

CHOC Children's Business Development Virtual Pediatric Lecture Series

**Bladder Function and Dysfunction:
Woes for Primary Care Clinicians**

Friday, November 13, 2020 from 12:30 – 1:30 PM (PST)

WELCOME

DISCLOSURES RELEVANT TO POTENTIAL COMMERCIAL BIAS

CHOC fully complies with the CMA Accreditation Guidelines and the updated ACCME Standards for Commercial SupportSM: Standards to Ensure Independence in CME Activities. The following disclosures meet SCS 6.0: Disclosures Relevant to Potential Commercial Bias (6.1-6.5).

Pediatric Virtual Lecture Series:

Bladder Function + Dysfunction; Woes for Primary Care Clinicians

Planning Committee Disclosures – *The following Planning Committee members have had no relevant financial relationships in the last 12 months with any entity producing, marketing, re-selling, or distributing health care goods or services consumed by, or used on, patients:*

- Leslie Castelo
- Mary Hickcox
- James D. Korb, MD

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Faculty Disclosures - *The following planner(s)/speaker(s) have had no relevant financial relationships in the last 12 months with any entity producing, marketing, re-selling, or distributing health care goods or services consumed by, or used on, patients:*

- Tony Khoury, MD

CME Planning Committee Disclosure -

This live activity was approved outside of the CME Committee. The following CME Committee members have had no relevant financial relationships in the last 12 months with any entity producing, marketing, re-selling, or distributing health care goods or services consumed by, or used on, patients:

- Mary E. Hickcox
- James D. Korb, MD



Department of Urology

University of California, Irvine

Bladder and Bowel Dysfunction: Frustrating for the Family and Doctor

Tony Khoury MD FRCSC FAAP

Walter R. Schmid Professor of Pediatric Urology
Professor, Department of Urology
University of California, Irvine
Head of Pediatric Urology
Children's Hospital of Orange County



CHOC Children's Urology Center

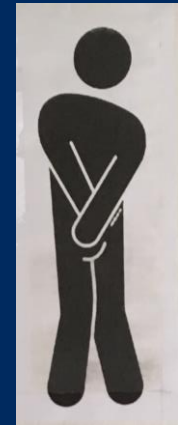


LEARNING OBJECTIVES

- The basics of normal bladder function
- Understand the relationship between bladder and bowel dysfunction
- Diagnose the different causes of urinary incontinence
- Manage the different therapeutic modalities to correct bladder and bowel dysfunction



The Poor Bladder



K.C.: NO PAYBACK FOR NOAH: PAGE 42



MAKING HIS PITCH

Tanaka hopes last outing lands him Opening start: P. 42-43

Wednesday, March 30, 2016

SPORTS FINAL

DAILY NEWS

Matt won't hold it in any longer, flushes away bladder woes in time for Opener

YA GOTTA RELIEVE!

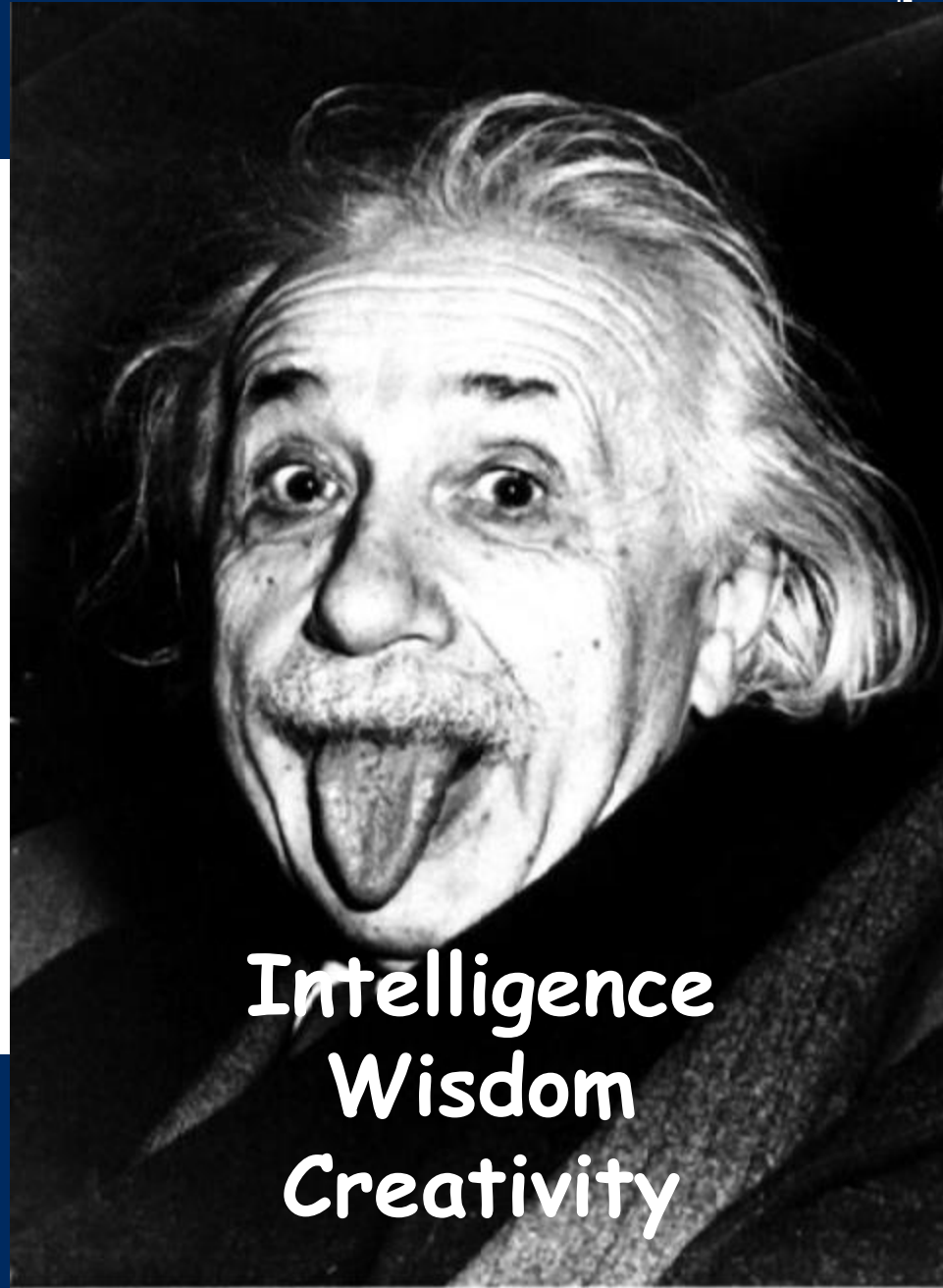


BE A WINNER Barcode Here

13143 SF-CITY 03/30/16
01 28832 10035



Matt Harvey, who gave Mets a scare with 'mysterious' medical problem Monday, is OK after passing painful blood clot in bladder. **Pages 40-41**



Intelligence
Wisdom
Creativity



Urinary Bladder

- Unique organ
- Dual functions of storage and emptying of urine
- Complex innervation of voluntary and involuntary control of function



