"Listening to the Little People" Enuresis, Encopresis and Urologic Problems in Children
Workshop 44
Tuesday24 August 2010,14:00-18:00

Time	Time	Topic	Speaker
14:00	14:05	Introduction	Frankie Bates
14:05	15:05	Nocturnal and Diurnal Enuresis in Children	Gina Porter
15:05	15:30	Constipation and Encopresis in Children	Claudia Brown
15:30	16:00	Break	
16:00	16:35	Constipation and Encopresis in Children (continued)	Claudia Brown
16:35	17:05	Things We Missed During Routine Evaluation of Lower Urinary Tract Symptoms in Children	Armando Lorenzo
17:05	17:15	Comfort Break	
17:15	17:45	Things We Missed During Routine Evaluation of Lower Urinary Tract Symptoms in Children (continued)	Armando Lorenzo
17:45	18:00	Closing Remarks and final questions	

Aims of course/workshop

Define Primary and Secondary Nocturnal Enuresis (NE) and Diurnal Enuresis. Discuss the etiologies and treatment choices for DE and NE . Determine, conservative, behavioral and pharmaceutical approaches for treatment of enuresis . Define constipation and encopresis. Discuss behavioral modification in the treatment of constipation, encopresis and dysfunctional voiding. Discuss the role of physiotherapy in incorporating these treatment modalities. Discuss anatomical urologic abnormalities (including congenital) in children. Discuss association of anatomic abnormalities with lower urinary tract symptoms and incontinence in children. Discuss neurogenic bladder, posterior urethral valves and ectopic ureter.

Educational Objectives

Educational Value:

This workshop is of great importance to health care providers to help increase understanding around urologic problems in children. These will include voiding dysfunctions, incontinence, constipation and encopresis. A background discussion and presentation will also enable the attendee to understand congenital and urologic problems in children leading to incontinence. Whilst not a life threatening disorder, incontinence in children is associated with behavioral problems, lack of self esteem and can present significant psychosocial problems for children and their parents.

The pediatric population needs to be focused on as incontinence is a common occurrence and often overlooked and ignored by health care providers. By attending this workshop a greater understanding of these problems and simple modifications/ life style changes can help change a child's life.

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Description:

Enuresis in Children: Gina Porter

Enuresis is a common disorder that affects the pediatric population world wide. It can be further qualified as nocturnal enuresis (NE) or diurnal enuresis (DE). The prevalence of enuresis varies by age and gender. It is estimated that 10 to 15 %of five year olds and 5% of 10 year olds suffer with NE, with 1 to 2 % continuing on past 18 years of age. The prevalence for DE is estimated to range from 2 to 4 % in six to seven year olds.
The etiologies of NE include maturational delay, genetic factors, polyurea, small bladder capacity, psychological factors, sleep disorders and diet. Various treatment options are available, such as night lifting, positive reinforcement, life style changes, treating constipation, moisture alarms and bladder control exercises. Failing this pharmacotherapy should be considered, such as DDAVP, or an anticholinergic such as Detrol/ Ditropan / Vesicare/ Enablex to help increase bladder capacity.
Causes of DE include constipation, diabetes, UTI, voluntary holding of urine, vaginal reflux, ectopic ureter, overactive bladder, structural anomalies, neurogenic bladder, and voiding dysfunctions. Treatment of DE is generally aimed at alleviating the underlying disorder causing the DE symptom. This may include reassurance, treating UTI if present; correct positioning on toilet, treating constipation, surgery for anatomic anomalies, pelvic floor exercises and Biofeedback therapy.
Successfully treating a child suffering with enuresis is a very rewarding and worthwhile endeavor as it will often impact the rest of the young person's life in a very positive way.

Constipation and Encopresis in Children: Claudia Brown:

Childhood constipation is a common disorder that may lead to encopresis. Accumulation of stool in the rectum can lead to impaction and rectal desensitization, and new stool proximal to the impaction becomes liquefied, leaking around the fecaloma to cause soiling.
In order to eliminate the encopresis, the constipation must be treated. Ideal treatment is multi-faceted, due to the biopsychosocial nature of the disorder. One aspect of the treatment approach addresses the functional technique of defecation.

Constipation is often the result of a poor evacuation technique, involving inadequate relaxation of the anal sphincter and pelvic floor musculature, coupled with excessive straining to defecate.

With physiotherapy, the child learns to identify the anal sphincter and pelvic floor musculature, with the help of imagery, manual instruction and biofeedback. With biofeedback, surface electromyographic electrodes are placed on the perineum to monitor muscle contractions and subsequent relaxation, to be displayed to the child for increased awareness and understanding. Balloon techniques may be used to increase rectal sensitivity and awareness, to improve the identification of fullness. Also, a rectal balloon may be used for the practice of simulated evacuation.
The child and his parents are instructed on the proper evacuation technique, to include discussion on timing, including regular attempts to evacuate and optimization of the gastro-colic reflex, demonstration of position and degree and nature of push. Functional exercises are given for home practice. A positive reinforcement regime is established in the form of simple rewards and words of encouragement.
Similarly, physiotherapy can help children with dysfunctional voiding, helping them to learn to relax the pelvic floor musculature for micturition.

