs with inward movement (toward the head) of the anus.
Instructing the patient in self-assessment

Watch penis move upward (as an elephant trunk)
Pull the turtle’s head back in (if the penis is short)

Instructing the patient in self-assessment

Palpate externally: Palpate the perineal body or anus during a contraction. It should move into the body. This can be done on the skin, underpants, or sometimes through thin pants in an exercise class.

Instructing the patient in self-assessment

Palpate internally: place a finger into the vagina to feel the contraction. Finger should be in about half its length and touching one of the side walls.
Partner exercises: Ask a partner for feedback about pelvic contractions felt by the penis during intercourse.
Therapist External Palpation of the PFM contraction

Can confirm moderate to strong inward PFM contraction
If no movement is felt or the tissue moves downward – progress to more advanced forms of evaluation including
- Internal palpation
- Imagine ultrasound
- EMG

Place index finger very lightly on the perineal body or anus during a contraction.

Teaching PFM Exercises

Key words to use – pull up and in
- Females - pinch your rectum, hold back gas
- Males – stop your pee, pull the turtle head back in, hold back gas
Do not hold your breath (ideally contract the PFM on exhale)
Do not bear down
Do not have the patient practice stopping urination - may increase retention, is not always related to PFM contraction (Sapsford 2012), and may be frustrating
PFM Contraction

PFM Exercises
  • Isolated, strength and endurance exercises
  • Functional, coordination exercises
  • Overflow exercises

Isolated PFM Strength and Endurance Exercise Prescription
  • Overload principle of training, unclear best method (Dumoulin 2011)
  • Duration – number of seconds holding (3 to 10 sec)
  • Rest – double work in weak muscles (5 to 10 sec)
  • Repetitions - usually 10 to 30 in a row
  • Sets per day – BID or TID, at least 45 reps per day
Isolated PFM Strength and Endurance Exercise Prescription

Position
- Supine or side lying (easiest)
- Sitting
- Standing (hardest, but most functional)
- Neutral spine best

Focused, not distracted
Isolated, no overflow
Keep breathing

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Isolated PFM Strength and Endurance Exercise Prescription

### EASY
- Duration – 2 to 3 seconds
- Rest – 4 to 6 seconds
- Repetitions – 10 to 15
- Sets per day – 2 to 3
- Position – lying down

### ADVANCED
- Duration – 8 to 10 seconds
- Rest – 10 seconds
- Repetitions – 20 to 30
- Sets per day – 2
- Position – lying down, sitting and standing

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Kegel Kat App

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Functional, Coordination Exercises

Breathing
- Diaphragm breath – expand abdomen, PFM relax slightly
- Exhale - PFM contraction upward and abdominal contraction inward

Squeeze before you sneeze, cough, laugh
Add movement – lift the arm/ leg, reach, bend, lift, plank or other abdominal exercises, wt training
Overflow Exercises

- When patients are very weak or confused about PFM contraction
- Make sure to palpate externally to confirm no bearing down
- Adduction – ball squeeze
- External rotation – push out against band around knees
- Gluteals - bridge

Summary

- Recognizing risk factor for UI
- Screening questionnaire
- Assessment – patient or therapist
- PFM exercises – three types

- Recheck PFM symptoms and exercises in one week and modify (harder or easier) as needed
- Exercises need to be continued aggressively 4 to 6 month for full recovery – maintenance
Refer Patient to Specialist if:

- Patient with neurological conditions and UI
- Symptoms have gotten worse or new symptoms occur
- No changes in symptoms after one month of focused training

Complete PFM Examination (Laycock 2008)

History and review of symptoms

Bladder diary – record of intake and output, occurrence of UI and circumstances
Complete PFM Examination

Functional mobility assessment if needed

Complete PFM Examination

Internal PFM examination by training PT

Complete PFM Examination

EMG assessment
Functional Goals for UI

Patient will be able to exercise for 30 min. without leaking OR with XX% decreased UI

Patient will have decreased number of nighttime voids from ___ # to ___ #; allowing improved sleep and decreased fall risk