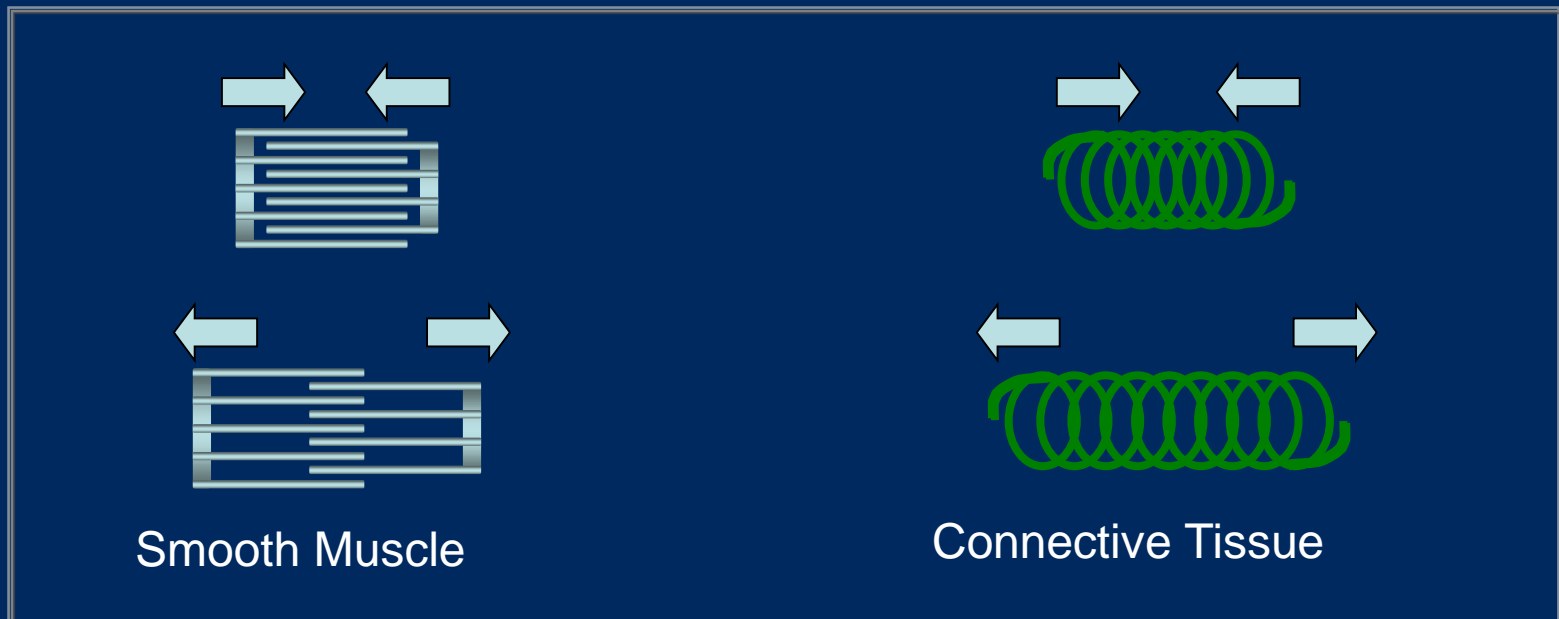
Normal Bladder Function

- Low pressure filling
- Low pressure storage
- Perfect continence
- Periodic voluntary expulsion
(at low pressure)
- Resist infection