Things we Missed during the Routine Evaluation of Lower Urinary Tract Symptoms of Childhood : Armando Lorenzo :

The topics that will be covered are to discuss anatomical abnormalities (including congenital) in children, the association of anatomic abnormalities with lower urinary tract symptoms and incontinence in children and the diagnosis and management of incontinence in Children. Urologic conditions in children such as neurogenic bladder, posterior urethral valves and ectopic ureter will be covered in detail.

Chair:
Frankie Bates, Canada
dbates@nbnet.nb.ca

Worked in the field of pediatric urology for 17 years. Treated dysfunctional voiding with biofeedback therapy as well as voiding cystourethrograms. Treated children with nocturnal and diurnal enuresis. Presented extensively both nationally and internationally on the subject of N.E and D.E and voiding dysfunctions. Received lectureship award in Oct 2004 for presenting "Nocturnal and Diurnal Enuresis" Society of Urologic Nurses Association 35th Annual Conference Florida US
"Nocturnal Enuresis" The Informer .Canadian Continence Resource Newsletter Fall 2008
"The Role of the Nurse Continence Advisor in a Urology Wellness Clinic". Urologic Nursing. Volume 22 Number 1 Feb 2002 (Received UNC Editorial award)

1St Speaker:
Gina Porter Canada
Gina.Porter@horizonnb.ca

Gina Porter developed and managed the Urodynamics Clinic at St. Joseph's Hospital in 1990. In 1994 she began seeing pediatric patients for Urodynamic testing as well as treating voiding

dysfunctions using voiding cystourethrogram (VCUG) to make the patient aware of their detrusor / sphincter dyssynergia. In 1995 she began treating pediatric patients with enuresis, both NE and DE. In this same year she also opened a Biofeedback and Stimulation clinic. In March 1998 she received her Nurse Continence Advisors certificate from McMaster University. In October 1998 she received her Pelvic Floor Physiotherapy course certificate. Gina presently co manages a Urology Wellness Clinic. Gina has presented both locally and nationally on a variety of topics including: Enuresis, Voiding Dysfunctions, Biofeedback Therapy and Urinary Incontinence .She has authored and co authored several articles over the past seven years.
"Around the Mulberry Bush without an Accident" 14th Annual Urologic Excellence Conference 2001
Bladder Health and our Children" A Health and Wellness Promotion Program on Nocturnal and Diurnal Enuresis Grand Manan NB 2001

2nd Speaker:
Claudia Brown Canada
claudiabrown@videotron.ca

Claudia Brown has been practicing pelvic floor physiotherapy for over 20 years, treating patients affected with incontinence, pelvic pain, and other pelvic disorders. A graduate of McGill university, she has lectured nationally and internationally on the subject of pelvic floor physiotherapy, and has been involved in several research projects in this field .Claudia teaches the first pelvic floor course for undergraduate physiotherapy students at McGill University, gives post graduate courses on the subject and is the owner and director of two physiotherapy clinics in the Montreal area. Publications include a chapter in the book, The Urinary Sphincter (Dekker), two chapters in The Pelvic Floor (Thieme) and several articles for the lay and professional audience. Claudia is a member of the Governing Board of the Canadian Continence Foundation.
Brown, C, Chapters 2.1 and 6.2, in Carrière, B., Markel Feldt, C :
The Pelvic Floor (Theime) New York 2006 (Chapter)

3rd Speaker:
Armando Lorenzo, Canada
armando.lorenzo@sickkids.ca
Dr Armando J Lorenzo graduated from the University of Panama School of Medicine, Panama City, Republic of Panama in 1994. He completed his residency program in Urology at UT Southwestern Medical School in Dallas and received his Fellowship in Urology in 2006 at The Hospital for Sick Children, Toronto, Canada. Below are just a few listings of his works:

Invited Visits to Other Hospitals/Universities

1. Canadian Urological Association, Quebec, QC, Jun 24, 2007 - Jun 26, 2007. Pediatric Panel Forum. Urinary Incontinence in Children: Your Day to Day Office Practice.
2. XV Congress of Latin American Pediatric Association, San Juan, Puerto Rico, Nov 15, 2009 - Nov 20, 2009. Neurogenic Bladder: Management and New Tendencies in Treatment (Podium Presentation).
3. Children's Hospital of Orange County, Orange County, California, May 2, 2009. Breakout Session: Common Problems in Pediatric Urology.
Lorenzo, AJ., Chait, PG., Wallis, MC., Raikhlin, A., Farhat, WA:

4. Minimally invasive approach for the management of urinary and fecal incontinence in selected spina bifida patients. Urology 2007: 70 (3): pp 568-571. PA
Dave, S., Pippi Salle, JL., Lorenzo, AJ., Braga, LH., Peralta-Del Valle, MH., Bagli, DJ., Farhat, WA., Khoury, AE:
5. Is long term bladder deterioration inevitable following successful isolated bladder outlet procedures in children with neuropathic bladder
Moodley, P., Demaria, J., Lorenzo, AJ., Pippi Salle JL., Braga, LH:
6.Concurrent Ureteropelvic and Ureterovesicl Junction Obstruction in Children: The Value of Retrograde Pyelography. Journal of Urology 2009. C

