Evaluation & Management of Pediatric Bladder & Bowel Dysfunction

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…..with some slides from…..

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SADLY, WE HAVE
NO DISCLOSURES

Disclosure Statement:

- Kathleen Kiernan has no relevant financial relationships with ineligible companies to disclose.

A Longstanding Problem

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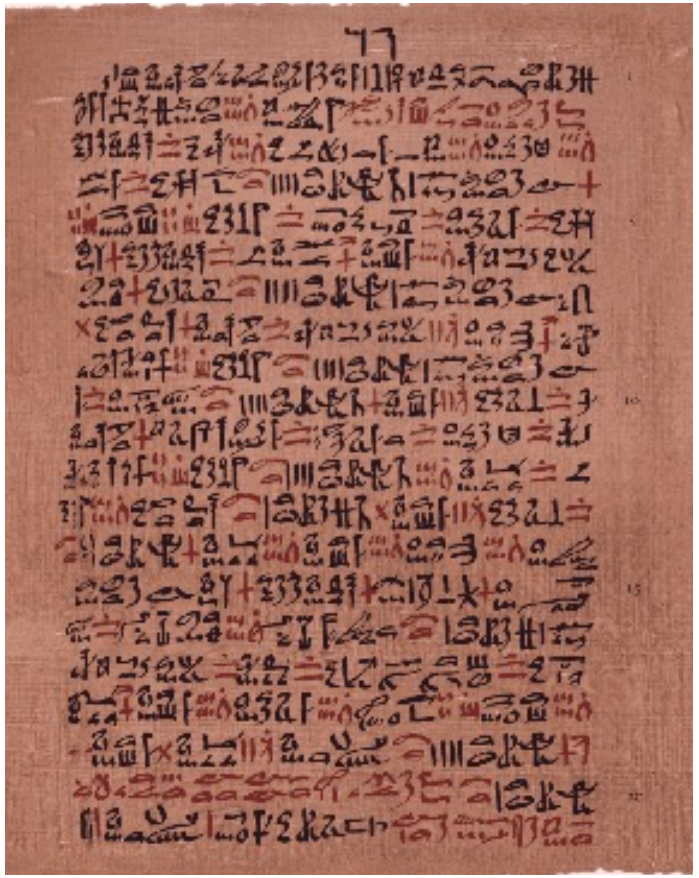


http://www.nlm.nih.gov/archive/20120918/hmd/breath/breath_exhibit/MindBodySpirit/IIBa18.html

Objectives

- To briefly review the anatomy and physiology of the lower urinary tract
- Differentiate between organic and functional elimination disorders
- Describe the evaluation of childhood functional constipation as it pertains to bowel and bladder dysfunction

Lower Urinary Tract Dysfunction: The Great Imitator

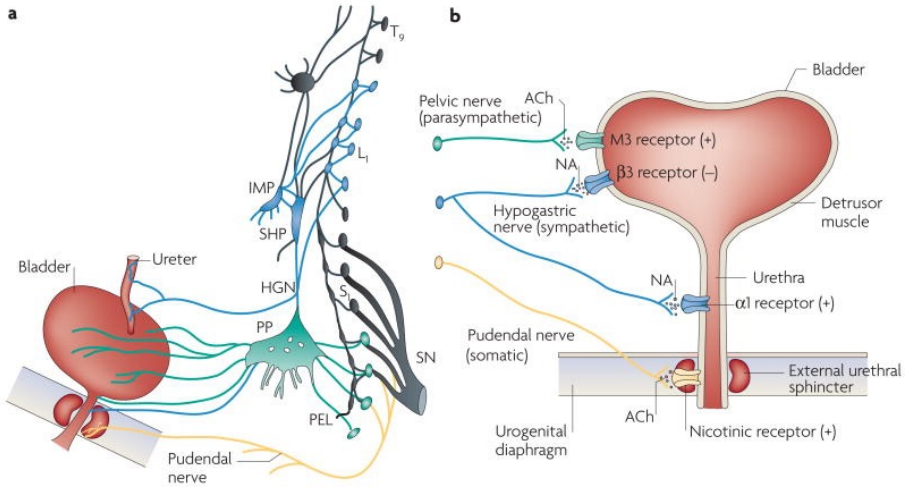
- Patients won't always present with incontinence

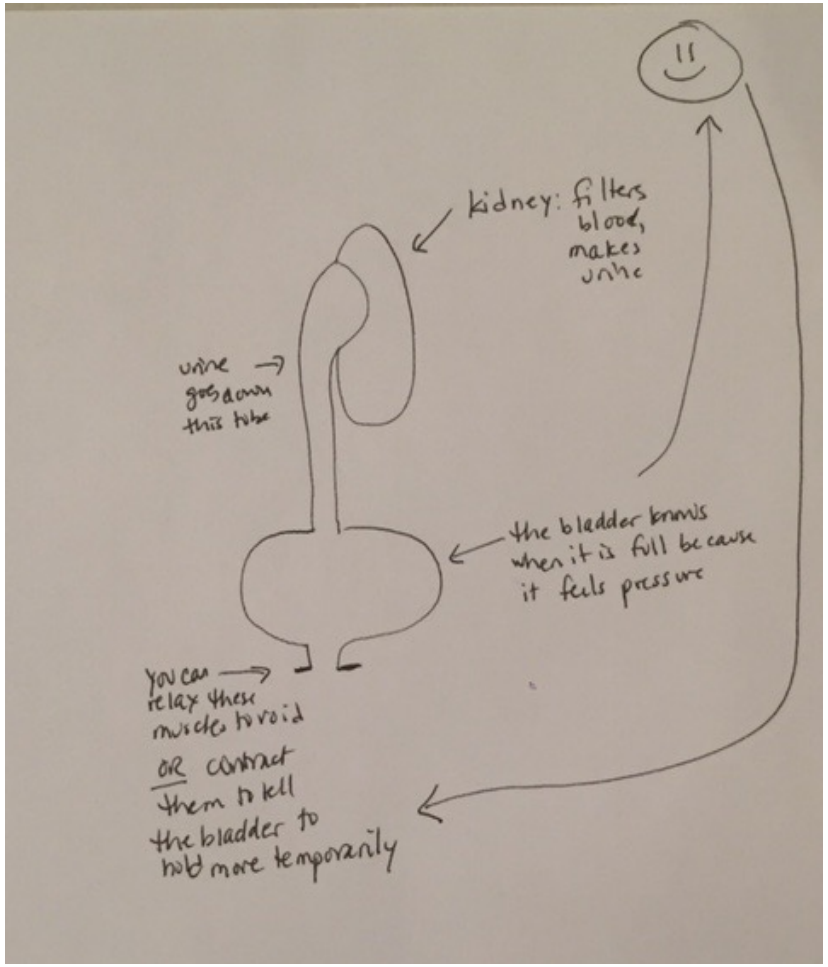
- Common complaints:
  - Recurrent UTI ("UTI every month")
  - Running to the bathroom
  - Penile pain
  - Testicular pain
  - Vulvovaginitis
  - Dysuria
  - Vaginal pain