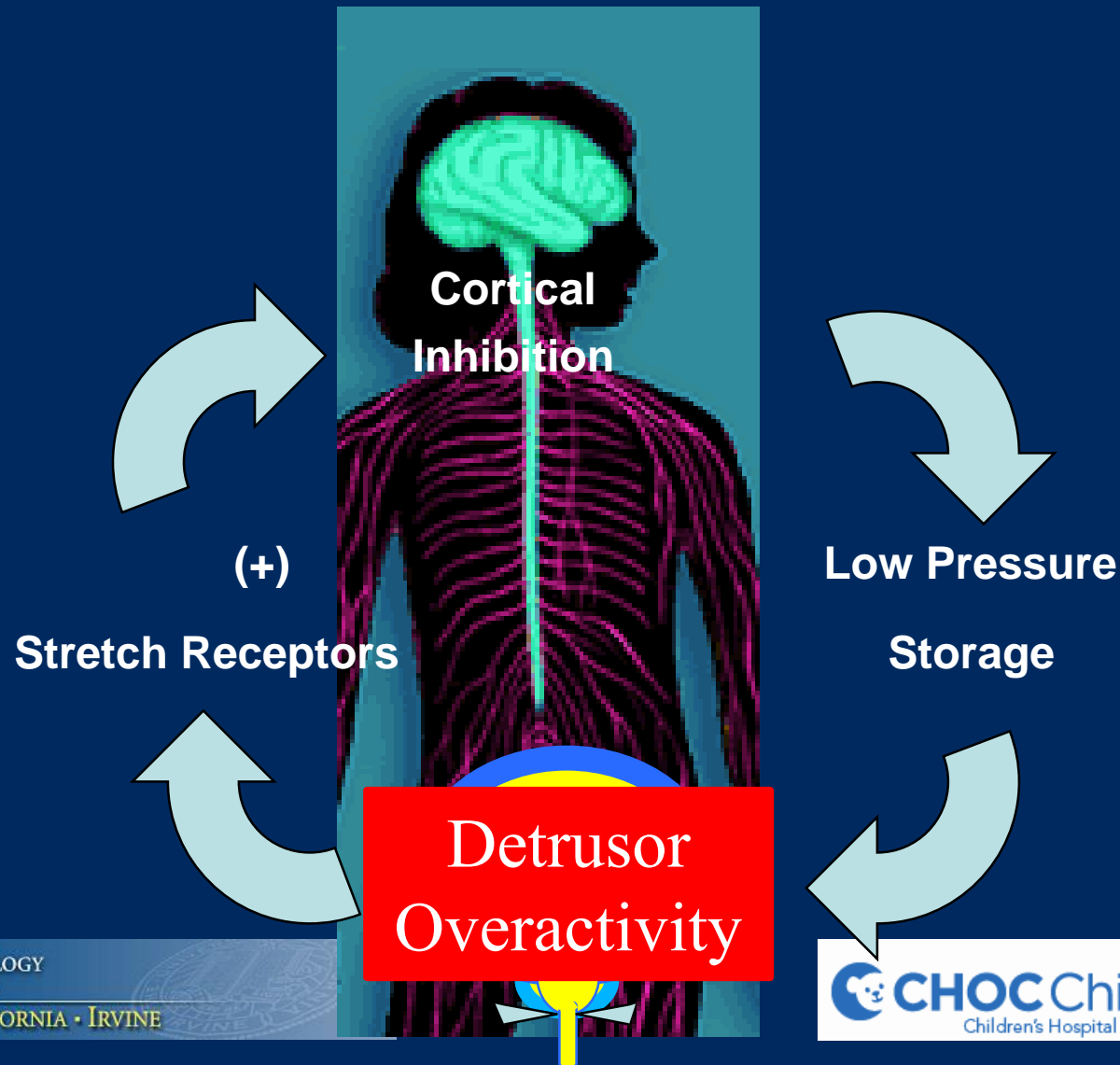


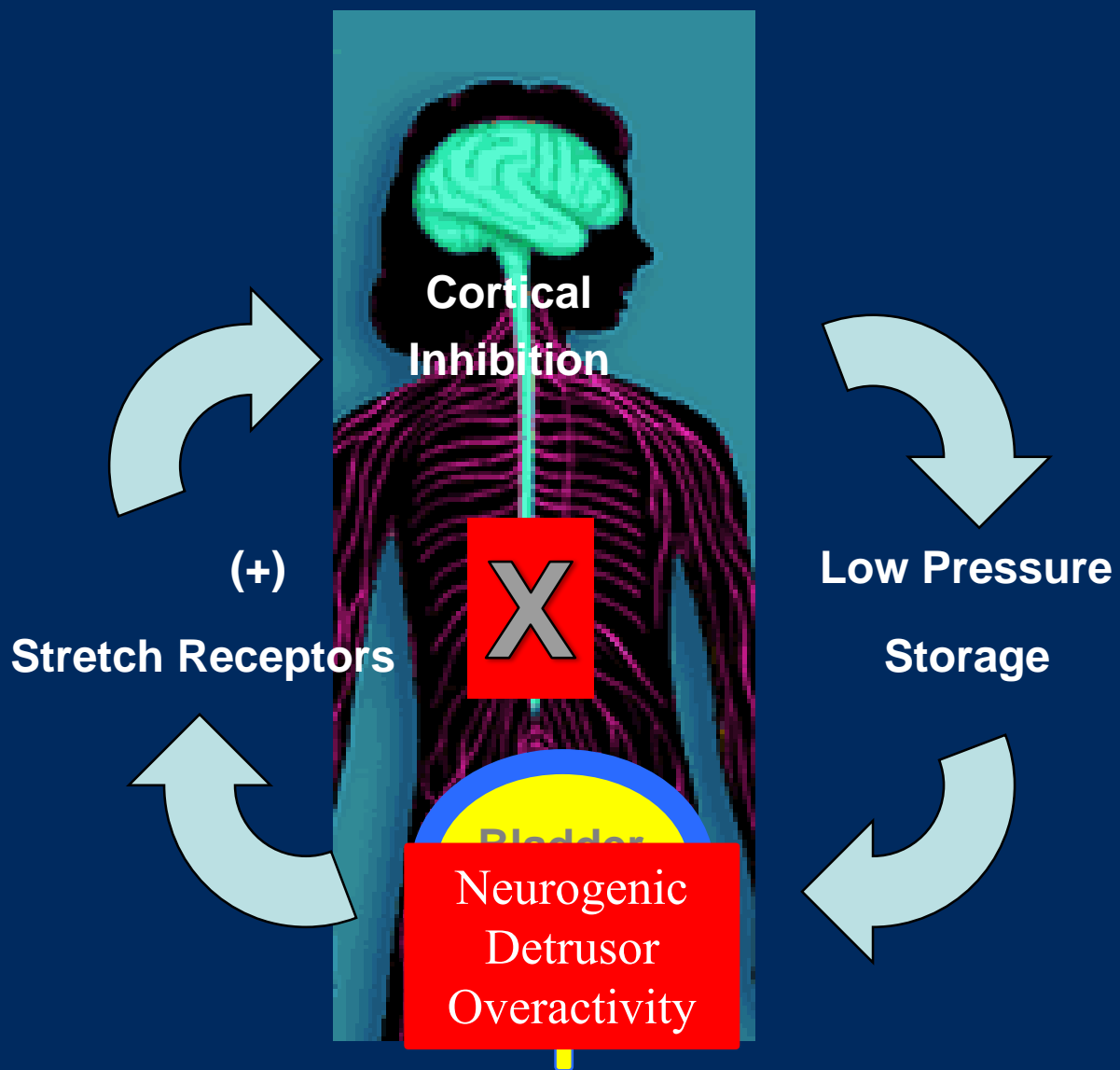
Detrusor Muscle Properties

Contractile properties well suited for either urine storage or release



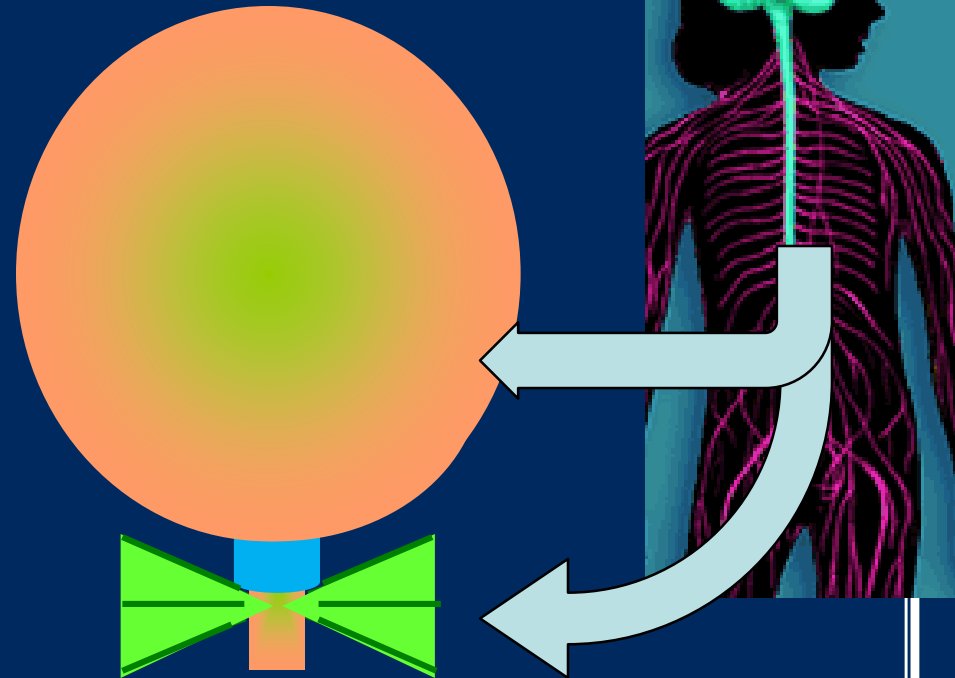
Normal Reflex





Evolution from Infantile to Adult Bladder

- 1 Progressive increase in functional bladder capacity
- 2 Maturation of voluntary control over the urethral striated muscle sphincter
- 3 Development of direct volitional control over the bladder-sphincteric unit so that the child can voluntarily initiate or inhibit the micturition reflex.



Yeung, 2001. Yeung CK: Pathophysiology of bladder dysfunction. In: Gearhart JP, Rink RC, Mouriquand PDE, ed. Pediatric Urology, Philadelphia: WB Saunders; 2001:453-469.

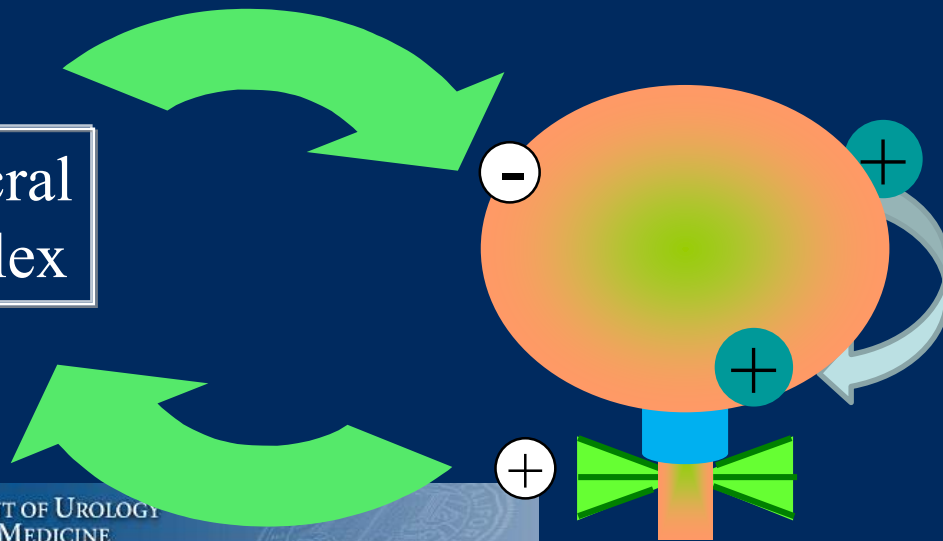
Urethral Control Mechanism

Smooth muscle maintains tone with relatively little expenditure of energy

Striated muscle for emergencies



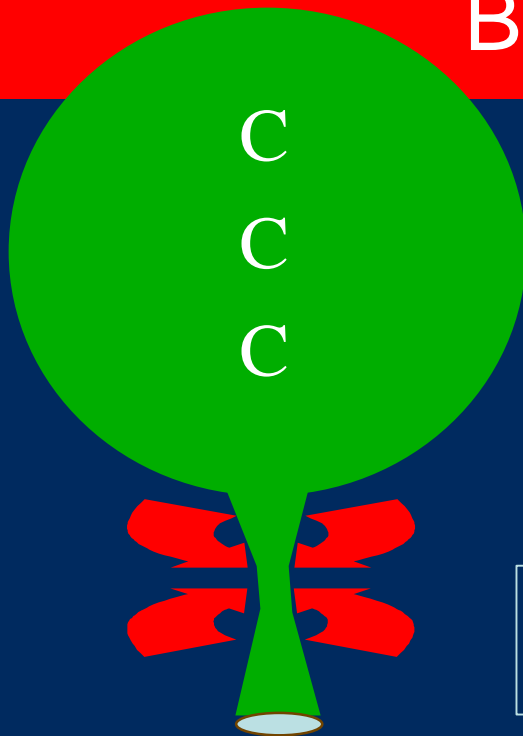
Sacral reflex



Holding Reflex
↓
Voiding Dysfunction

Detrusor-Sphincter Dyssynergia

Sphincter Contraction in response to
Bladder contraction

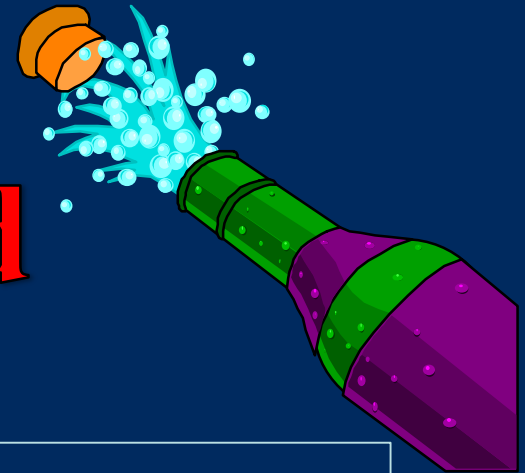


Storage pressure

Increased

Outlet Resistance

Hinman Syndrome



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Detrusor- Sphincter Dyssynergia