MONDAY	O 	O 	O 	O 
TUESDAY	O 	O 	O 	O 
WEDNESDAY	O 	O 	O 	O 
THURSDAY	O 	O 	O 	O 
FRIDAY	O 	O 	O 	O 
SATURDAY	O 	O 	O 	O 
SUNDAY	O 	O 	O 	O 

KEY:	HAPPY FACE	SAD FACE	COLOR BED IN	X THROUGH BED
				
	Did Not Wet	Wet The Bed	Got up alone, voided and changed	Did not get up, slept through alarm

NOTES:_____

_____

_____

_____

TWO WEEK BOWEL CHART

Please fill in the chart every day using the numbers from the Bristol Stool Scale chart for the type of stool (bowel movement). If no stool is passed then just leave the chart empty for that day.

	Type & amount of stool (i.e. large, med., small)	Type & amount of stool (i.e. large, med., small)	Type & amount of stool (i.e. large, med., small)
MONDAY			
TUESDAY			
WEDNESDAY			
THURSDAY			
FRIDAY			
SATURDAY			
SUNDAY			
MONDAY			
TUESDAY			
WEDNESDAY			
THURSDAY			
FRIDAY			
SATURDAY			
SUNDAY			

Bristol Stool Scale:

The seven types of stool are:

- 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 its surface
- Type 4: Like a sausage or snake, smooth and soft
- Type 5: Soft blobs with clear cut edges (passed easily)
- Type 6: Fluffy pieces with ragged edges, a mushy stool
- Type 7: Watery, no solid pieces. **Entirely liquid**

The Bristol Stool Scale

The Bristol Stool Scale was developed in the United Kingdom by a small team of gastroenterologists. It was developed by Heaton and Lewis at the University of Bristol and was first published in the *Scandinavian Journal of Gastroenterology* in 1997.It is designed to be a representative explanation for stools commonly seen.

How to Analyze Your Stools:

Type 1: Separate hard lumps, similar to nuts. (hard to pass)

Type 2: (Constipation)
Sausage- shaped but lumpy

Type 3 : Like a sausage but with cracks on its surface.

Type 4): Like a sausage or snake, smooth and soft.

Type 5: Soft blobs with clear-cut edges, passed easily.

Type 6: Fluffy pieces with ragged edges,a mushy stools.

Type 7: Watery, no solid pieces. Entirely liquid

Lewis SJ, Heaton KW (1997). "Stool form scale as a useful guide to intestinal transit time". *Scand. J. Gastroenterol.* **32** (9): 920–4.

CHILDHOOD ENCOPRESIS

> Encopresis is defined as the repeated passage of feces into inappropriate places. The event must take place at least once a month for a minimum of 3 months, and the chronologic and developmental age of the child must be at least 4 years. The behaviour is not due exclusively to the direct physiological effects of a substance (e.g., laxatives) or a general medical condition except through a mechanism involving constipation.
>
> *Diagnostic and Statistical Manual of Mental Disorders(DSM III)*

It is estimated that 1-3% of children below the age of 10 suffer from encopresis. Approximately 80% of these are boys. Encopresis may be involuntary or voluntary.

INVOLUNTARY ENCOPRESIS

Between 80-95% of encopresis is involuntary, and usually associated with a history of constipation and/or painful bowel movements. Chronic constipation leads to rectal distension, decreased sensation and overflow incontinence, which is uncontrollable. Patients may present with palpable stool throughout the distribution of the colon, and decreased resting tonus of the anal sphincter.

VOLUNTARY ENCOPRESIS

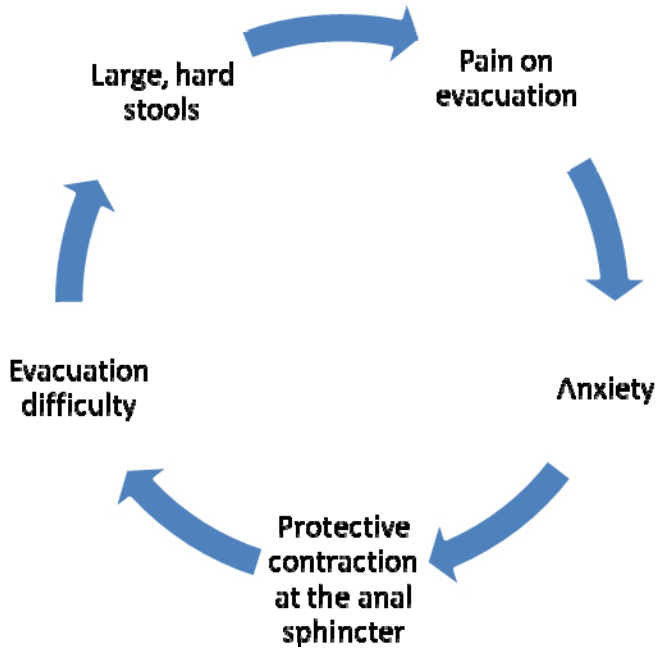
Voluntary encopresis is found in a much smaller percentage of patients, who have good bowel control but choose to evacuate in inappropriate places. It is often termed 'non-retentive' encopresis as it is not related to constipation. Patients have normal stool consistency and do not demonstrate evidence of incomplete evacuation upon evaluation.

