Strategies to Address Urinary Incontinence
Every Physical Therapist Should Know

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Presentation recorded on March 30, 2017
FACTS AND STATISTICS

- **Urinary Incontinence (UI)** is a stigmatized, underreported, under-diagnosed, under-treated condition that is erroneously thought to be a normal part of aging.
- **Social Costs of UI** are high and even mild symptoms affect social, sexual, interpersonal, and professional function.
- UI affects 200 million worldwide.
- **2/3 of men and women age 30-70** have never discussed bladder health with their doctor.

www.NAFC.org

FACTS AND STATISTICS

- **53% of homebound older persons** are incontinent.
- **UI is one of the 10 leading diagnoses among homebound persons.**
- More than half of all residents in nursing homes are incontinent.
- It is the second leading cause of institutionalization.
- The elderly’s need for frequent toileting and/or urgency to void increases the risk of falls by as much as 26% and bone fracture by as much as 34%.

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WHAT IS INCONTINENCE?

- **Involuntary loss of urine, flatus, or feces**

**Types of Incontinence**
- Stress Incontinence
- Urge Incontinence
- Mixed Incontinence
- Retention Urinary Incontinence/Overflow Incontinence
- Functional Incontinence
- Anal/Fecal Incontinence

**Stress Urinary Incontinence (SUI)**

- Associated with an increase in intra-abdominal pressure
  - Cough, sneeze
  - Lifting
  - High-impact exercise
- Pelvic floor muscles are not capable of exceeding the downward force on the bladder
URGE URINARY INCONTINENCE (UUI)

- Associated with a strong, sudden, uncontrollable urge to urinate
- Triggered by environmental cues
- “Overactive Bladder” (OAB): strong urge with or without incontinence
- Often treated with medication or neuromodulation/sacral stimulation
- Worsened by bladder irritants, restricting fluids, frequent urination

COMMON TRIGGERS

- Hearing running water
- Arriving home/unlocking the door
- Seeing the toilet/walking into the bathroom
- Change in temperature: warm to cold
BLADDER IRRITANTS

- Caffeine
- Carbonated Beverages
- Acidic Beverages
- Spicy Food
- Alcohol
- Artificial Sweeteners
- Nicotine

NORMAL BLADDER FUNCTION

- Capacity: 400-600ML
- Bladder filling: 15 drops per min
- First sensation to void: 150-200ML
- “Micturition” or urination usually at 400ML
- Normal frequency:
  - 4-8 times per day
  - 0-1 times per night
  - Over age 65: 1-2 times per night
- In infants: Sacral Micturition Reflex S2-4
- Gradual control by higher centers in the frontal lobe of cerebral cortex
NEUROLOGICAL CONTROL: STORAGE

- **Sympathetic Nervous System**
- **Detrusor-Sphincter Reflex**:
  - **Afferent Firing of the Pelvic Nerve**
  - **Stimulating the Hypogastric Nerve (T10-L2)**
  - **Inhibitory Signals to the Bladder and Excitatory Signals to the Internal Urethral Sphincter (IUS)**
- **Guarding Reflex**:
  - **Bladder Afferents Fire Efferents at Onuf’s Nucleus (S2-4) to Increase Activity of External Urethral Sphincter (EUS) and Pelvic Floor**
- **Pontine Micturition Center allows Storage by Overriding Spinal Reflexes**

NEUROLOGICAL CONTROL: EMPTYING

- **Parasympathetic = Peeing or Micturition Phase**
- **Stretch Receptors Reach Threshold and Strong Desire to Void is Sent from Bladder to Sacral Micturition Center to Brainstem to Cortex**
- **Cerebrum Determines If Voiding Is Appropriate**
- **The Pontine Micturition Center Sends an Inhibitory Signal to the Sympathetics and Stimulatory Input to the Parasympathetics**
- **There is Relaxation of the External Urethral Sphincter**
- **Secondary Reflex Initiated by the Flow of Urine Stimulates the Detrusor/Bladder Further to Complete Emptying**
MIXED AND OVERFLOW INCONTINENCE

• **MIXED INCONTINENCE**
  • Symptoms include those of stress and urge incontinence

• **RETENTION INCONTINENCE/OVERFLOW INCONTINENCE**
  • Urinary leakage occurring when the bladder fills past its capacity
  • Sometimes associated with neurological disorders

FUNCTIONAL INCONTINENCE

• **FUNCTIONAL INCONTINENCE**
  • Occurs with impaired mobility impacting the ability to get to the toilet in a timely manner, or manage buttons/zippers