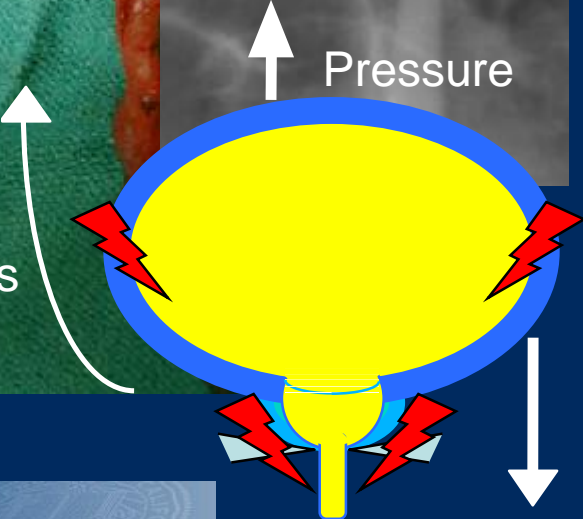
Sphincter Contraction in response to
Detrusor contraction in NB
(OA or voiding contraction)

Voiding Dysfunction

Learned behavior
in a neurologically intact person.
Failure of relaxation of urethra during
voiding



Hydronephrosis
Reflux



Incontinence



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Clinical Significance

- BBD predisposes children to Recurrent UTIs and VUR
- Incontinence impacts behavioral, emotional, and social aspects of a child's daily life.
- “Wetting pants in class” rated as the third most stressful life event in school children

TH Ollendick et al: Fears in children and adolescents: reliability and generalizability across gender, age and nationality. *Behav Res Ther.* 27:19-26 1989



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Epidemiology

- BBD accounts for up to 40% of pediatric urology clinic visits annually
- Daytime incontinence is estimated to affect up to 7 million children in the United States 6 years of age or older
- Daytime urinary incontinence is more common in girls (6.7%) than in boys (3.8%)



Childhood constipation: Finally some hard data about hard stools!

It is estimated that 55 million adults in the United States, approximately 28% of the population, are constipated.¹ Similar large-scale epidemiologic data

are not available in pediatrics, although it has been reported that 34% of toddlers in the United Kingdom and 37% of Brazilian children younger than 12 years of age were considered by their parents to be constipated.² A disorder of defecation is the chief complaint in 3% to 5% of visits to pe-

diatricians. At Children's Hospital of Pittsburgh, a review of visits to the

**See related articles, p. 35
and p. 41.**

gastroenterology clinic during the past year reveals the prevalence of children

J Pediatr 2000;136:4-7.

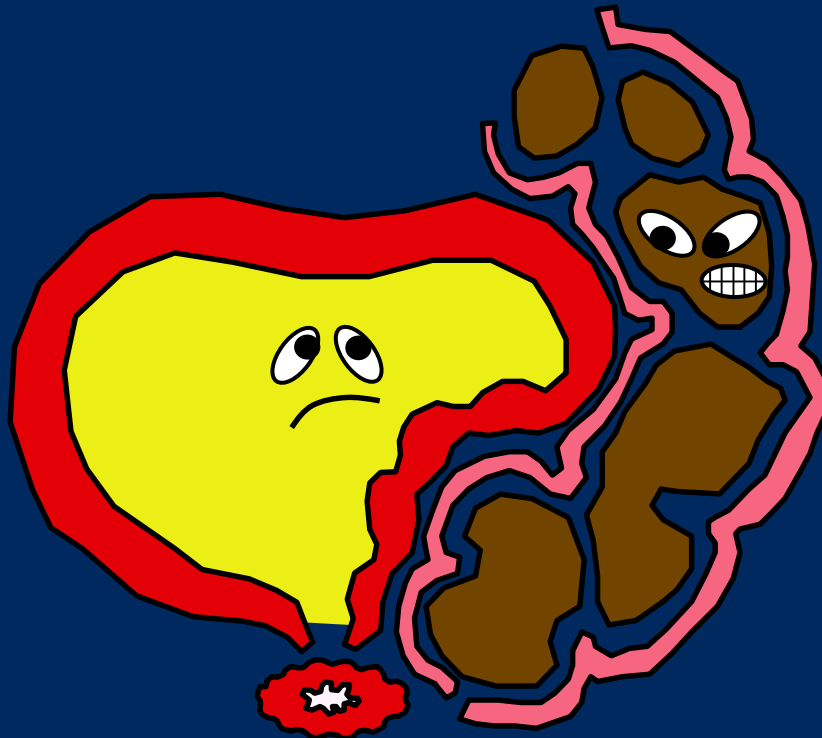
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0022-3476/2000/\$12.00 + 0 9/18/103665



Urinary Incontinence **the bladder** and **the bowel**

– partners in crime



Often an association
between
constipation
& bladder problems

Constipation

- Relief of constipation resulted in resolution of:
 - daytime urinary incontinence in 89%
 - enuresis in 63% of patients

Loening-Baucke, 1997

Understanding The Cause of Incontinence



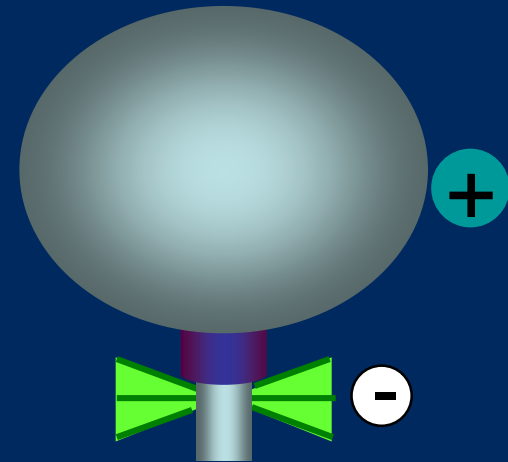
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Wein's Functional Classification

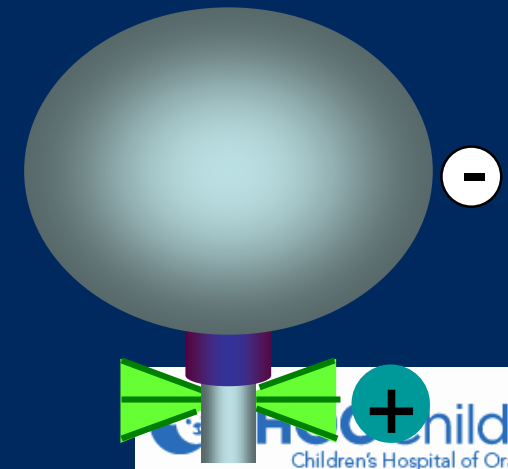
Failure to Store

- Because of Bladder (CCC)
- Because of Urethra
- Combined



Failure to Empty

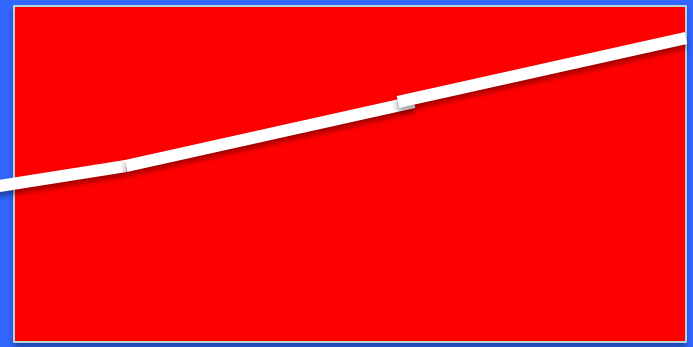
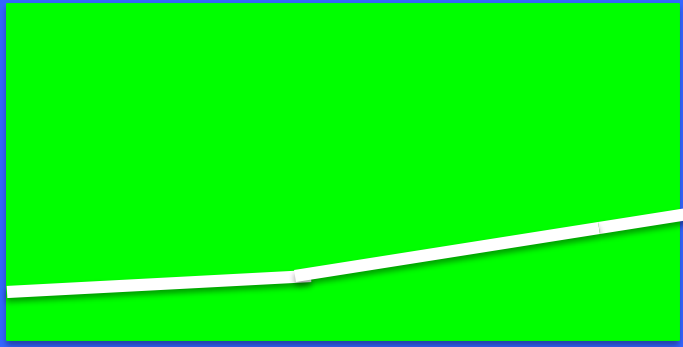
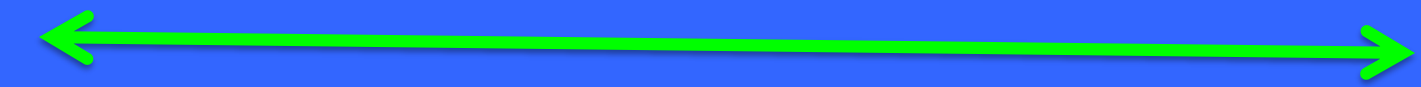
- Because of Bladder
- Because of Urethra
- Combined



Effect of incomplete emptying on storage

Bladder Capacity (in ounces) = Age (yrs) + 2

P
r
e
s
s
u
r
e



200

400

Volume mls.