Myths About Lower Urinary Tract Function

- There is no problem if the child is dry
- The child is incontinent on purpose
- The bladder is “too small” for the child
- Offering access to a bathroom is sufficient
- Urethral dilatation will fix the problem

Normal Voiding





Fowler et al 2008
Bragg et al 2014

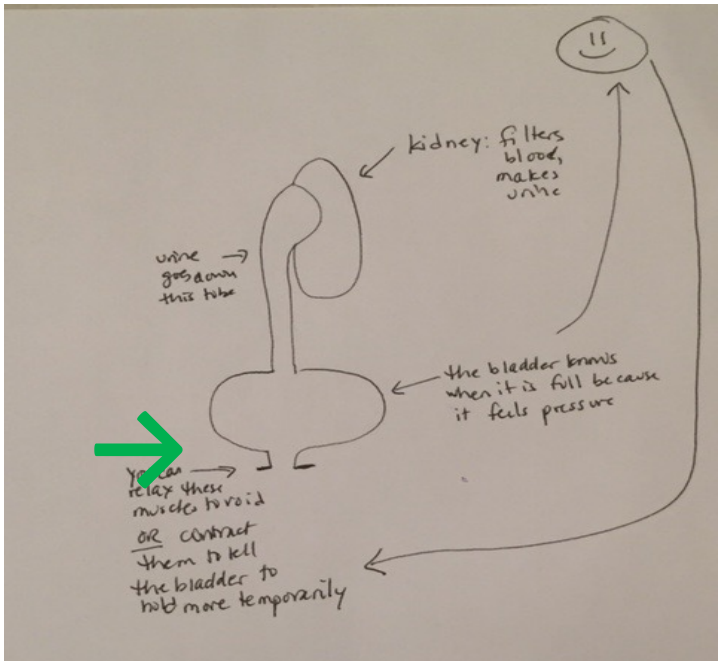
A Quick Review of Meaningful Stimuli

- Different than background
- Intermittent
- Episodic

Urinary Urgency

- Clinical presentation
  - Immediate urge to void
  - Urinary frequency
  - Maneuvers to hold urine (contraction of pelvic floor muscles, Vincent's curtsy)
  - Recurrent UTIs

- Typically seen in 5-7 year old girls, but my experience suggests that many patients are male

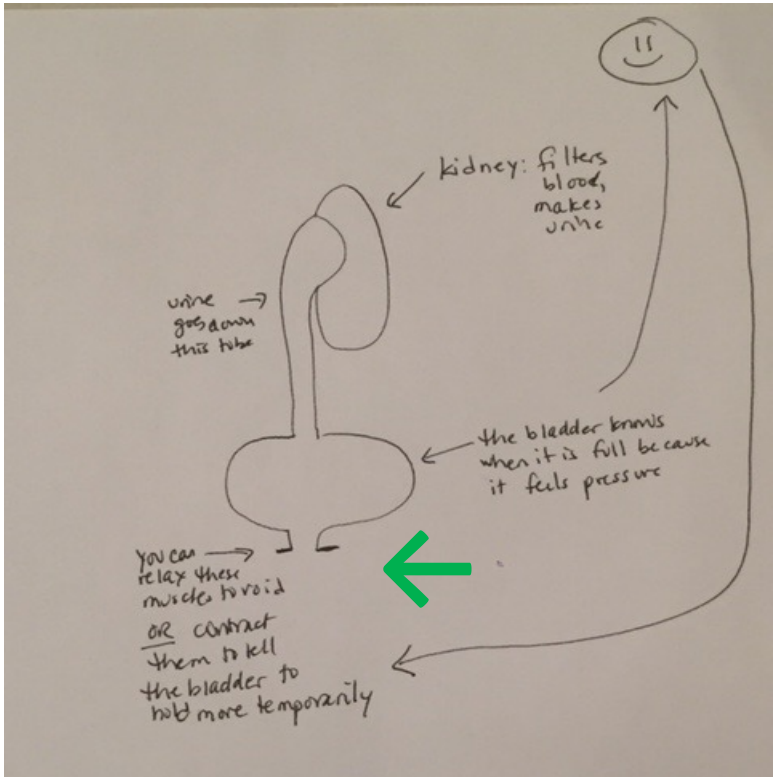


Ramsay and Bolduc, 2017
Chang et al, 2017

Stress Incontinence

- Nearly one-third of female varsity collegiate athletes experienced stress incontinence

- High-impact sports seemed to have higher rates of incontinence: 67% for gymnastics vs 0% for golf
  - Decreased foot flexibility?
  - Force transmission



Cardoso et al 2018; Nygaard 1994; Nygaard 1996; de Mattos Lourenco et al, 2018; Casey and Temme 2017