• **ANAL INCONTINENCE**
  • Fecal incontinence: involuntary leakage of stool
  • Anal incontinence: involuntary leakage of stool or gas
FUNCTIONAL INCONTINENCE

- INABILITY TO GET TO THE BATHROOM IN TIME DUE TO PHYSICAL LIMITATION
  - ORTHOPEDIC SURGERY: THR, TKR, ETC
  - ARTHRITIC JOINTS AND DIFFICULTY WITH ZIPPERS, BUTTONS, ETC
- CAN BE MANAGED WITH CLOTHING ADAPTATIONS, TOILET ADAPTATIONS

VOIDING DIARY

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<th>Date:</th>
<th>Time Voided</th>
<th>Toilet</th>
<th>Leakage</th>
<th>Product/Clothing</th>
<th>Activity at Time of Leakage</th>
<th>Fluid Intake</th>
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BE A DETECTIVE/ASK THE QUESTIONS

- OFTEN CLUES IN MEDICAL HISTORY
- IN SCREENING AND ASSESSMENT
- USUALLY UNDER-REPORTED
  - SOCIETAL “TABOO” TOPIC
  - CONSIDERED NORMAL
  - POOR AWARENESS OF TREATMENT AVAILABLE
- CAN BE PART OF RISK ASSESSMENT
  - RISK OF FALLS
  - DEPRESSION

MEDICATIONS USED TO TREAT INCONTINENCE

- ANTICHOLINERGIC MEDICATIONS: BLOCK ACETYLCOLINE
  - OXYBUTYNIN (DITROPA XL, OXYTROL)
  - TOLTERODINE (DETROL)
  - DARIFENACIN (ENABLEX)
  - SOLIFENACIN (VESICARE)
  - TROSPIUM (SANCTURA)
  - FESOTERODINE (TOVIAZ)
- MIRABEGRON (MYRBETRIQ): RELAXES BLADDER
- SIDE EFFECTS: MOST COMMON DRY MOUTH AND CONSTIPATION
SCOPE OF THE PROBLEM

URINARY INCONTINENCE PERSISTING AFTER CHILDBIRTH: EXTENT, DELIVERY HISTORY, AND EFFECTS IN A 12-YEAR LONGITUDINAL COHORT STUDY

• 7879 WOMEN RECRUITED AT 3 MONTHS POST CHILDBIRTH
• 3763 (48%) RESPONDED AT 12 YEARS
• PREVALENCE OF PERSISTENT UI WAS 37.9%
• AMONG THOSE REPORTING UI AT 3 MONTHS, 76.4% HAD PERSISTENT UI AT 12 YEARS
• OLDER AGE AT FIRST BIRTH, GREATER PARITY, OBESITY/OVERWEIGHT WERE ASSOCIATED WITH PERSISTENT UI

MacArthur, et al 2015
URINARY INCONTINENCE IN WOMEN: PREVALENCE RATES, RISK FACTORS AND IMPACT ON QUALITY OF LIFE

• 1050 FEMALES, 20-80 YEARS, MEAN AGE 48.80 + 11.53 YEARS
• PREVALENCE OF UI WAS 44.6%
  • 31% SUI
  • 47.4 UUI
  • 33.1 MIXED
• 64.7% HAD NOT RECEIVED ANY MEDICAL HELP
• CONSTIPATION, MENOPAUSE, PARITY, FAMILY HISTORY, AND DIABETES WERE ASSOCIATED WITH INCREASED RISK

Sensoy N 2013

URINARY INCONTINENCE IN PHYSICALLY ACTIVE WOMEN AND ATHLETES

• PREVALENCE 28-80%
• MOST WITH HIGH IMPACT ACTIVITY
• TENDENCY TO DISCONTINUE EXERCISE IF LEAKAGE OCCURS; IMPACT ON HEALTHY LIFESTYLE
• PREVALENCE IN EATING DISORDERED ATHLETES SIGNIFICANTLY HIGHER

Goldstick 2014
PREVALENCE IN HIGH SCHOOL GIRLS

• 90 FEMALES BETWEEN 15 AND 18 YEARS OF AGE
• 42% EXPERIENCED SOME FORM OF URINARY LEAKAGE
  • 37.8% SUI WITH COUGHING, LAUGHING OR SNEEZING
  • 23.3% SUI WITH PHYSICAL ACTIVITIES SUCH AS LIFTING, RUNNING, JUMPING OR ABRUPT MOVEMENT
• 16.7% UUI