Evaluation



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Intake and Voiding Diary

Patient name

INTAKE AND VOIDING DIARY

Instructions: Begin recording as soon as you wake in the morning and continue for 24 hours. Choose 2 full days to complete this record—note that they DO NOT need to be consecutive, but just days that you can be sure to record EVERY void. Please measure voided volumes in the hat provided in 'cc' and fluid intake in 'oz.' Please record approximate times for all events, and try to note the severity of urinary leakage and if there is any associated urgency.

TIME	Voided volume (cc)	Leakage 1 = damp 2 = soaked	Urgency 1 = yes 2 = no	Fluid intake (oz)

TIME	Voided volume (cc)	Leakage 1 = damp 2 = soaked	Urgency 1 = yes 2 = no	Fluid intake (oz)

Bristol Stool Chart

Type 1  Separate hard lumps, like nuts (hard to pass)

Type 2  Sausage-shaped but lumpy

Type 3  Like a sausage but with cracks on the surface

Type 4  Like a sausage or snake, smooth and soft

Type 5  Soft blobs with clear-cut edges

Type 6  Fluffy pieces with ragged edges, a mushy stool

Type 7  Watery, no solid pieces. Entirely Liquid



The Dysfunctional Voiding Symptom Score



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The Dysfunctional Voiding Symptom Score

- To quantify pediatric DV symptoms.
- Does bladder retraining make a difference?



Materials and Methods

- Group A: (n=104, aged 3 to 10 years, M: F 1:4) presenting to the Pediatric Urology Clinic with history of:
 - diurnal urinary incontinence.
 - urinary tract infections.
 - or abnormal voiding habits
- Group B: (n=54), M: F 1.3:1] consisting of children without suspected voiding dysfunction or fluid imbalances from a non-urology clinic

DVSS

Ten questions reflecting unique BBD parameters were assigned scores of 0 to 3 according to prevalence (maximum score 30).

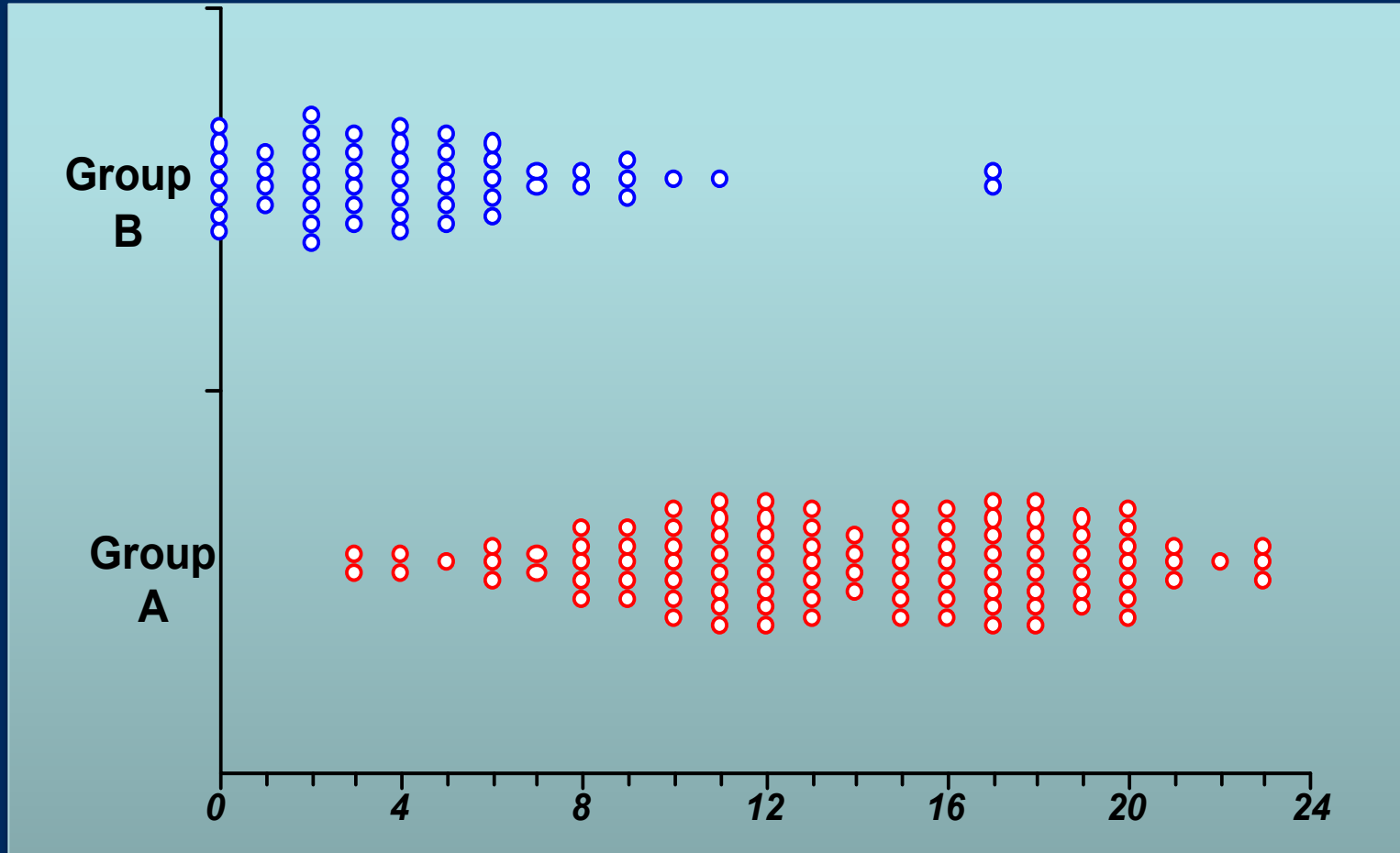


Over the last month

	Almost never	Less than half the time	About half the time	Almost every time	Not Available
1. I have had wet clothes or wet underwear during the day	0	1	2	3	NA
2. When I wet myself, my underwear is soaked	0	1	2	3	NA
3. I do not have a bowel movement every day	0	1	2	3	NA
4. I have to push for my bowel movements to come out	0	1	2	3	NA
5. I only go to the bathroom one or two times each day	0	1	2	3	NA
6. I can hold onto my pee by crossing my legs, squatting or doing the “pee dance”	0	1	2	3	NA
7. When I have to pee, I can not wait	0	1	2	3	NA
8. I have to push to pee	0	1	2	3	NA
9. When I pee it hurts	0	1	2	3	
10. Parents to answer: Has your child experienced something stressful like the example below?		No (0)			Yes (3)
TOTAL					