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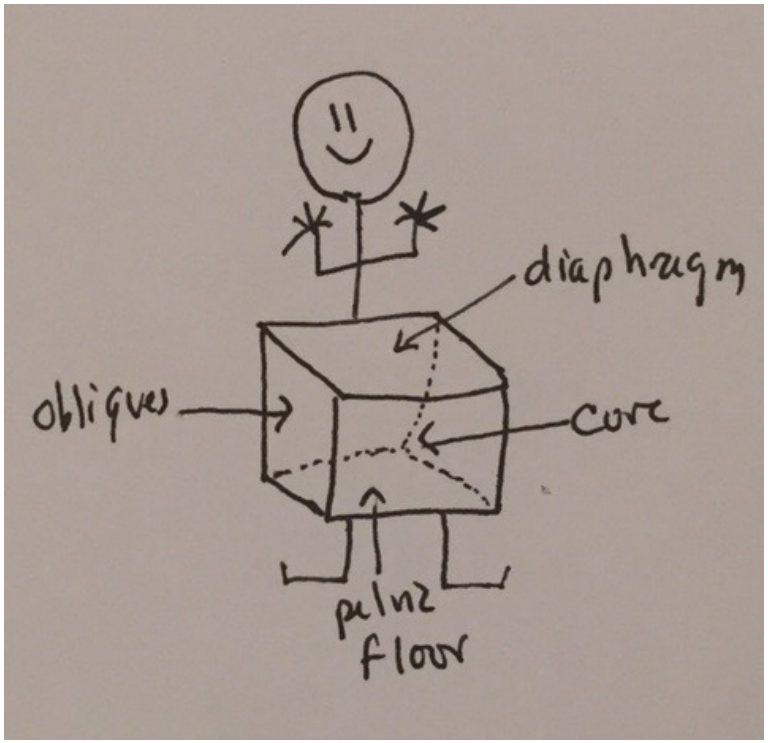
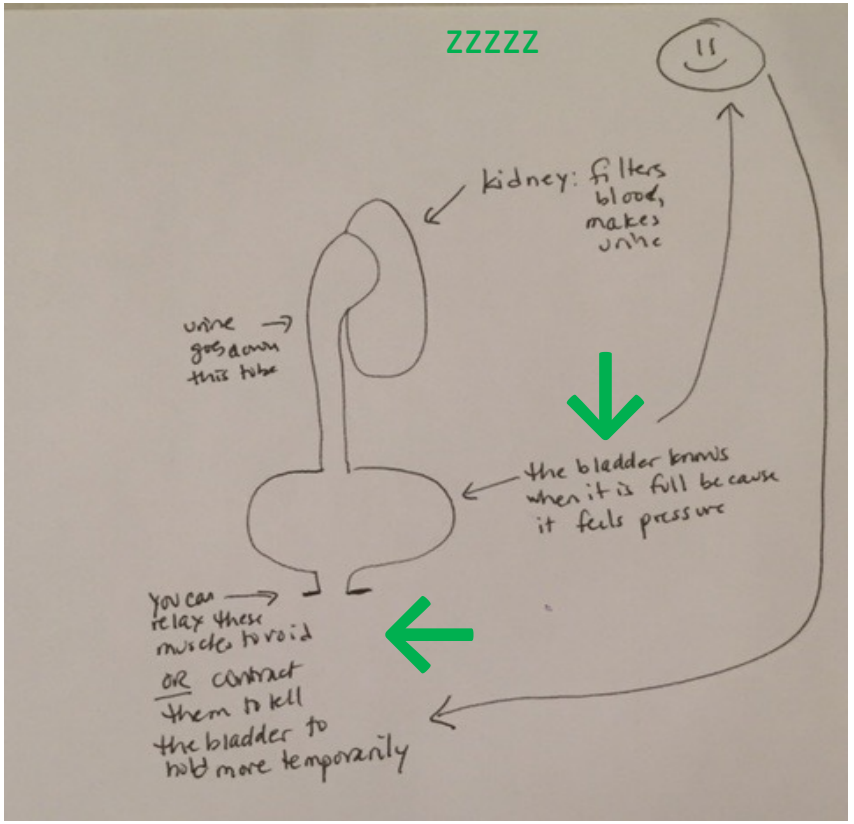


Cardoso et al 2018; Nygaard 1994; Nygaard 1996; de Mattos Lourenco et al, 2018; Casey and Temme 2017

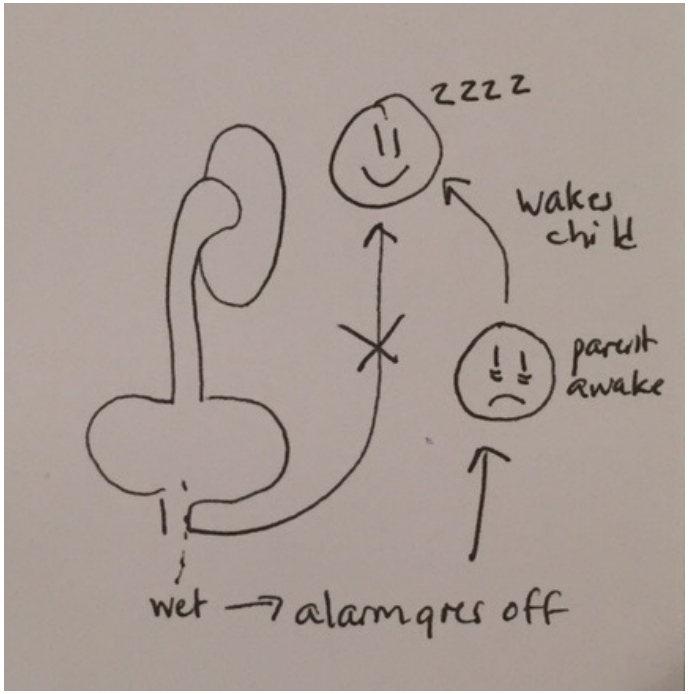
The Bladder-Brain Connection

- Is the stimulus not adequate to prompt an accurate awareness of the need to void?