Dockter et al 2008

URINARY INCONTINENCE IS ASSOCIATED WITH AN INCREASE IN FALLS: A SYSTEMATIC REVIEW

• URG E UI ASSOCIATED WITH A MO DEST INCREASE IN FALLS
• LINK IS LIKELY RELATED TO RUSH TO THE BATHROOM
• POSSIBILITY OF SLIPPING ON URINE
• NOCTURIA IS A SYM PTOM OF OAB:
  • ALTERED SLEEP PATTERNS ASSOCIATED WITH DAYTIME DIZZINESS, DROWSINESS, DECREASED FUNCTION
  • NIGHT-TIME TRIPS TO THE BATHROOM COMBINED WITH POOR LIGHTING, RAPID CHANGES IN BODY POSITION, EFFECTS OF DISTURBED SLEEP
• UI: REDUCED SOCIAL CONTACT, PHYSICAL ACTIVITY OUTSIDE THE HOME, INCREASED SHAME, DEPRESSION

Chiarelli P 2009
Male Urinary Incontinence: Prevalence, Risk Factors, and Preventative Interventions

- Estimated 11% ages 60-64
- 31% in older men
- 16% white males
- 21% African American males
- Community-dwelling men
  - Daily leakage in 30-47%
  - Weekly leakage in 15-37%
  - Only 22% with weekly leakage sought help

Shamliyan TA, 2009

Urinary Incontinence Post-Prostatectomy

- Incidence reported in the literature post-prostatectomy
  - 6%-87% (Fiocamo, et al 2005)
  - 1%-90% (Borgermann 2010)
- Stress, urge or mixed incontinence, or post-void dribble
- Risk factors:
  - Age
  - Pre-existing incontinence/voiding dysfunction
  - Surgical expertise
  - Preservation of the neurovascular bundle (NVB)
  - Damage to the internal urethral sphincter during surgery
IMPACT OF PROSTATECTOMY ON CONTINENCE

- Removal of the prostate and prostatic urethra
- Potential damage to the internal urethral sphincter (IUS)
  - At the bladder neck
  - Smooth muscle, autonomic control
- Re-anastomosis of the urethra

CORE MUSCLES

- Transversus abdominis
- Pelvic floor
- Multifidus
- Respiratory diaphragm
PELVIC FLOOR MUSCLES

- **SLING OF MUSCLES THAT SITS LIKE A HAMMOCK AT THE BASE OF THE PELVIS**
- **FROM PUBIC BONE ANTERIORLY TO THE COCCYX POSTERIORLY, AND LATERALLY TO THE ISCHIUM**
- **SURROUND THE URETHRA, VAGINA, AND RECTUM**

**FUNCTION: 4 S’S**
- **SPHINCTERIC**
- **SEXUAL**
- **STABILITY**
- **SUPPORT**
TRANSVERSUS ABDOMINIS

- Connects to the lower 6 ribs and the superior rim of the pelvis
- Deepest abdominal muscle
- Encircles the trunk

RESPIRATORY DIAPHRAGM AND BREATHING

- Dome-shaped muscle attaching to the ribs and interdigitating with the Transversus Abdominis
- Involved with respiration and increase in intra-abdominal pressure
**MULTIFIDUS MUSCLE**

- Thin strip of muscle connecting from the sacrum at segmental levels
- Multiple attachments to the spinous processes

**BIOFEEDBACK**

- Rehabilitative Ultrasound Imaging
- Surface EMG
- Pressure Biofeedback
**REHABILITATIVE ULTRASOUND IMAGING (RUSI)**

- Evaluation of muscle structure (morphology) and behavior
- Biofeedback mechanism: impact of muscle contraction on associated structures such as the bladder
- Aimed at improving neuromuscular function
- As opposed to diagnostic ultrasound examining the effect of injury or disease

**BIOFEEDBACK: LOW TECH**

- Mirror to view perineum
- Tactile cue
- Stopping flow
  - Not to be done as regular exercise
- Pelvic weights
PELVIC FLOOR WEIGHTS/CONES

- Provides resistance to pelvic floor muscle contraction
- Provides proprioceptive feedback
- Provides visual feedback

Disadvantages
- Functional use of pelvic floor muscles???
- Create tension with prolonged hold???