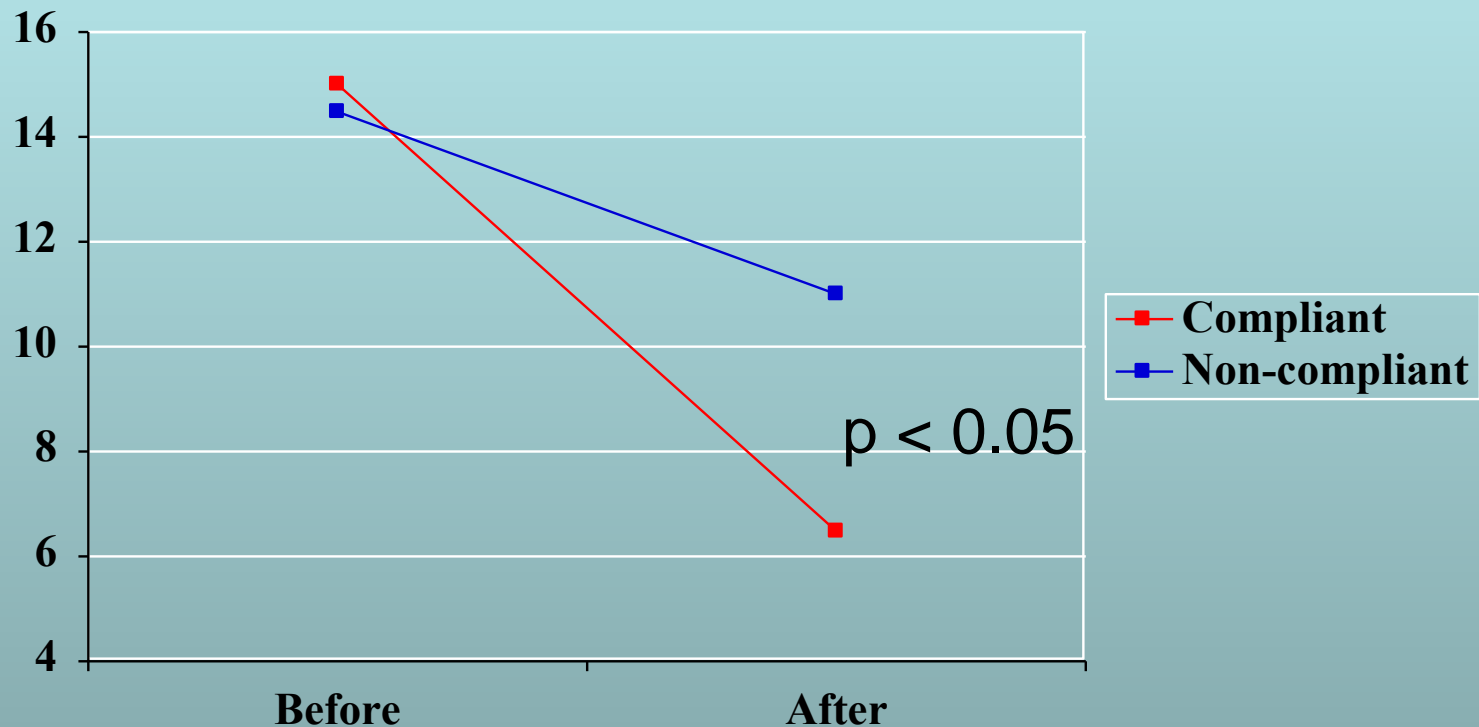
- New baby
- New home
- New school
- School problems (tests/ friends)
- Abuse (sexual/physical)
- Home problems (divorce, death)
- Special events (birthday)

Distribution of DVSS between Groups A and B



Maximum score 30

DVSS an Objective Measure



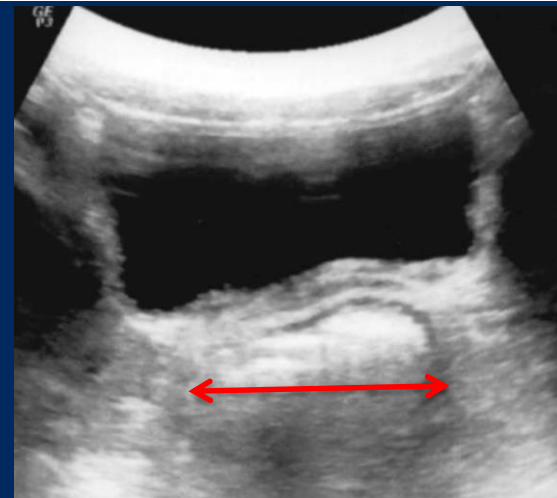
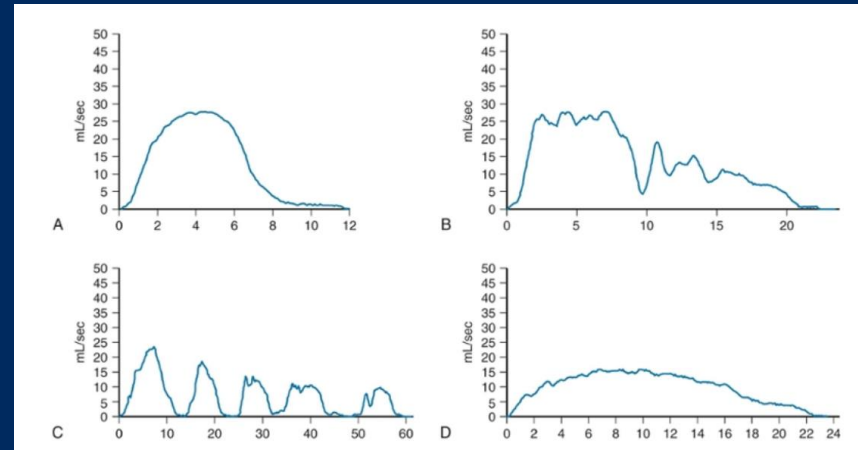
Physical Exam

- Abdomen:
Tenderness over colon
→ constipation
- Spine
- Genitals:
Meatal stenosis or
Labial adhesions
- Check Underwear for
urine and stool stains



Investigations

- UA and UC
- UroFlow and
- PVR by US



Beware The Bag Specimen

Bag



Always Positive
(USELESS for Culture **OK for UA**)

Midstream



Helpful if done properly
Always Check for Pyuria

Catheter



Gold Standard



Inadequate fluid intake

low urine volume

Infrequent voiding

Increased bacterial incubation in bladder

Colonization
Incubation
Attachment
Attack

Constipation

Dysfunctional voiding

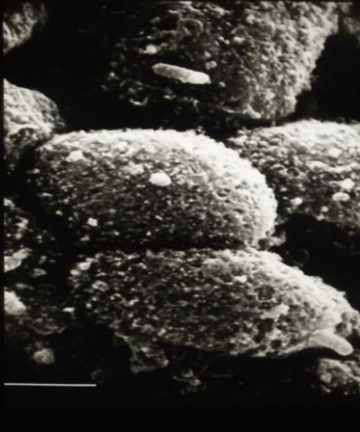
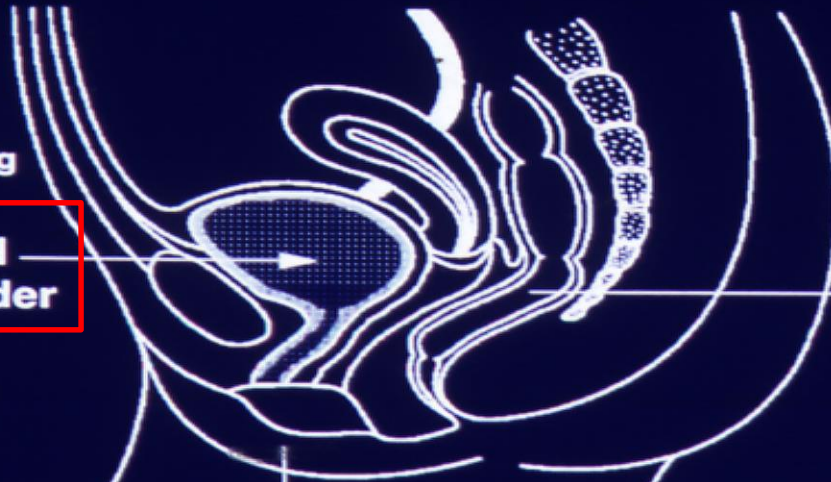
Increased perineal colonization

Improper wiping
Poor hygiene
Dampness

Bladder instability

UTI
Neurogenic Bladder

Urinary Incontinence
Nylon underwear (Non absorbent)
Regurgitation of urine into vagina



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Conservative Management

- Behavioral modification of voiding (i.e., timed voiding schedules)
- Lifestyle modifications
- Treatment of constipation

- 70% Reduction in symptoms

Bowel Management

- Increased fluid intake:
1 8 oz cup/ yr of age
up to 8 cups
- High fiber:
 - age in years + 15-20 gms of Fiber
 - Pears, Prunes, Papaya
 - Flax/Chia seeds
- PEG

Behavioral Modification

- Timed voiding
 - Watch
 - Diary → rewards for voiding
- Motivation improves with age
 - Peer pressure
 - Maturation of bladder



Pharmacotherapy

Based on findings on diary and FR/PVR

- Storage
 - Anticholinergics: follow up FR PVR
- Voiding dysfunction
 - BN: Alpha Blocker
 - Pelvic Floor: Biofeedback