INVESTIGATION

History will indicate chronologic and mental age above four years, and at least one episode of fecal incontinence per month since a minimum of three months. Standard investigation procedures rule out organic or metabolic disorder other than chronic constipation. In the case of involuntary encopresis, abdominal and rectal examination may demonstrate incomplete evacuation, colonic fullness and/or anal hypotonicity. Soiling and skin irritation may be evident upon surface inspection. These findings are absent with voluntary encopresis.

TREATMENT

Treatment will depend upon the cause. In the case of involuntary encopresis, the cause is usually chronic constipation. At times, this may be the result of the association of pain or anxiety with defecation, possibly as a result of stress, or as a result of the difficult evacuation of large hard stool, thereby causing a dysfunctional evacuation cycle:



A multi-faceted treatment approach will target each element of the cycle.

Large, hard stools

Treatment may necessarily begin with enema use for the disimpactment of a fecaloma. Short term use of laxatives and stool softeners may be indicated to promote optimum consistency. Parent, care-giver and patient education, dietary modification and increased fluid intake, along with a controlled yet de-dramatized evacuation routine will help to promote the establishment of soft, pain-free stools.

Pain on evacuation

Success in targeting the other elements of the dysfunctional evacuation cycle will lead to a decrease in pain on evacuation. In addition, deep breathing exercises, local massage of the peri-anal area prior to evacuation, anal dilatation and the occasional application of a topical anaesthetic will help to decrease pain and break the cycle.

Anxiety

Parent, care-giver and patient education will help to decrease the anxiety associated with evacuation. The rewarding of successes and the de-dramatization of failures are key elements in enabling the child to gain control of his bowel movements. Deep breathing exercises, imagery techniques and a positive attitude towards toileting will help to decrease anxiety, leading to improved relaxation at the anal sphincter during defecation. Conflict, pressure to perform, argument and embarrassment should be avoided at all costs. Also, successful pain management will in turn decrease anxiety.

Protective contraction at the anal sphincter

Patients with fecaloma may demonstrate low resting tone at the internal anal sphincter, possibly due to reflex inhibition at rectal distension. Chronic constipation may also be associated with increased tone at the anal sphincter. Paradoxically, the anal sphincter may contract during the attempt at evacuation, initially as a protective mechanism against pain or anxiety, and eventually as a conditioned response at evacuation.

The child must learn to relax the anal sphincter during evacuation attempts:

- ✓ Bulbocavernosis reflex for identification of contraction
- ✓ Biofeedback (EMG or manometry)
- ✓ Manual techniques (digital dilatation, massage and myofascial release, pubo-rectalis stretching)
- ✓ Pelvic floor exercises to do at home, with emphasis on the relaxation component

- ✓ Concentration on relaxation of anal sphincter during evacuation

The use of the bulbocavernosis reflex (anal wink) will allow the child to identify the sensation of a contraction, to enable him to subsequently imitate this contraction actively. Biofeedback can also be used to help the child discover the activity of his anal sphincter. Surface electromyographic (EMG) electrodes or a manometric catheter positioned at the external anal sphincter will record muscle activity for immediate display. This improves the learning of the sphincteric contraction and relaxation. Inventive computer graphics help to make this learning activity a pleasurable one. Manual techniques may be employed to improve proprioception.

Once the patient knows how to contract the muscle, it is easier for him to learn to relax it on his own. A home exercise program consolidates the learning, and will eventually enable the child to concentrate on the relaxation of the pelvic floor and anal sphincter during evacuation. Coupled with the optimum evacuation technique, this will help to promote a more complete and pain-free evacuation.

<u>Evacuation difficulty</u>

Evacuation will be facilitated with an optimum routine and evacuation technique.

Routine:

- ✓ evacuation attempt 20 minutes after each meal to take advantage of the gastro-colic reflex, especially after breakfast

- ✓ intestinal massage just prior to evacuation, to promote peristalsis

- ✓ evacuation attempt for no longer than 5-10 minutes in one sitting

- ✓ reward success, dedramatize failure

Technique:

- ✓ Sit comfortably on toilet, use child seat if indicated.

- ✓ Feet are well-supported, with knees higher than hips to open ano-rectal angle and promote relaxation of pubo-rectalis portion of levator ani.

- ✓ Contract and relax anal sphincter for identification. Maintain relaxation.

- ✓ Gently increase intra-abdominal pressure:
    - o Diaphragmatic breathing
    - o Abdominal binding
    - o Use of transverses abdominus muscle

- ✓ Maintain relaxation of anal sphincter and pubo-rectalis muscle until evacuation is complete.

Chronic constipation may lead to excessive rectal distension and decreased sensitivity. Patients may no longer feel the sensation to defecate in a timely manner. A water or air-filled balloon may be distended in the rectum to help the patient to concentrate on and identify the sensation of fullness. Also, the balloon may be used to help the patient to simulate evacuation with instruction from the therapist.

