

Pediatric Enuresis

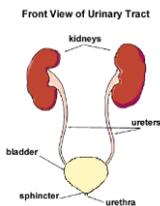
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Introduction

- ▶ Developing Continence
- ▶ Types of Voiding Disorders
- ▶ Attention Deficit Hyperactivity Disorder
- ▶ Treatment

Easy Anatomy



Early Function

- ▶ Normal Development of bladder and sphincter control
 - First 2–4 weeks: once/hour
 - At 6 months, decreases to 10–15 times/day
 - At 1 year, decreases to 8 – 10 times/day and voided volumes increase 3–4 times
- ▶ Bladder volume increases 30 mL per year until puberty
- ▶ Bladder volume: Age in years plus 2 oz
- ▶ <2 years: 2 X years of age + 2
- ▶ >2 years: Age in years/2 plus 6 ounces

Normal bladder physiology

- ▶ Between age 1–3 there is cortical inhibitory pathway to and from the brain, allowing control of the detrusor and the sphincter
- ▶ Child can sense bladder fullness
- ▶ Voluntarily initiate or inhibit the detrusor contraction, thus able to hold and void at will

Voiding Dysfunction

- ▶ Symptoms
 - Urgency
 - Frequency
 - Incontinence
 - UTI
- ▶ Self Esteem
- ▶ Misconceptions of parents and teachers and PCPs
- ▶ Association with ADHD

Pediatric Voiding Dysfunction

- ▶ Most common chief complaint assessed in the pediatric urology outpatient environment, accounting for 20–40% of visits.
- ▶ Children rate wetting their pants as the third worst thing that can happen to them.
- ▶ Incidence is between 5–10 % of school aged children



Voiding Dysfunction

- ▶ Neurogenic
- ▶ Non Neurogenic
- ▶ Anatomic Abnormalities as in Posterior Urethral Valves
- ▶ Associated with UTI, urinary retention and VU Reflux



Voiding Dysfunction

- ▶ Overflow incontinence
- ▶ Detrusor Instability causing frequent involuntary voiding, incomplete bladder emptying and leaves the child at risk for urine stasis, UTI and reflux
- ▶ Constipation
- ▶ Staccato voiding/pelvic musculature causing prolonged voiding time and PVR



Etiology – Behavioral

- › Habit Disturbance
- › “Busy Little Girl”
- › ADHD
- › Sexual abuse
- › Mild delay of the CNS– micturition reflex
- › Inappropriate toilet learning



Voiding History

- › Family Hx: Neuro or congenital abnormalities
- › Previous urinary tract infection and work up
- › Relevant surgery
- › Menstrual and sexual history if appropriate
- › Hematuria
- › Stream
- › Age at which toilet training was attained
- › Bowel Habits



Other History

- › Family History of DES, DV, NE
- › Diet and Use of caffeine
- › Fluid Intake
- › Toilet Training
- › Developmental Milestones
- › Family/Social: order of siblings/recent losses/parental issues/other stressors



Voiding Habits

- ▶ Bathroom school avoidance
- ▶ Not being allowed to use the toilet
- ▶ Dehydration during school hours
- ▶ Positioning/Posture during micturation
- ▶ Proper support under the legs
- ▶ Sitting properly to allow for the free flow of urine- Not squatting
- ▶ Counting to 10



Other history

- ▶ Micturation Charts
- ▶ BM history
- ▶ Dribbling/Dampness
- ▶ Functional bladder capacity
- ▶ Frequency of voiding



Physical Examination

- ▶ Back: Lumbosacral spine inspection
- ▶ Neurologic: Presence of anal dimple, asymmetry of the buttocks, Lower extremity issues, gait
- ▶ Urologic: Examination of the genitalia
- ▶ Skin discoloration, hair growth
- ▶ Presence of full bladder or full sigmoid
- ▶ Observation of urine stream/Urinalysis & C/S
- ▶ Bladder scanning



Treatment

- ▶ Timed Voiding
- ▶ Biofeedback
 - Real Time uroflowmetry
 - Sensors
 - Measures, records and provides immediate feedback about voiding function
 - Invasive, expensive
- ▶ Pelvic floor exercises



Treatment

- ▶ Timed Voiding
- ▶ Double voiding
- ▶ Anticholinergic Therapy
- ▶ Proper Voiding Mechanics
 - Vaginal Voiding
- ▶ The Use of a Vibratory Watch or Timer



Capstone: Timed Voiding

- ▶ 100% (n=96) demonstrated improvement.
- ▶ The mean DVISS score at Visit One was 21.61 (SD 7.4).
- ▶ The mean DVISS score at Visit Two was 5.2 (SD 5.7).
- ▶ Timed Voiding resulted in significant improvement ($t=2.231$, $df=95$, $p<.001$).