BBD and VUR

The Journal of Urology

Volume 184, Issue 3 , Pages 1134-1144, September 2010

Summary of the AUA Guideline on Management of Primary Vesicoureteral Reflux in Children

Craig A. Peters, Steven J. Skoog, Billy S. Arant Jr., Hillary L. Copp, Jack S. Elder, R. Guy Hudson, Antoine E. Khoury, Armando J. Lorenzo, Hans G. Pohl, Ellen Shapiro, Warren T. Snodgrass, Mireya Diaz

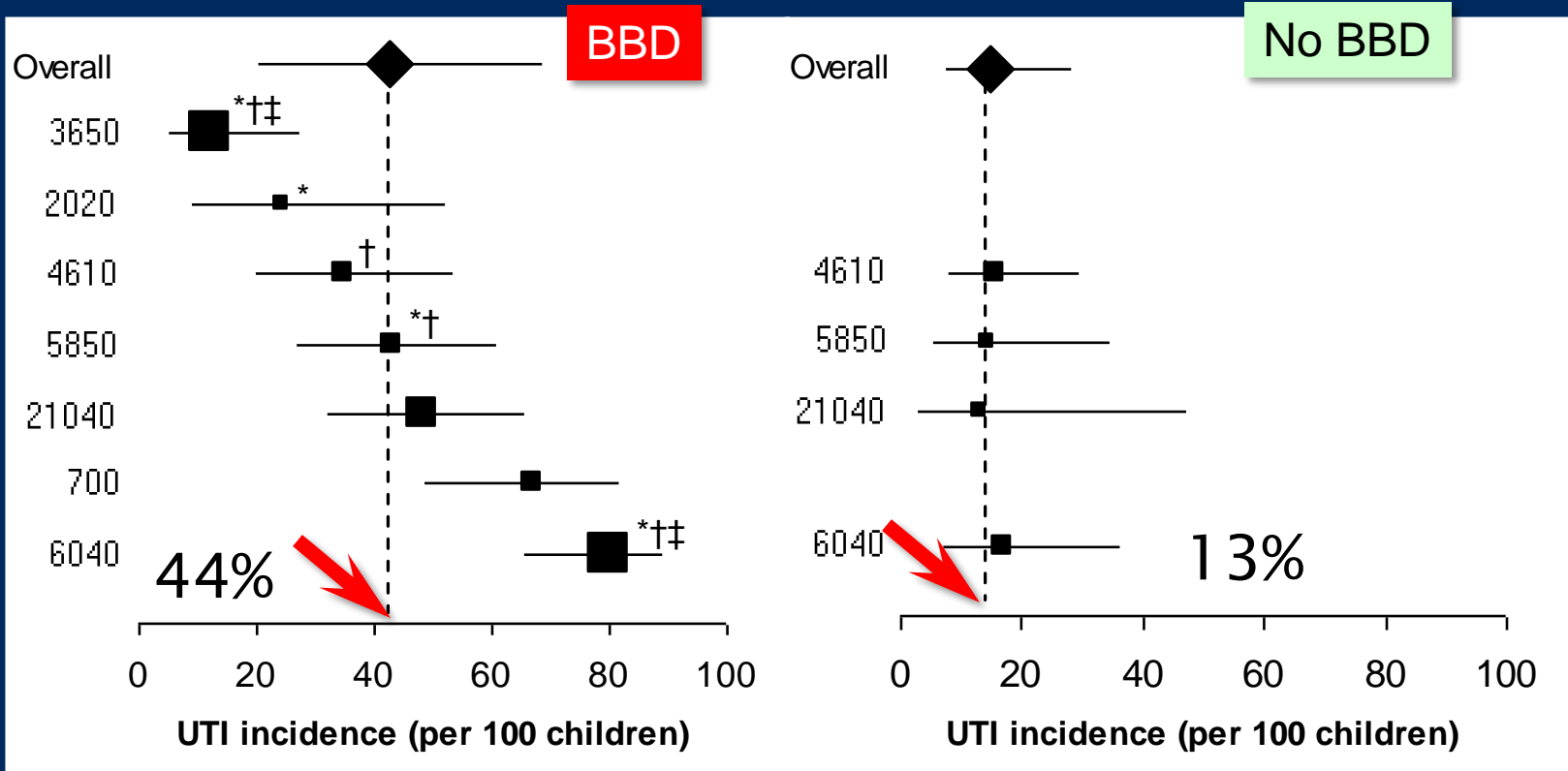


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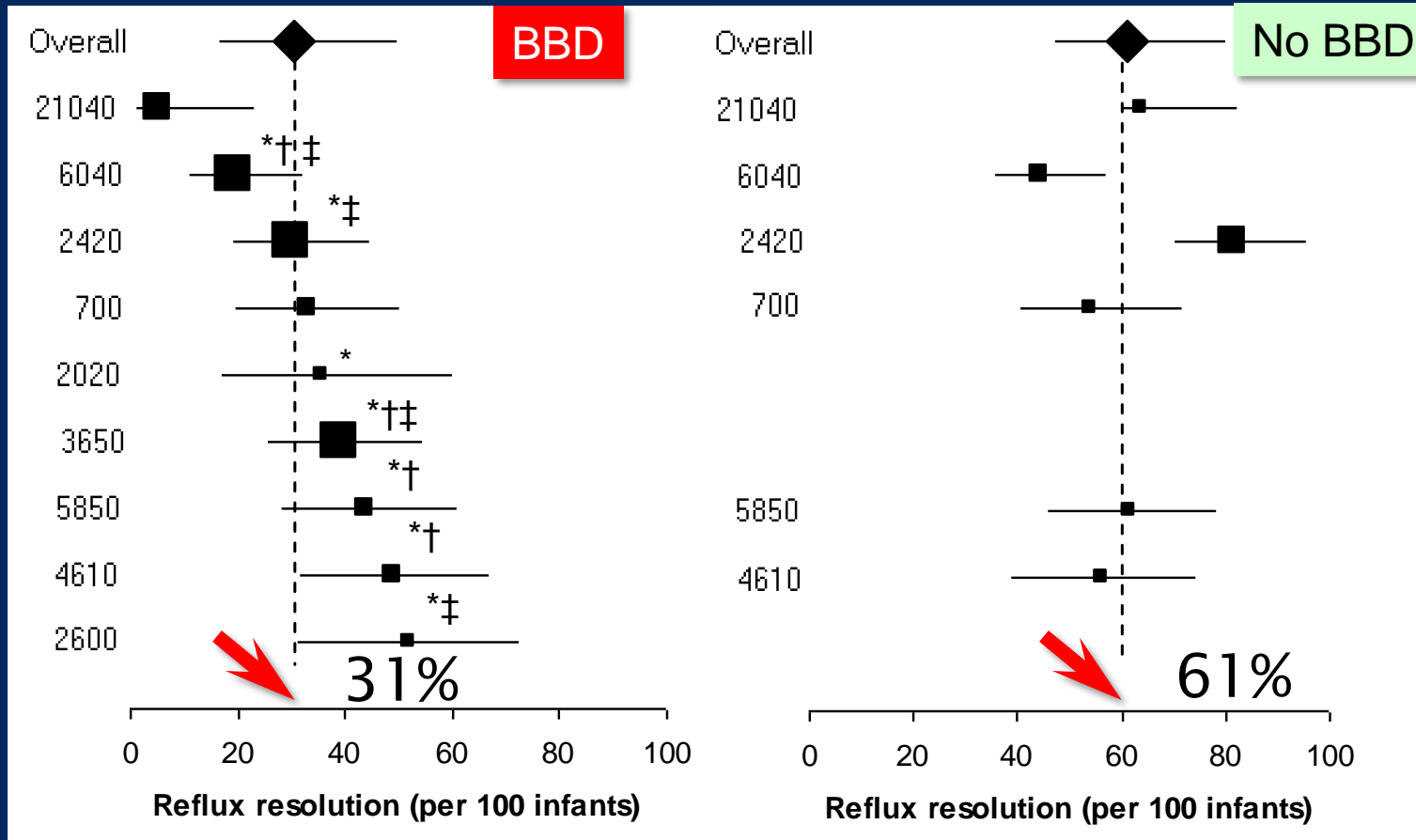
BBD is associated with more UTIs on CAP