The child must be involved in the management of his encopresis . He is given a bowel and bladder diary on which he records, with parental assistance, his attempts at evacuation and evacuation successes, episodes of incontinence, medication , and diet. This diary serves as an evaluative aid, a treatment guide, a learning tool and an outcome measure.

The involuntary encopresis usually ceases once the constipation is resolved.

For voluntary encopresis, a psychological referral may be warranted. Once the underlying cause of the abherrant behaviour is discovered, behavioural modification and family therapy may help to solve the problem. For older children, a psychiatric consult may be necessary.

In either case, a non-threatening and non-judgemental approach is required for optimum co-operation and success. Maintenance is accomplished through regular follow-up visits, the development of regular bowel habits and the establishment of a healthful high-fibre diet.

Encopresis may be prevented through the avoidance of precocious toilet training, the avoidance of constipation and through parental modelling in terms of diet, fluid intake, evacuation outine and a healthy attitude towards toileting.

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Things we miss during the evaluation of lower urinary tract symptoms in children

Armando J. Lorenzo
ICS IUGA 2010
Toronto, Ontario

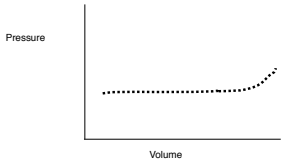
Normal Bladder Function

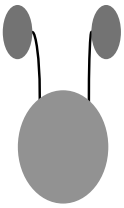
- Slow filling
- Sensation of full bladder
- Relaxation of sphincter
- Initiation of voluntary bladder contraction
- Bladder neck relaxes
- Voiding is complete and urethral pressure rises and sphincter closes

Bladder Physiology

STORAGE

- Compliance: fill at low pressure
- Capacity: proportional to age

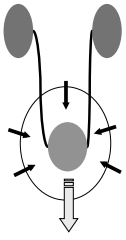




Bladder Physiology

EMPTY

– Contract
- Complete
- Unobstructed



Incontinence

Failure to Store

Failure to Empty

Failure to Store

Bladder
- The 3 C's of bladder storage include capacity, compliance and contractility

Urethra
- Dysfunctional Bladder Neck / Sphincter

Combination

Failure to Empty

Bladder
- Poor Contractility

Urethra
- Obstruction of the urethra, bladder neck / sphincter, meatal stenosis

Combination

The basics

- MOST children do not need referral to specialized clinic
- MOST children do not have an underlying medical condition (i.e. neurological issue)
- MANY patients are treated because of PARENTAL distress
- MOST patients do not need or benefit from invasive tests

Goals of treatment

- Alleviate parental concerns
- Prevent/decrease psychological sequelae
- **Early diagnosis and treatment of underlying medical conditions:**
  - **Neurological issues (TCS)**
  - **Anatomical abnormalities (Ectopic ureter)**
  - **Nephrological/endocrine issues (Polyuria 2/2 diabetes mellitus or insipidus)**
- Adequate use of resources

The problems

- Impatience ("Quick fix")
- Imprecision ("Trial and error")
- Invasiveness ("Test to see")
- Innumerable practitioners ("Shop around for a cure")

Things we miss…

Ectopic ureter

- Females
- No "dry" period
- Failure to respond to behavioral or medical interventions
- May be missed on a quick physical exam
- Vaginal pooling of urine and vulvar irritation are frequently detected clues

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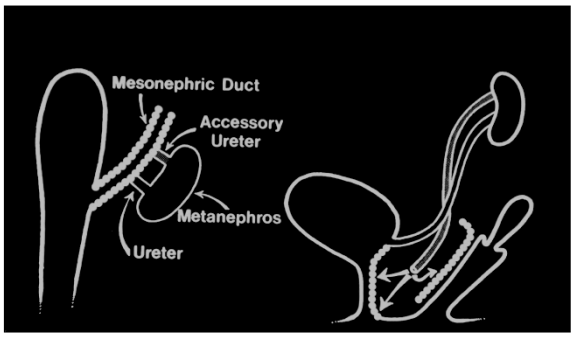

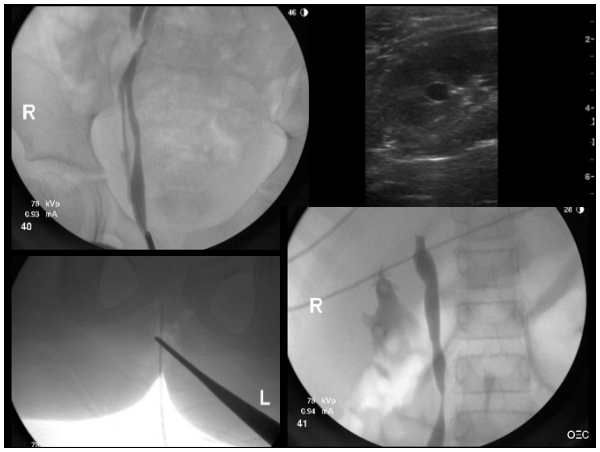

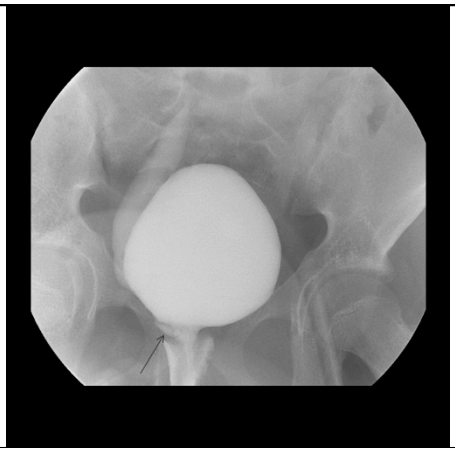

Ectopic ureter in boys

- Insertion proximal to sphincter
- No incontinence
- Lower urinary tract symptoms may occur if associated inflammatory conditions
  - Beware of the boy with recurrent epidydimitis

