Pediatric Incontinence
A Family Affair

Objectives
1. Understand common types and causes of incontinence in children
2. Gain a basic knowledge of the normal development of continence in children
3. Understand what is needed for an evaluation of this client and treatment approaches to be used with this population
4. Have a greater interest in pursuing this specialty area

Pediatric Incontinence: A Family Affair Outline

I. Types of Pediatric Voiding Problems
II. Pelvic Floor Anatomy
III. Physiology of Gaining Bladder Control
IV. PT Evaluation and Treatment
V. Q & A

Most common pediatric voiding problems
- Overflow incontinence/voiding postponement/"lazy bladder syndrome"
- Urinary retention
- Urge incontinence
- Stress incontinence
- Bladder-sphincter Dyssynergia
- Diurnal enuresis
- Nocturnal enuresis
- Giggle enuresis
Overflow Incontinence/Postponement/"Lazy Bladder", cont'd

- Bladder distends too much
- Children use withholding postures
- Leads to vesicourethral reflux (VUR) and recurrent UTIs
- Common in kids w/ADHD and ADD
- Constipation also commonly seen with this type of dysfunctional voiding

Constipation & DI

- DI = Detrusor Instability (bladder spasms)
- Pressure from full rectum on bladder neck and urethra
- Can either be CAUSE of DI, or may be caused by DI:
  - Cause OF detrusor instability – pressure from overfilled rectum stimulates uninhibited detrusor contractions, also stimulates reflex relaxation of urinary sphincters -> urinary incontinence

Urinary retention

- Presents with: inability to allow urine to pass, abdominal pain, recurrent UTIs
- Most common cause is due to abnormally high tone in the pelvic floor muscles
- Also caused by PFM dysynergia
- Urethral strictures (scar tissue)
- Post-surgical trauma

Urge Incontinence

- Loss of urine with strong sensation of need to void
- Most common form of functional incontinence in children
- Characterized by:
  - Frequent voiding
  - Higher rate of UTIs
  - Holding maneuvers
  - Crossing legs, dancing, squatting, wiggling, Vincent's curtsy (heel presses into perineum)
Stress Incontinence
- Usually combined with overflow incontinence
- Involuntary loss of urine with physical exertion
  - Playground activities are most common in kids
  - Coughing, sneezing, etc.
- Increased abdominal pressures
- Possible malfunction of the urethral sphincter

Bladder-sphincter Dyssynergia
- Staccato voiding (intermittent PF and sphincter activity during voiding)
- Higher post void residual
- Frequent voiding (bladder capacity is usually NL)
- Decreased urine flow coinciding with rise in bladder pressures
- Failure to maintain relaxation of PF mm throughout emptying phase

Diurnal Enuresis
- Occurring without any other voiding symptoms
- Intense concentration on activity they are engaged in at the time of leakage
- Generally are not bothered by the damp/wet underclothing or odors
- Assess age, maturity, motivation; may have other immature habits
- Often have significant psychological factors present
  - Family dynamics, school issues, abuse

Giggle Incontinence
- Urinary leaking with laughter, complete loss of bladder contents, or nearly complete loss
- Usually in 12-16 yr olds (but can occur at any age)
- Laughter causes detrusor instability – treat for detrusor instability, and this type of incontinence will resolve

Nocturnal Enuresis
- Incontinence occurs during sleep
- Primary and Secondary types - secondary is easier to treat, but 90% are primary
  - PRIMARY - have never experienced night time dryness for greater than 2-3 months (w/o treatment); physical exam is NL and negative UA
  - SECONDARY - child will stop bedwetting and be dry for 5 months or longer, then resumes BEDWETTING IS NOT AN ILLNESS!!

Nocturnal Enuresis, cont’d
- Prevalence
  - 5-7 million in US, boys 50% more likely than girls
  - 10% are 6 yr olds and older, and spontaneous resolution rate is 15% for each yr thereafter
  - 1-3% of 18 yr olds are bedwetters
  - 10-25% of bedwetters also wet during the day and may also have problems controlling bowels
  - 77% of bedwetting children had 1 or both parents that were also bedwetters
Nocturnal Enuresis, cont'd
- Causes of primary enuresis
  - Delayed development or delayed maturation
  - Small capacity bladder – may also display frequent daytime voiding habits
  - Stronger than NL bladder contractions
  - Genetics – 40% more likely to be a bedwetter if 1 parent had it, but 77% more likely if both were
  - Sleep disorders – if CNS is not fully matured, then arousal from sleep will be impaired
  - Antidiuretic hormone dysfunction (ADHD) – must treat this first to be successful in treating the bedwetting