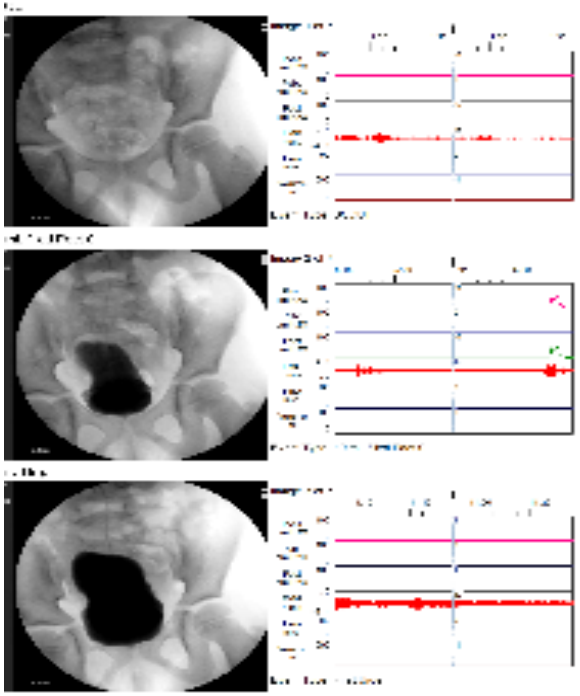
Bedwetting Alarms

- Work on the Pavlovian operant conditioning principle
- Since child is a deep sleeper, parents must wake child entirely
- Most effective when elimination habits optimized



Myogenic Detrusor Failure

- Manifestation of end-stage, decompensated bladder
- Associated with holding urine extensively or high-pressure voiding



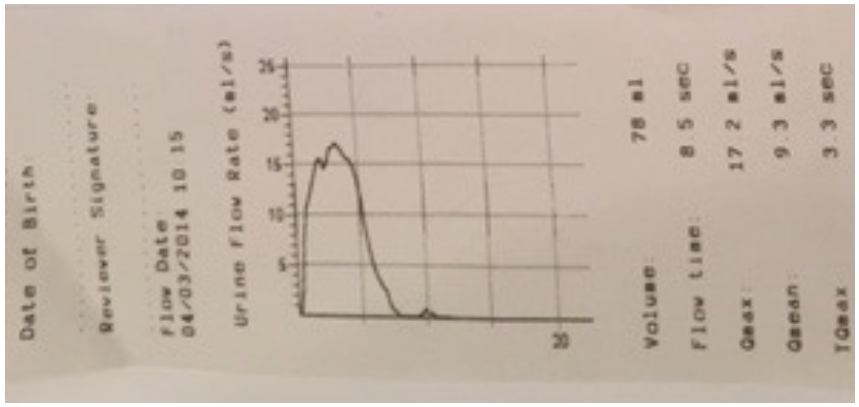
Evaluation: Is This Organic or Functional?

- Physical examination: looking for “red flags”
  - Neurologic deficits/asymmetry
  - Sudden severe urinary retention
  - Comorbid conditions

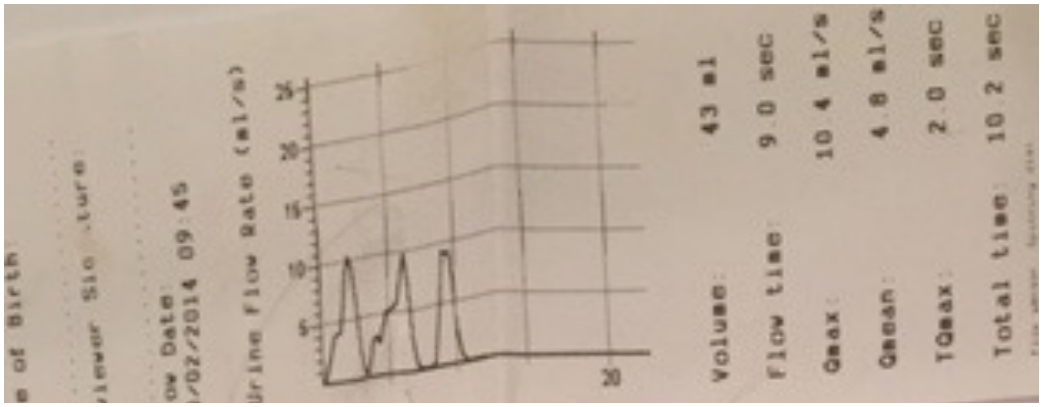
- Urinalysis
  - Glucosuria
  - Concentrating ability
  - Hematuria
  - Infection

- Voiding diaries

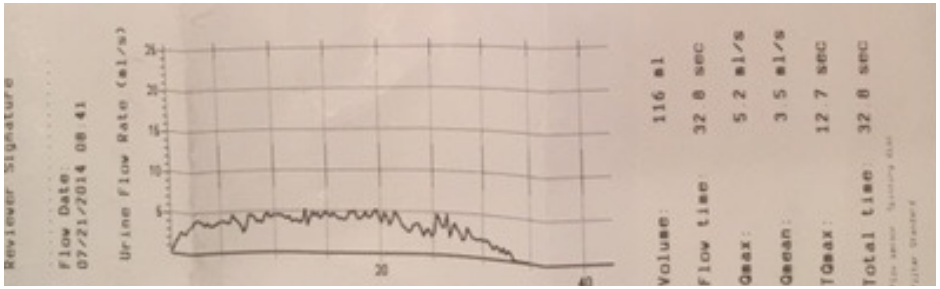
Uroflow and PVR



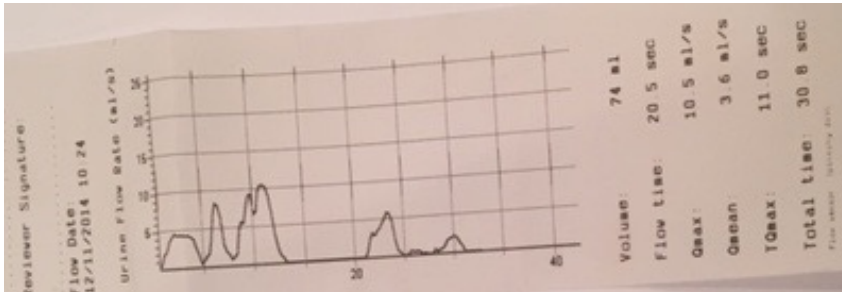
Tower-shaped



Interrupted (abdominal straining)



Plateau



Staccato (mostly)

Austin et al 2016

Initial Management of Functional Lower Urinary Tract Issues

- Drink a lot: keep urine light yellow in color
- Pee a lot: first thing in the morning, last thing at night, and every 2 hours during the day, whether or not the child needs to
- Poop (soft BM, every day!)