INTEGRATING THE PELVIC FLOOR/CORE

- The relationship between incontinence, breathing disorders, gastrointestinal symptoms, and back pain in women: A longitudinal cohort study (Smith, et al. 2014)
- Effects of stabilization exercises focusing on pelvic floor muscles on low back pain and urinary incontinence in women (Ghaderi, et al. 2016)
- Postural and respiratory functions of the pelvic floor muscles (Hodges, et al. 2007)
- Postural response of the pelvic floor and abdominal muscles in women with and without incontinence (Smith, et al. 2007)
- The role of lumbopelvic posture in pelvic floor activation in continent and incontinent women (Capson, et al. 2011)
COORDINATION WITH DIAPHRAGMATIC BREATHING

• The pelvic floor muscles work synergistically with the respiratory diaphragm
• Usually needed in activities in which exhalation is dominant
  • Cough, sneeze
  • Lifting
• Pre-activation of the core muscles with strenuous activity or those causing leakage
• Avoidance of breath-holding/Valsalva

STRATEGIES FOR TREATMENT OF STRESS INCONTINENCE

• Incorporation of core principles in ADL and exercise training
  • Rising from a chair, lifting, resisted exercise
• Incorporation of muscle training properties in exercise program
  • Specificity, overload, reversibility
• Progressive resistance
• Balance activities
• Simulation of activities causing leakage with engagement of the core
• “The Knack”
STRATEGIES FOR TREATMENT OF URGE INCONTINENCE

• Urge inhibition/suppression
• Behavioral training
  • Timed voiding: 2-hour intervals or less
  • Changes in routine/neural pathway
  • Dietary changes: eliminating bladder irritants
  • Bowel regimen: the role of constipation

LOWER URINARY TRACT SYMPTOMS (LUTS) IN CHRONICALLY CONSTIPATED WOMEN

• 161 Constipated women
• 162 Healthy female volunteers
• LUTS more common in the constipated group
  • Urinary frequency: 34% vs 14%
  • Nocturia: 31% vs 8%
  • Urinary Urgency: 53% vs 21%
  • Incomplete Emptying: 24% vs 9%
• UI: 21% vs 5%

CONSTIPATION, FECAL INCONTINENCE, AND OVERACTIVE BLADDER

• Common Embryological origin
• Common motor nerve supply
• Constipation is a common side effect of pharmacological treatment of OAB
• Raised toilet seats and the recto-anal angle
• Bladder pressure with full rectum

URG E SUPPRESSION/INHIBITION

• Deep Breathing
• Pelvic Floor Muscle Contraction/GLuteal and Adductor Overflow
• Pressure over the perineum
• Distraction
• Timed Voiding
DOES CENTRAL SENSITIZATION HELP EXPLAIN IDIOPATHIC OVERACTIVE BLADDER?

• A VARIETY OF CHRONIC PAIN DISORDERS SHARE ATTRIBUTES OF OAB
• TREATMENT OF OAB AND URGE INCONTINENCE HAS ASPECTS OF NEURAL CALMING


WARNING: BAD HABIT #1

• “THE HOVER”
  • GLUTEAL AND ADDUCTOR MUSCLES CREATE OVERFLOW INTO THE PELVIC FLOOR
  • PELVIC FLOOR MUSCLE CONTRACTION INHIBITS A BLADDER CONTRACTION
  • “HOVERING” TO URINATE REQUIRES BEARING DOWN TO INITIATE URINATION AND UN-TRAINS THE PROTECTIVE MECHANISM/INHIBITORY REFLEX
  • DIFFERS FROM A DEEP SQUAT COMMON IN OTHER CULTURES

Mama Said, Mama Said – She always said that if you don't know the toilet, don't sit on it. Some call it hovering

www.etsy.com
WARNING: BAD HABIT #2

- **Frequent Urination/Reduced Fluid Intake**
  - Bladder accustoms to smaller volume
  - May cause urinary frequency and urgency
  - Bladder’s role is to store urine: keeping the bladder empty is not the same as continence
  - Reduced fluid intake = more concentrated urine; more irritating to the bladder

OTHER CONSIDERATIONS

- Urinary Tract Infection can be a sole cause of urinary incontinence
- Lower extremity edema/dependent edema can result in an increase in nocturia
- Pharmacological treatment of urinary incontinence may have a side effect of cognitive impairment
IN CONCLUSION…

• Treatment of Urinary Incontinence is a common condition, but often left unaddressed/unreported due to embarrassment, lack of awareness of available treatment, or sense of normalcy.

• UI symptoms are present in all areas of PT practice.

• Behavioral and exercise advice can be extremely powerful.

• Emphasis/inclusion of pelvic floor function in core training, sports medicine, home health, etc. is vital in “optimizing movement to improve the human experience.”

• If you need to find a pelvic PT: http://www.womenshealthapta.org/pt-locator/

REFERENCES


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