Nocturnal Enuresis, cont'd
- Effects of bedwetting
  - Low self esteem
  - Anger
  - Frustration/feelings of failure
  - Shame/humiliation
  - Feelings of guilt
  - Becoming anti-social (feel different than peers, embarrassed)
  - Not just the bedwetter, but also the parent, possibly siblings will experience these effects

Pelvic Floor Anatomy
- 5 layers of tissues
  - 3 layers = muscular tissue (diaphragms)
    - Superficial perineal space -> urogenital diaphragm -> pelvic diaphragm
  - Perineum consists of: genitalia, anal triangle, perineal body, and the urogenital triangle
  - Urogenital triangle has 3 muscle layers – 1st layer consists of superficial transverse perineal m., bulbocavernosus, and ischiocavernosus, and is made up of primarily fast twitch fibers (fast response to get reflex initiated quickly)

Pelvic Floor Anatomy, cont'd
- 2nd layer of Urogenital Triangle consists of the deep transverse perineal m. and the sphincter urethrae (voluntary control of urination)
- Pelvic Diaphragm
  - 3rd muscle layer – deepest of striated muscles
  - Collectively termed as the Levator Ani muscles
  - Function = elevation of the pelvic floor and to resist intra-abdominal pressures
  - Levator Ani mm = pubovaginalis, puborectalis, iliococcygeus, and the coccygeus

Pelvic Floor Anatomy, cont'd
- Fourth layer of muscle is smooth muscle
  - Consists of:
    - Internal urethral sphincter – smooth m., sympathetic innervation
    - Intrinsic urethral sphincter – striated type I w/pudendal and sympathetic innervation
    - External urethral sphincter – striated type II innervated by the perineal branch of the pudendal nerve

Pelvic Floor Anatomy, cont'd
- Fifth layer is called the endopelvic fascial diaphragm
  - Function is to anchor the fallopian tubes and uterus to the pelvic bowl
Pelvic Floor Anatomy, cont'd

- Urinary tract consists of
  - Lower urinary tract (LUT) = bladder, urethra, internal & external sphincters
  - Upper urinary tract (UUT) = kidneys, ureters
  - Bladder = detrusor muscle
  - Trigone = smooth muscle at the base of the neck of the bladder

Physiology of Gaining Bladder Control

- Increasing bladder capacity between ages 1-2 ~ a total increase of 400% in first 5 yrs
- Voluntary voiding control starts at about age 2-3 (varies in different studies, some as early as 1 yr old)
- Adult pattern of urinary control occurs around age 4-5
- Awareness of bladder sensation, and ergo the control of bladder, begins around age 1-2

Physiology of Gaining Bladder Control

- Complex system of neurophysiologic mechanisms, involving the peripheral sympathetic, parasympathetic, and somatic nervous systems
- System is controlled by interactions between spinal cord micturition center, brain stem, midbrain & higher cortical centers
- Voiding occurs when:
  - Sphincters relax as the detrusor (bladder) contracts and pelvic floor muscles are relaxed
  - Sphincters and PF mm must remain relaxed until void is complete

Physiology of Gaining Bladder Control

- Control is the reverse – contracting PF mm also contracts the external sphincter, thereby relaxing the detrusor contraction
- Continence requires an intact nervous system and urinary system
- Also requires full cognitive abilities (awareness of full bladder and identify proper place to void), and physical ability to get there and get self undressed
- Full control = ability to stop & start urinary stream, voluntary relaxation of external sphincter to initiate void, and be able to inhibit a bladder contraction from the cortical level

Physiology of Gaining Bladder Control

- Voiding Cycle (by age 12 = that of adult)
  - Storage phase – bladder fills via ureters, and bladder is a low pressure reservoir w/continence maintained by the bladder outlet (its pressure is always greater than the bladder pressure)
  - Transition Phase – stretch receptors in bladder wall are activated, sending sensation of urge/bladder fullness, voluntary contraction of PF mm will inhibit sphincter relaxation and keep the trigone closed until child has transported self to the bathroom