Voiding Tool

VARIABLES					
AGE IN YEARS	4-6 (1)	7-11 (2)	12-17 (3)		
SEX	Male	Female (2)			
ETHNICITY	(1)				
	AA (2)	Caucasian (1)	Asian (2) Mideastern (3)	Other (4) Am Indian (5)	
					Pre Post
History of UTI	NO (2)	YES (1)			
Presence of ADHD	NO (2)	YES (1)			
USE OF WATCH	NO (2)	YES (1)			
Urinary Incontinence	NO (2)	YES (1)			
Soaking Factors					
DAY TIME WETNESS	No (2)	Sometimes (3)	Always (3)		
DEGREE OF WETNESS	No (2)	DAMP PANTS (3)	SOAKING (5)		
DIURNAL URINE	NO (2)	1-2 NTS/WEEK (1)	3-5 NTS/WEEK (3)	6-7 NTS/WEEK (5)	
NIGHTTIME WETNESS	N/A (2)	DAMP (3)	SOAKED (4)		
NUMBER OF VOIDS/DAY	1-7 (2)	>7 (1)			
STRAINING	NO (2)	YES (1)			
PAIN	NO (2)	YES (1)			
INTERMITTENT VOIDING	NO (2)	YES (2)			
DELATED VISITS	NO (2)	YES (2)			
DISCHARGE	NO (2)	YES (1)			
CROCODING THE LEGS	NO (2)	YES (2)			
DOES IT HURT	NO (2)	YES (2)			
Constipation	NO (2)	YES (1)			
					TOTAL SCORE

Overall results: The Watch

- ▶ The DVISS change score for the 20% of children who used the watch (n=19) was 18.84 (SD 4.9).
- ▶ The DVISS change score for the 80% of children who did not use the watch (n= 77) was 15.82 (SD 8.45).
- ▶ This difference was not statistically significant (F=2.223, df=2, p = .138).

Capstone Results

- ▶ Girls demonstrated a significantly greater change in score than boys (F=7.036, df=1, p=.009).
- ▶ Children with a previous history of UTI vs. no UTI (F=6.04, df, = 1, p=.016) demonstrated greater change in score.
- ▶ This significance was not evident between gender or UTI history when the groups were evaluated by those who needed medication and those who did not.

Limitations

- ▶ Researcher Bias
- ▶ Results not generalizable
- ▶ Interval between visits not controlled

Summary

- ▶ Timed voiding should continue to be utilized as the first line treatment for children with voiding dysfunction.
- ▶ The watch needs further more rigorous study.
- ▶ A patient/family-friendly mechanism of long term follow-up and coaching may be indicated to evaluate, measure and sustain success.

Nocturnal Enuresis

- ▶ Nocturnal enuresis is the involuntary loss of urine that occurs at night over the age of 5
- ▶ Primary vs Secondary
- ▶ Monosymptomatic
- ▶ Polysymptomatic
- ▶ Incidence: 5-7 million children in the US
- ▶ Most common urologic complaint
- ▶ Males > Females (60-40%)

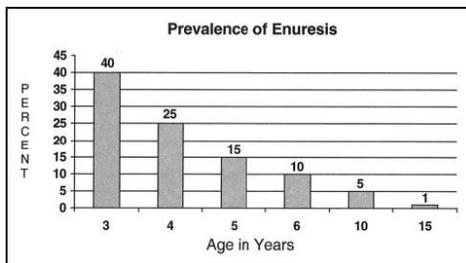
Etiology: Multifactorial

- ▶ Affected children have a lack of vasopressin that normally increases during sleep causing Nocturnal polyuria—this evidence is conflicting
- ▶ Heavy sleepers
- ▶ Bladder capacity/Urodynamics
- ▶ Psychological components/maturational delay
- ▶ Genetics

Etiology

- ▶ Association with OSA
 - ▶ Sleep Disturbances
 - ▶ Obesity
 - ▶ ADHD
-
- ▶ Evidence that suggests that RX with nasal steroid decreased enuresis

Prevalence



Considerations

- › Stressors NOT proven
- › Children with Bedwetting have lower self image than normal kids and kids who have chronic debilitating illness

Questions to ask when taking a history of a child with bedwetting

Question	Significance
To distinguish primary from secondary enuresis: At what age was your child consistently dry at night?	"Never dry" suggests primary enuresis
To distinguish uncomplicated from complicated enuresis: Does your child wet his or her pants during the day?	Positive answer suggests complicated nocturnal enuresis
Does your child appear to have pain with urination?	Urinary tract infection
How often does your child have bowel movements?	Infrequent stools: constipation
Are bowel movements ever hard to pass?	Constipation
Does your child ever soil his or her pants?	Encopresis

History

- Drinking habits
- Parasomnias
- Psychiatric symptoms
- Environment
- Nighttime wetting and toilet practices
- Daytime symptoms
- Longevity and frequency of enuresis
- Abnormalities of urine stream

Adapted from Faber SH, Goblin AZ, Jacobs TH, et al.