ADL not limited by UI / urgency / frequency

Exercise not limited by UI / urgency / frequency

Overall treatment of PFM
weakness / underactive PFM

General health
- Medical treatment of limiting factors / coexisting conditions
- Generalized exercise program

Functional mobility
- Walking/aerobics
- Gait training
- Environmental modifications
- ADL training/modifications
Overall treatment of PFM weakness / underactive PFM

Relationship with abdominals
- Transversus strengthening
- Body mechanics

Bladder training

Pelvic floor strengthening
- Individualized pelvic floor exercise program
- Simple biofeedback
- Pressure biofeedback, EMG biofeedback
- Grades 0-2
  - Facilitated exercises
  - Electrical stimulation
- Grades 3-5
  - Vaginal weights
Overall treatment of PFM weakness / underactive PFM

Pelvic floor strengthening

Grades 0-2
- Overflow exercises
- Electrical stimulation

Grades 3-5
- Vaginal weights
- Upright and functional exercises
Historical Perspective on Women’s Health in PT

• Women’s health taught in physiotherapy undergraduate education in Europe 1970s
• Section on Women’s Health (SOWH) of the APTA founded by Elizabeth Noble (Australia) 1977
• Kari Bo (Norway) and Jo Laycock (UK) publishing research on the PT role in UI 1980s
• First SOWH courses on women’s health early 1990s

World Confederation of Physical Therapists (WCPT) recognizes the International Organization of Women’s Health Physical Therapists (IOPTWH) under the direction of its first president Jill Boissonnault a PT from the US -1999

• APTA guide to PT practice
• Certificate of achievement in pelvic PT – CAPP-pelvic 2006
• Herman and Wallace Institute established and began offering a certificate – 2006
• Certificate of achievement in pregnancy and post-partum – CAPP-OB 2008
Historical Perspective on Women’s Health in PT

International Continence Society established the Physiotherapy Committee – 2008

Women’s health certified specialist (WCS) – 2009

Scope of Practice of Women’s Health Physical Therapy

- Pelvic Physical Therapy - Gynecological, urological, gastroenterological dysfunction
- Obstetric musculoskeletal pain and dysfunction
- Lymphedema, swelling management, and post-op breast surgery rehabilitation
- Osteoporosis, female athlete, and other diagnosis with high female incidence

Pelvic Physical Therapy - Gynecological, urological, gastroenterological dysfunction

Treatment of pelvic floor muscle (PFM) disorders in all populations including geriatric, pediatric, neurological, and orthopedic
- Underactive PFM – UI, FI, POP
- Overactive PFM - PFM spasm / trigger points, episiotomy / surgical scars, fecal / urinary retention, prostatodynia

Treatment of pelvic pain disorders
- Musculoskeletal pain – coccyx, CPP, pudendal neuralgia
- Abdominal / organ based pain – dysmenorrhea, PMS, endometriosis, adhesions
- Perineal pain – vulvodynia, vaginismus, anismus
Pelvic Physical Therapy - Gynecological, urological, gastroenterological dysfunction

- Treatment and education on sexual disorders – pain and lack of orgasm
- Community education on self care and PT interventions (UI and pelvic pain)
- Professional education – MD, RN, PA, NP, CNM, PT, OT (and more)
- Research on PT interventions in gynecology, urology and gastroenterology

Overlap with many other specialties

- Orthopedic
- Geriatrics
- Pediatrics
- Neurology

Advancing Education in Pelvic PT

www.womenshealthapta.org – Section on Women’s Health APTA
http://pelvicrehab.com/ – Herman and Wallace pelvic rehabilitation institute
www.phoenixpub.com – Phoenix Core solutions, Jan Hulme
www.bcia.org – Biofeedback Certification International Alliance
www.bfe.org – Biofeedback Federation of Europe
http://www.juliewiebept.com – Julie Wiebe
Basic Professional books


Patient Education Books


Toilet Mechanics

Reaching to wipe – trunk rotation, arm ROM
Sitting – may be difficult to fully relax if hip flexion is limited or sitting is painful
Standing – may be difficult if hip extension is limited
Pushing for BM – may increase LBP
Questions

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