The Atlantic

EDUCATION

When Schools Tell Kids They Can't Use the Bathroom

By imposing harsh restrictions on when students can use the restroom, educators are teaching kids to ignore their bladder.

BY ALIA WONG
26 FEBRUARY 2019 · 5-MIN READ

Lower Urinary Tract Dysfunction in Elementary School Children: Results of a Cross-Sectional Teacher Survey

Lauren N. Ko, Kai-wen Chuang, Angelique Champeau, I. Elaine Allen and Hillary L. Copp*

From Harvard Medical School, Boston, Massachusetts, and University of California-San Francisco (KC, AC, IEA, HLC), San Francisco, California

Neveus et al 2010; Cooper et al 2003; Arlen et al 2011

Behavioral Modification

- 30-50% of patients will improve with timed voiding alone (but one-third will recur within a year)

- Up to 88% of patients will improve with a regimen combining timed voiding, modification of fluid intake, pelvic-floor exercises, and voiding diaries

- Medical therapy is thus an adjunct to, rather than a replacement for, behavioral modification

Sillen et al, 2010

Pelvic Floor Biofeedback Training

- Requires motivated children and parents
- Better results if elimination habits optimized (consider PT if GI issues also)
- In one study, up 89% of patients will have symptomatic improvement and 61% will have symptom resolution using biofeedback with animation
  - In another study, similar rates of symptomatic success but children who were treated with animation had larger decrease in PVR

McKenna et al, 1999; Oktar et al, 2018; Combs et al 1998; Ladi-Seyedian S et al 2015; Ladi-Seyedian et al 2019; Pekbay et al 2019

Well…… What About the Poop? (slides from Dr. Ambartsumyan)

Neurogastroenterology & Motility

Neurogastroenterol Motil (2016) **28,** 924–933 doi: 10.1111/nmo.12794

Simultaneous urodynamic and anorectal manometry studies in children: insights into the relationship between the lower gastrointestinal and lower urinary tracts

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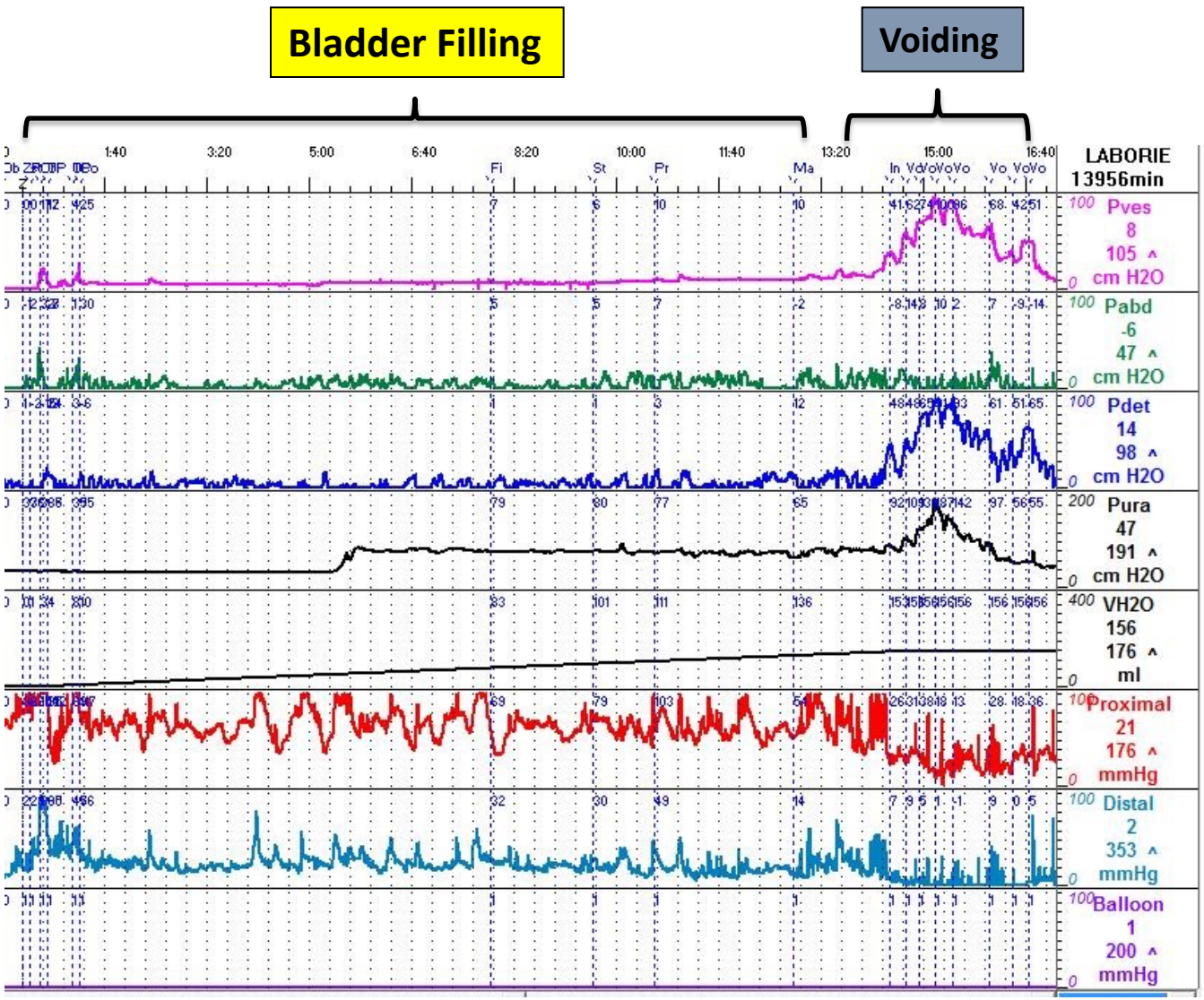
*Center for Motility and Functional Gastrointestinal Disorders, Boston Children's Hospital, Boston, MA, USA
†Department of Urology, Boston Children's Hospital, Boston, MA, USA