Physiology of Gaining Bladder Control

- Emptying Phase – requires voluntary relaxation of PF mm to relax sphincters, allowing trigone to open and the bladder outlet to relax, simultaneously allows the bladder to contract and stay contracted until bladder is empty.
PT Evaluation & treatment

- **Pre visit questionnaires**
  - to be completed by the parent
  - History of problem – when?, how long?, how many leaks per day? Per night?, how many voids per day & night?
  - Bladder diary/log
  - Other treatments to date

PT Eval & Treatment, cont’d

- **Initial visit**
  - Thorough history (includes any pre visit questionnaires)
  - Informed consent – either written or verbal, but must be completed before the physical examination
  - Parent must be present for the entire session
  - Explanation of what will happen after taking the history (educate both the parent and the child on the physical exam part)

PT Eval & Treatment, cont’d

- **Physical Examination**
  - Screen for flexibility, tone issues, strength (especially trunk and LE’s), posture
  - Perineal exam: skin, resting position, visual observation of contract/relax, cough/valsalva response, anal wink reflex
  - Muscle testing of PF mm
    - NO INTERNAL exam
    - Anal reflex testing
    - Other sensory testing

PT Eval & Treatment, cont’d

- **Physical Exam, cont’d**
  - sEMG evaluation/assessment (biofeedback) – test on an extremity first as it helps the child to understand/process the concept later on PF mm
    - Baseline rest
    - Fast twitch/phasic contractions
    - Slow twitch/tonic contractions
    - Recruitment/relaxation patterns

PT Eval & Treatment, cont’d

- **Biofeedback, cont’d**
  - Invite parent to watch as electrode(s) is/are placed on child
  - Reinforce what child is feeling (in their own words) as they correctly perform a PF contraction
PT Eval & Treatment, cont’d

- **Assessment**
  - Determine type of voiding dysfunction
  - Educate parent/child on diet/fluid intake, NE voiding patterns, bladder irritants, NE voiding posture/positioning

- **Plan**
  - Explain to parent how often for the sessions (typically 1x/week), duration of visits (1st 3-4 sessions weekly, then 2x/month, then 1x/month, for a total of 8 visits), length of each visit, parental responsibilities

PT Eval & Treatment, cont’d

- **Goal setting** – should include input from parent and child, be specific, be functional, be reasonable
- Explain what to expect for next visit, and what needs to be completed by child (and parent) by then.

---

PT Eval & Treatment, cont’d

- **Education** – may or may not get to this on 1st day
  - Toileting: posture, feet supported, wipe from front to back
  - PF exercises
  - Breathing – use of blow toys
  - Bladder stimulation (tapping on bladder)
  - Valsalva

PT Eval & Treatment, cont’d

- **Techniques used to teach PF m. ex’s**
  - Begin w/education of muscle location, function, types of muscles (more for parent, or older child)
  - Imagery: “up & in”; “lift & hold”; “squeeze”, “hold back a fart”, “pull up toward your belly button”; “pucker up your bottom”
  - Have the parent observe the contraction on the child; have the child watch in a mirror, or feel w/their hand (over their underclothing)

---

PT Eval & Treatment, cont’d

- **Exercise Guidelines**
  - Should be based on evaluation and functional abilities (and parental availability)
  - Both types of muscles need to be worked WITH overload
  - Hold/relax ratio of 1:1 or 1:2 (5 sec contract w/5 or 10 sec relax) for children <10 y.o.
  - Frequency of 1-2x/daily
  - Begin w/gravity ASSISTED (supine, bridging) and progress to functional positions, then movements
PT Eval & Treatment, cont’d

- Treatment for Nocturnal Enuresis

  - **Reassurance** – child needs to know that this is **NOT THEIR FAULT**, the body just isn’t working right for them right now!
  - Night waking – child wakes on their own (with or w/o the aid of an alarm), parent wakes the child; child must locate bathroom on their own; continue until child is able to awaken quickly at first rousing, for 7 consecutive days
  - Bladder control training – bladder awareness; withhold urges for longer and longer times

- Dry-bed training (charts, stickers, timed awakenings)

- Conditioning therapy (alarm system)

- Pharmacology

Using rewards – after treatment sessions (great motivator), and from parents when child succeeds at being dry

- Books/Aides – pottyrd.com
  - bedwettingstore.com
  - HDIS.com (for ordering pull-ups)
  - “Do Little Mermaids Wet the Bed?”
  - “Dry All Night”

Questions??

THANK YOU!