History

- ▶ Anatomic problems (posterior urethral valves, spina bifida, ectopic ureter)
- ▶ Diabetes insipidus, Diabetes mellitus
- ▶ Encopresis or constipation
- ▶ Endocrine dysfunction
- ▶ Allergies or asthma
- ▶ Sleep apnea (heavy snoring or mouth breathing)
- ▶ Urinary tract infection
- ▶ Child abuse
- ▶ Urethral, genital, or midline skin abnormalities

Adapted from Faber, Goblin, Jacobs, et al.

Parent questions

- ▶ How many times does your child need to use the bathroom?
 - To distinguish possible functional bladder disorder from nocturnal polyuria: More than seven times a day: functional bladder disorder
- ▶ Does your child have to run to the bathroom?
 - If yes, indicates functional bladder disorder

Questions to ask:

- ▶ Does your child hold urine until the last minute?
Positive response: functional bladder disorder
- ▶ How many nights a week does your child wet the bed? Most nights: functional bladder disorder one or two nights: nocturnal polyuria
- ▶ Does your child ever wet more than once a night? Positive response: functional bladder disorder
- ▶ Does your child seem to wet large or small volumes?
- ▶ Large volumes: nocturnal polyuria

Other questions

- ▶ How have you handled the nighttime accident?
 - Elicits information on interventions that have already been tried; be alert for responses suggesting that the child has been punished or shamed.



Evaluation

- ▶ U/A
- ▶ R/O Diabetes Insipidus (SG > 1.015)
- ▶ Absence of Glucose
- ▶ Urine Culture if symptoms suggest
- ▶ Ultrasonography/VCUG
- ▶ Sleep study



Treatment

- ▶ *Parents' and children's level of motivation
 - Consider age, level of development, self esteem and family function
- ▶ Parents and children's acceptance vs. shame and doubt given the developmental resolution of the issue
- ▶ Dealing with the punishment/acceptance issues



Treatment

- ▶ Motivational
 - Drinking after 7
 - Diaries
 - Elimination of caffeine
- ▶ Behavioral therapy
- ▶ Dry Bed Training
- ▶ Alarm
- ▶ Pharmacotherapy



Treatment

- ▶ Desmopressin (DDAVP)
 - 0.2 mg tabs, start with 0.6 right at bedtime
 - Short duration (lasts only 6–8 hours)
 - Begin at age 8
- ▶ Oxybutinin
 - XL is best (insurance may not cover)
 - Other dose is 5mg bid-tid (> 5yrs) Max 15 mg/day
 - .2 mg/kg BID-TID (< 5 yrs)
 - Side effects



Selected bedwetting alarms

Nytone Alarm	Nytone Alarms, 2424 S. 900 West, Salt Lake City, UT 84119 Telephone: 801-973-4090 Web site: www.nytone.com
Wet-Stop Alarm	Palco Laboratories, 8030 Soquel Ave., Suite 104, Santa Cruz, CA 95062 Telephone: 800-346-4488 Web site: www.palcolabs.com
Potty Pager (silent alarm)	Ideas for Living, 1285 N. Cedarbrook, Boulder, CO 80304 Telephone: 800-497-6573 or 303-440-8517 Web site: www.pottypager.com
DRI Sleeper	Alpha Consultants, 94 Selwyn Place, P.O. Box 569, Nelson, New Zealand 7001 Telephone: 877-331-2768 Web site: www.dri-sleeper.com



Outcomes

- ▶ Alarms alone: Response is 60–70% with relapse (10–30%)
 - 1/3– to 1/2 of families d/c the alarm within 3 WEEKS!
- ▶ Med response is 10–60% with relapse (80–90%)
- ▶ Two studies showed no better improvement after one year than the expected 15% cure rate/year



References

- ▶ <http://bedwettingstore.com/>
- ▶ <http://pedsinreview.aappublications.org/content/22/12/399.full.pdf+html>