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Genital folds and adhesions

- Some are variants of normal anatomy
- Symptoms due to vaginal pooling, irritation, stream hitting the structure past the meatus
- Some need surgical management
  - Labial adhesions
  - Recurrence is a problem

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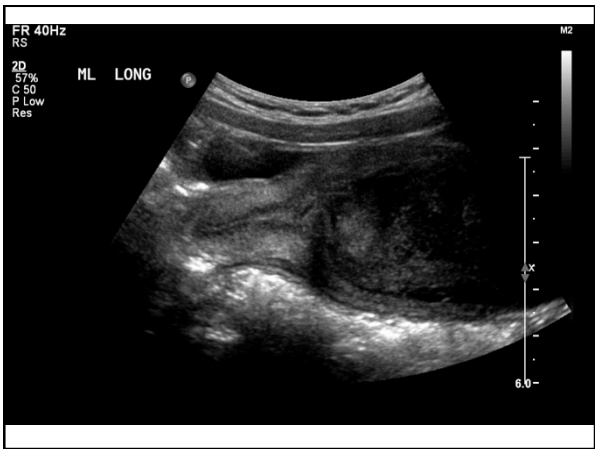

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Meatal stenosis

- Mostly seen in circumcised boys
- History of deviated urinary stream
- "Incontinence" really means urine all over the place when child attempts to void
- Occasionally child may have prolonged micturition with incomplete emptying leading to frequency and dysuria

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Spinal dysraphism

- Many cases obvious at birth
- Problem: Those with subtle abnormalities
- Other problem: Limited physical exam or relying on a previous "normal" exam
- Suspect:
  - Worsening at times of growth spurt
  - Deterioration despite treatment
  - Associated lower extremity/bowel symptoms

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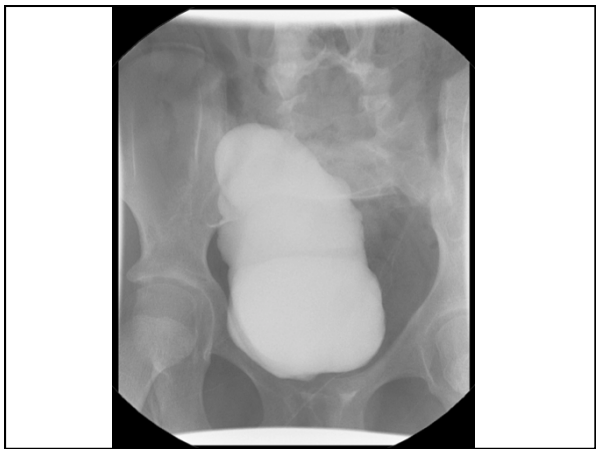

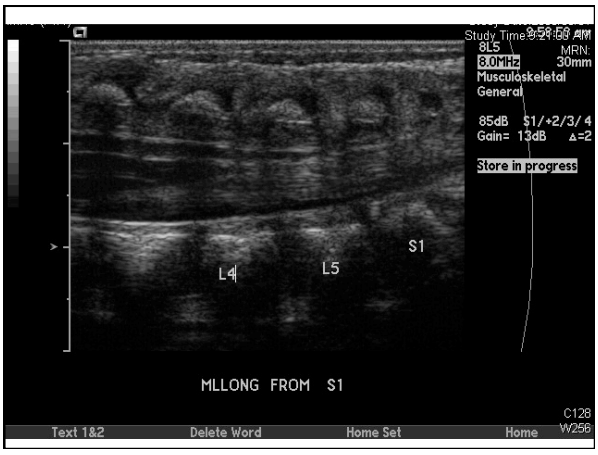
8L5
8.0MHz
Musculoskeletal
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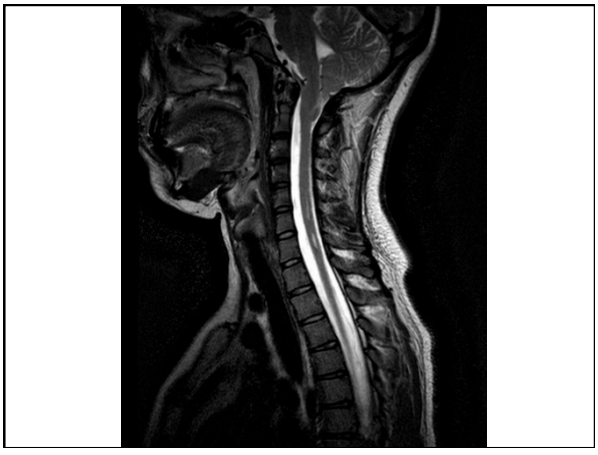
Home Set
Home
C128
W256