AUA GUIDELINES



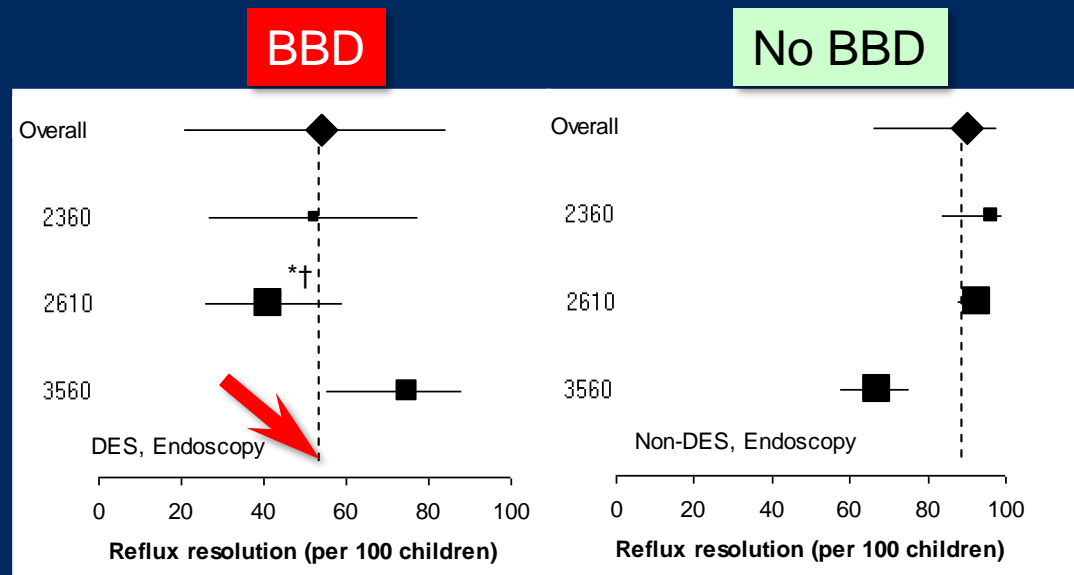
BBD is associated with less VUR resolution at 2y

AUA GUIDELINES



BBD is associated with reduced success for endoscopic VUR Correction

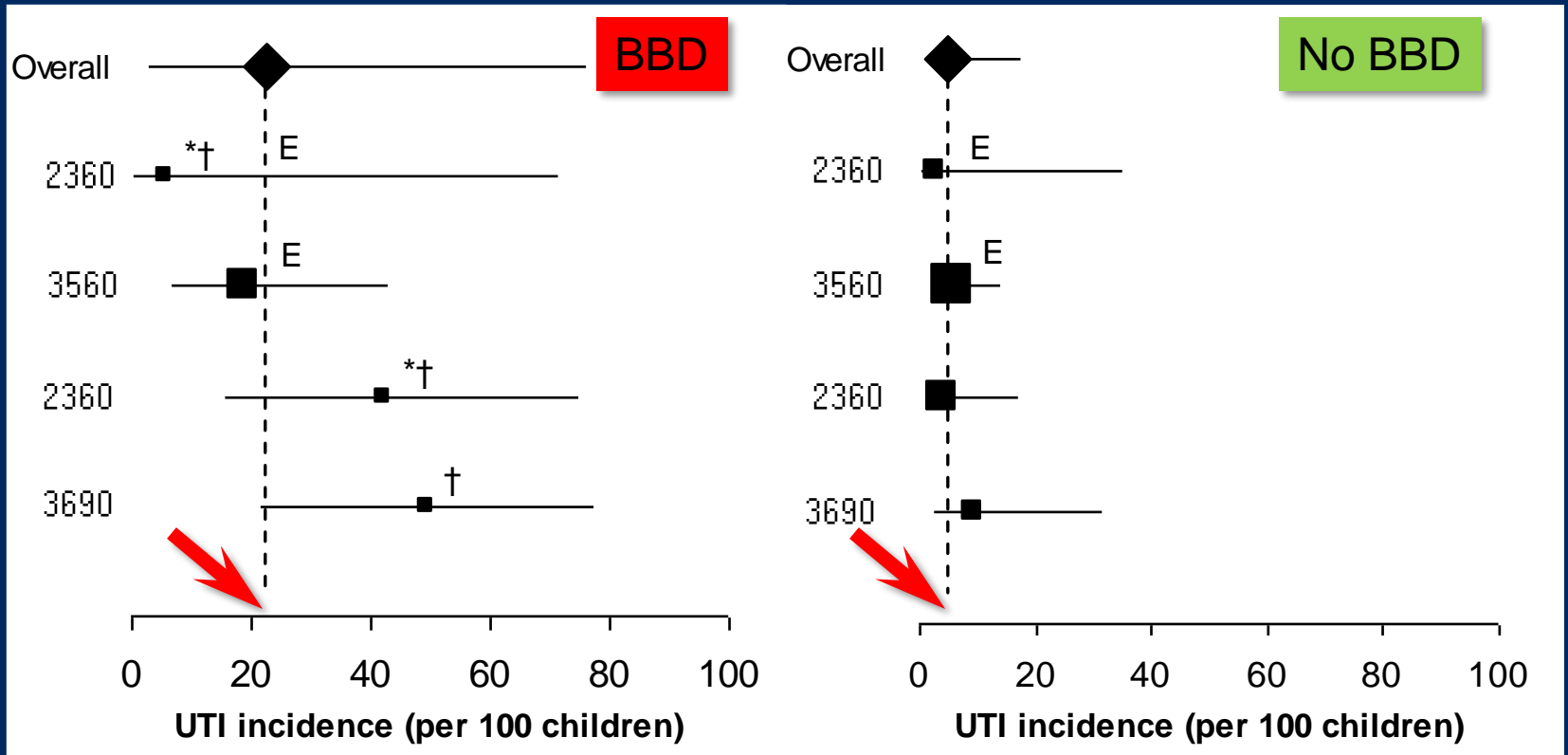
AUA GUIDELINES



57%

BBD is associated with increased incidence of UTI after surgery

AUA GUIDELINES



23%

5%

SPECIFIC CONDITIONS



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Specific Conditions

- Overactive bladder (OAB),
- Voiding postponement
- Underactive bladder
- Giggle incontinence
- Vaginal reflux
- Pollakiuria (Sensory Urgency and Frequency)
- Enuresis



Overactive Bladder (OAB)

- Symptoms:
 - Frequency
 - Urgency
 - Urge incontinence
- Management:
 - Constipation
 - Water
 - Anticholinergic



Underactive Bladder (Lazy Bladder, Holders)

- Large Bladder / decompensated detrusor
- Void with straining
- High PVR
- Encourage timed voiding and double voiding
- Alpha Blocker
- CIC



Voiding Postponement

- Holder - Infrequent voider
- Bladder diary
- FR PVR
- Timed Voiding



Giggle Incontinence (Enuresis Risoris)

- CNS inactivation (cataplexy) in association with laughter
- RX:
 - Behavioral modification
 - Methylphenidate
 - Anticholinergics



Sensory Urgency and Frequency (Pollakiuria)

- Extreme Urgency and Frequency
- Small daytime volumes
- WITHUOT INCONTINENCE
- No Nocturia
- Large volume in the morning
- Usually self limiting
- Rx: Increase water intake , Anticholinergics

Vaginal Entrapment / Voiding

- Typically wet after voiding
 - History important here !!
- Prepubertal girls
- Check for Labial adhesions
- Rx. Postural change and stand up to wipe

Take Home Messages

- Common Problem
- A good H&P Diary and Qnaires very telling
- Behavioral modifications resolve the majority
- Remember the Rectum
- Non-invasive studies
- Short term meds and follow-up Diary and Qnaires
- Most get better with time

PRACTICE INFORMATION

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CHOC Commerce Tower

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ADDITIONAL LOCATIONS

Mission Viejo and Huntington Beach

Specialty Care Physician Concierge Service: 714-509-4013

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CHOC Business Development at
714-509-4363, or BDINFO@choc.org

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Neurosurgery: Minimally Invasive Surgery for Craniosynostosis
January 14, 2021, 12:30 p.m. - 1:30 p.m.

Orthopaedic Oncology
February 25, 2021, 12:30 p.m. - 1:30 p.m.

Free registration at: choc.org/VirtualLectureSeries

Contact CHOC Business Development: (714) 509-4291



THANK YOU.