Combined Urodynamics & Anorectal Manometry



Bladder Pressure

Abdominal Pressure

Detrusor Pressure

Urethral Pressure

Filling Volume

Intra-anal Pressure

Intra-anal Pressure

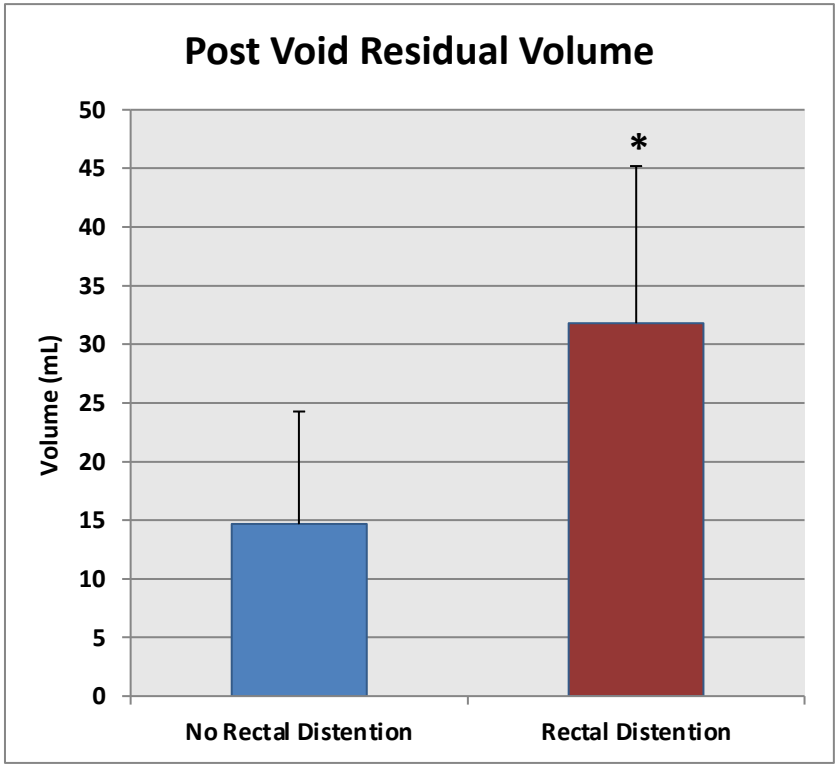
ARM Balloon

Bladder Dynamics

Increase in Post Void Residual with rectal balloon distention

Patients did not effectively empty their bladder when the rectum was distended

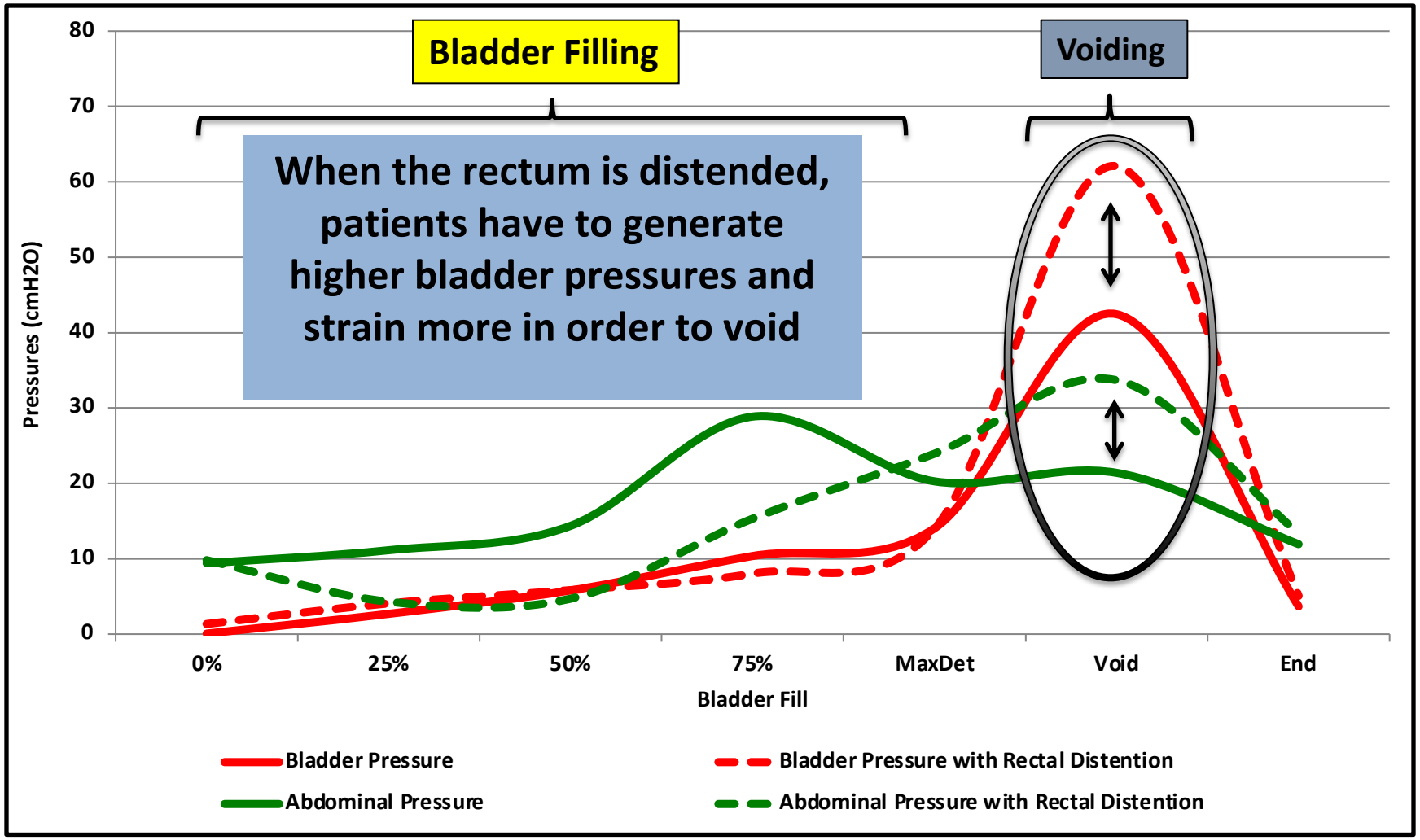
Increased PVR Volume is associated with Urinary Tract Infections