Sacral agenesis

- Rare
- Subtle findings on physical exam
- Affected children have severe and difficult to treat incontinence
- Flat gluteal region and palpable abnormalities of lower spine are important clues

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Urethral prolapse

- Rare
- Suspect if blood spots in underwear and new onset of incontinence or lower urinary tract symptoms
- Diagnosis straightforward on physical exam

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Urogenital sinus

- Common channel (single opening) only diagnosed if labia separated during physical exam
- Incontinence due to vaginal pooling of urine
- Lower urinary tract symptoms due to irritation and compression by full vagina

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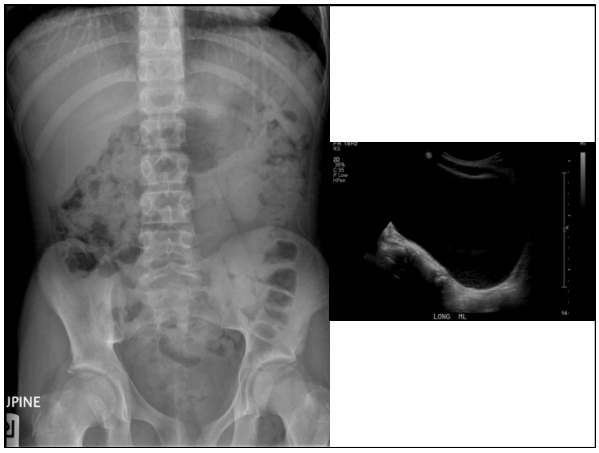
Bowel abnormalities

- Most problems are functional
- Occasionally specific disorders are the culprit
  - Beyond the bladder, bowel should always be considered in children with lower urinary tract symptoms
  - Beware of missed diagnoses, such as Hirschsprung's disease
  - Keep the GI service on speed dial



Epispadias

- Not as obvious as exstrophy
- Not necessarily associated with total incontinence
- Mild forms may only present with stress incontinence
- Easily detected on a good genital physical exam (if done)
- Easier to address if detected earlier in life

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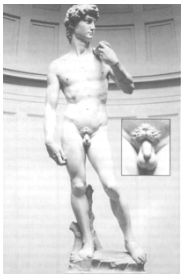
Phimosis

- Common!
- Urine entrapment and irritation
- Not all patients are treated by circumcision
  - Steroid cream
- Maybe be associated with important conditions
  - BXO
  - Buried penis



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Congenital urethral abnormalities

- Rarely the cause of incontinence or lower urinary tract symptoms (boys)
- Diverticulae and strictures most commonly seen post surgery (Imp to get a full surgical history)
- Congenital abnormalities seen in children with associated conditions (Prune Belly syndrome)

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Anorectal malformations

- Commonly detected at birth
- Focus early on the GI tract
- GU tract not uncommonly involved
  - Fistulas
  - Associated structural abnormalities
  - Neurogenic bladder (Spinal cord abnormalities, denervation injury from previous surgeries)

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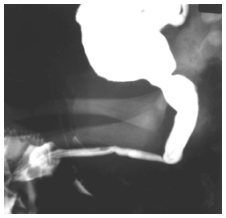
Posterior urethral valves