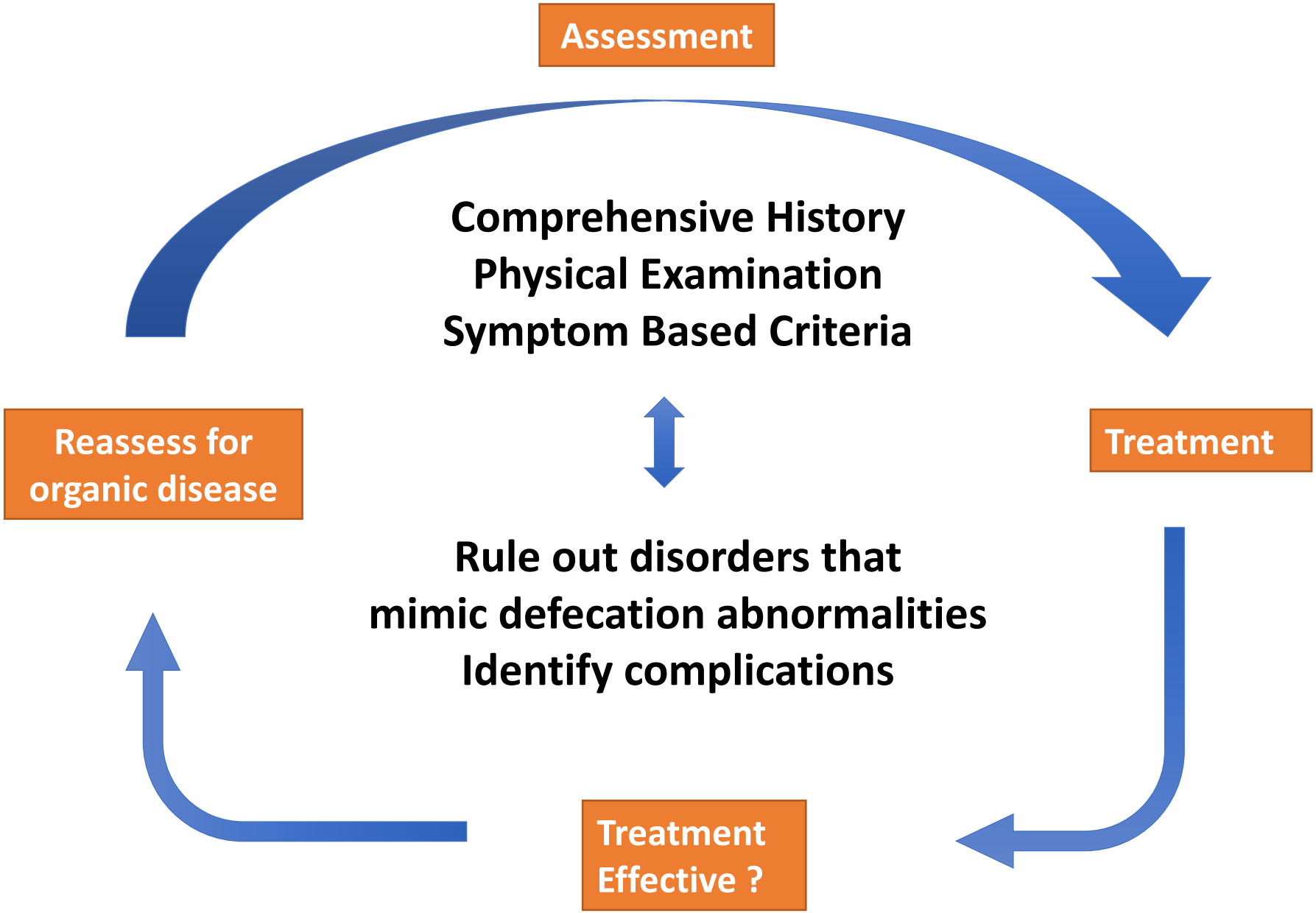


p = 0.01

Bladder Void Dynamics

Increase in Bladder and Abdominal pressures during voiding with rectal balloon distention




Assessment
Comprehensive History
Physical Examination
Symptom Based Criteria
Treatment
Rule out disorders that
mimic defecation abnormalities
Identify complications
Treatment
Effective ?
Reassess for
organic disease

Alarm Signs & Symptoms

Constipation starting extremely early in life (<1 mo)

- Passage of meconium >48 h
- Family history of HD
- Ribbon stools
- Blood in the stools in the absence of anal fissures
- Failure to thrive
- Fever
- Bilious vomiting
- Abnormal thyroid gland
- Severe abdominal distension
- Perianal fistula
- Abnormal position of anus
- Absent anal or cremasteric reflex
- Decreased lower extremity strength/tone/reflex
- Tuft of hair on spine
- Sacral dimple
- Gluteal cleft deviation
- Extreme fear during anal inspection
- Anal scars

Hirschsprung's Disease

- Up to 99% of neonates pass meconium within 48 hours of life
- 33-50% of neonates with HD also pass meconium within 48 hours of life

Anorectal Malformations

Neurologic Spinal Anomaly

Sexual abuse

Tabbers, M., et al., Evaluation and Treatment of Functional Constipation in Infants and Children: Evidence-Based Recommendations From ESPGHAN and NASPGHAN. JPGN, 2014. 58(2): p.258-274.

Goals of Treatment

Facilitate colonic emptying

Ensure fecal continence

Preserve colonic neuromuscular integrity

Treatment: Non-Pharmacological

Dietary Fiber

- Soluble & Insoluble

Fluid Intake

Physical Activity

Probiotics & Prebiotics

Behavioral Therapy

Biofeedback

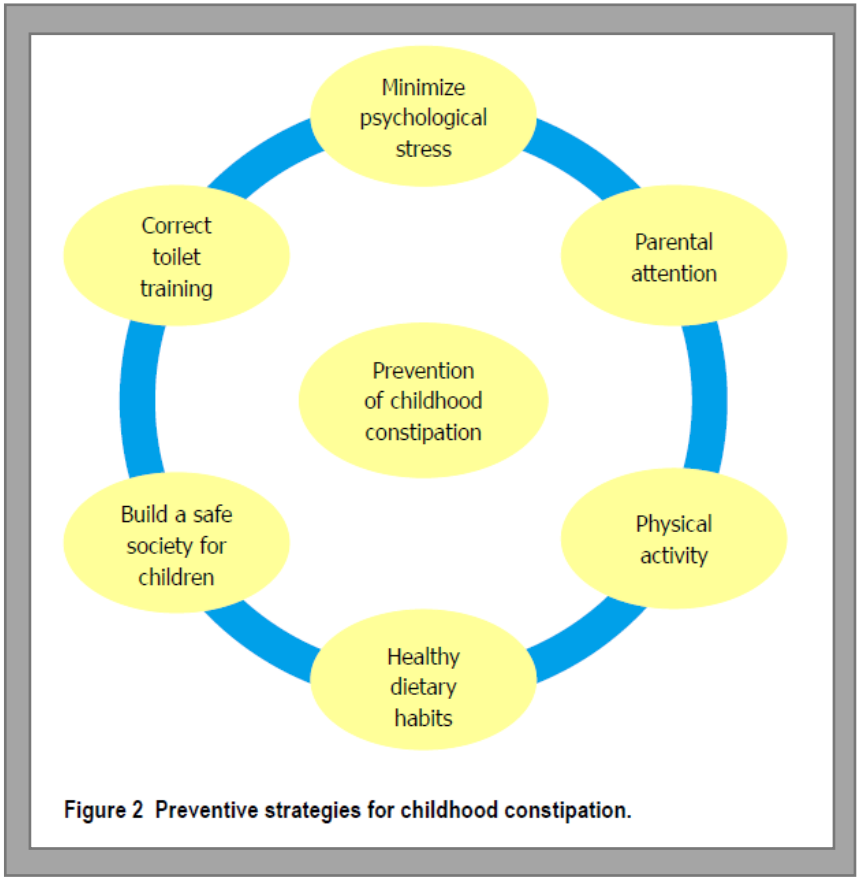


Figure 2 Preventive strategies for childhood constipation.

Koppen I. et al. Childhood constipation: finally something is moving! Expert Rev. 2016 Gastroenterol. Hepatol. 10(1);141-155

Tabbers M.M, et al. *Evaluation and Treatment of Functional constipation in Infants and Children: Evidence-Based Recommendations From ESPGHAN and NASPGHAN*. JPGN 2014;58: 258-274

Koppen I et.al. Management of functional Constipation in Children: Therapy in Practice. Pediatr Drugs(2015)17:349-360

Rajindrajith S, et al. Childhood constipation as an emerging public health problem. World J. Gastroenterol 2016 Aug;14:22(30):6864-75

Gastroenterology 2017;152:82–91

CLINICAL—ALIMENTARY TRACT

Effectiveness of Pelvic Physiotherapy in Children With Functional Constipation Compared With Standard Medical Care

Marieke L. van Engelenburg-van Lonkhuyzen,[1] Esther M. J. Bols,[1] Marc A. Benninga,[2] Wim A. Verwijs,[3] and Rob A. de Bie[1]

[1]Department of Epidemiology, School for Public Health and Primary Care, Maastricht University Medical Centre, Maastricht, The Netherlands; [2]Department of Paediatric Gastroenterology, Emma Children's Hospital/Amsterdam Medical Centre, Amsterdam, The Netherlands; [3]Department of Paediatrics, Zuwe Hofpoort Hospital, Woerden, The Netherlands

ORIGINAL ARTICLES

www.jpeds.com • THE JOURNAL OF PEDIATRICS

(J Pediatr 2017;190:74-8).

Physical Therapy for Fecal Incontinence in Children with Pelvic Floor Dyssynergia

Swathi Muddasani, MBBS[1], Amanda Moe, PT, DPT[2], Caitlin Semmelrock, PT, DPT[2], Caroyl Luan Gilbert, PNP[1,3], Valentine Enemuo, MD[1,3], Eric Howard Chiou, MD[1,3], and Bruno Pedro Chumpitazi, MD, MPH[1,3]

Treatment: Pharmacological

Osmotic Laxatives

- Polyethylene glycol
- Lactulose
- Milk of magnesia (magnesium hydroxide)

Fecal Softeners

- Mineral Oil
- Docusate

Note: NO RCTs of optimal dosing

Stimulant Laxatives

- Senna
- Bisacodyl

Enemas

- Sodium phosphate
- Sodium docusate
- Mineral Oil
- Glycerin
- Bisacodyl

Suppositories

- Glycerin
- Bisacodyl

Tabbers, M., et al., Evaluation and Treatment of Functional Constipation in Infants and Children: Evidence-Based Recommendations From ESPGHAN and NASPGHAN. JPGN, 2014. 58(2): p.258-274.

Treatment

Duration of treatment

- No randomized controlled trials available
- Should be continued for at least 2 months
  - ***SCH Motility : 3-6 months***

Discontinuation

- Resolution of all symptoms for at least 1 month
- Completed toilet training
- Gradual weaning of medications
  - ***SCH Motility : over 6-12 months***

Tabbers, M., et al., Evaluation and Treatment of Functional Constipation in Infants and Children: Evidence-Based Recommendations From ESPGHAN and NASPGHAN. JPGN, 2014. 58(2): p.258-274.

Thank you