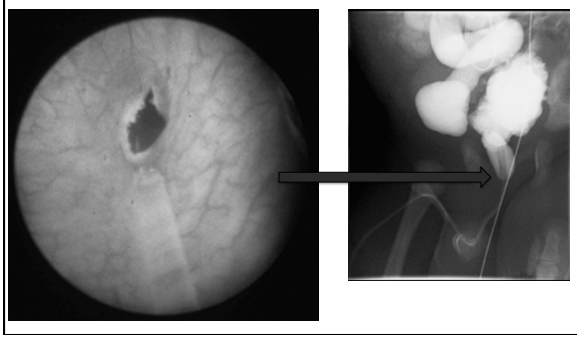


Cystogram: Imaging study of choice

MRI

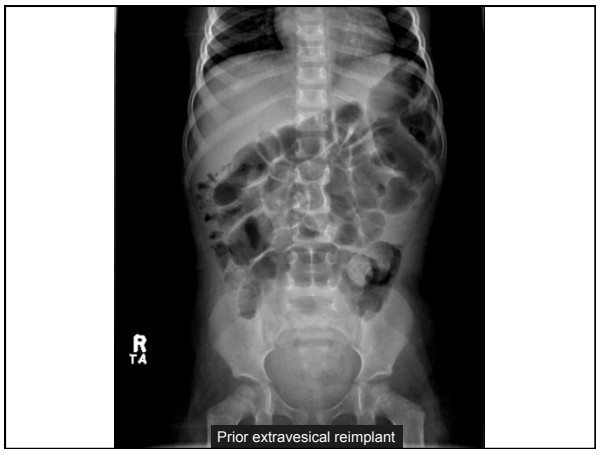
Antenatal diagnosis

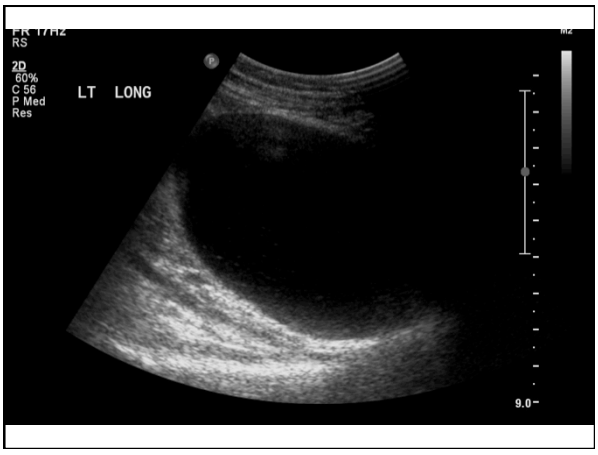
Posterior urethral valves (PUV)

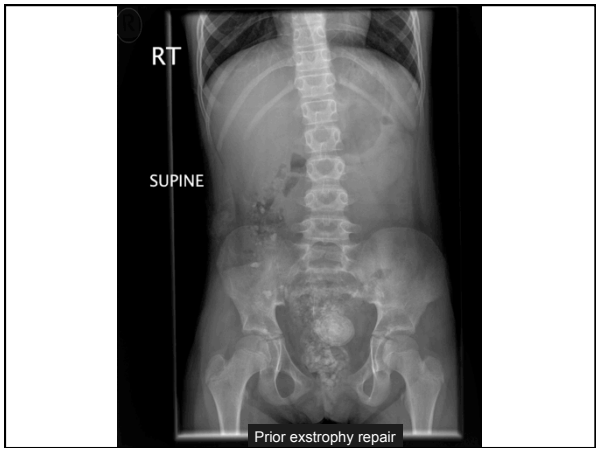


Postoperative voiding problems

- Worsening lower urinary tract symptoms or incontinence after surgery
- Suspect even if child previously had symptoms
- Important culprit:
  - Extravesical ureteral reimplantation (bilateral)

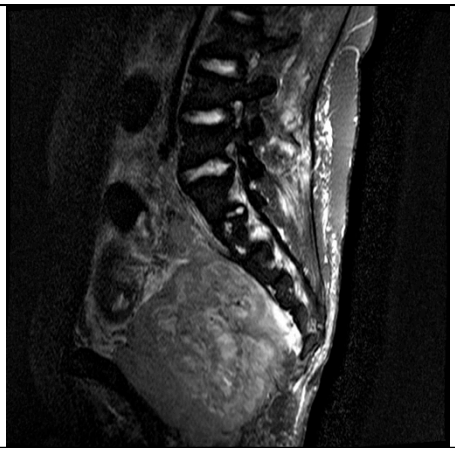






History of prior malignancies

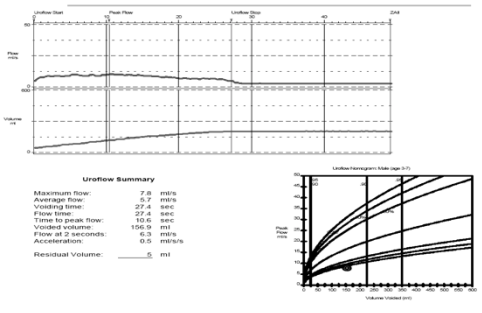
- Suspect GU involvement
- History if malignancy is usually readily provided
- We miss the link between this history and the possibility of malignant involvement or side effect from treatment



Urethral stricture

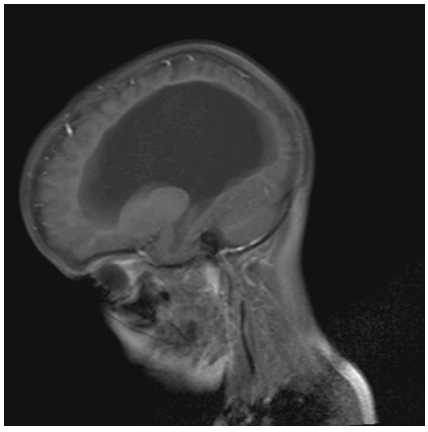
- Symptoms due to incomplete emptying and having to strain to urinate
- Suspect if prior straddle trauma or previous urethral instrumentation
- Flow rate useful study

Plateau Curve



Neurological symptoms

- Headaches
- Clumsy
- Back pain
- Asymmetry in muscle mass/tone
- Abnormal gain
- Failure to improve or respond to treatment
- Unexplained etiology for findings on other imaging studies (i.e. trabeculated bladder)



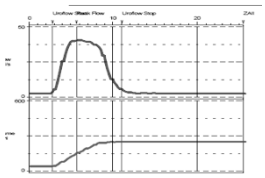
Step 1

- Medical history? Focused ROS. Full PE.
- When do symptoms occur?
  - Day only vs. night only vs. day and night
- Onset?
  - Since toilet training?
  - Stressors?
- Voiding diary
- Assess for constipation

Uroflows

- A flow rate is defined as the volume of fluid expelled via the urethra per unit time (ICS, 2008)
- Post-voided residual urine should be less than 10 % of the individual's bladder capacity (ICS, 2008)
- We perform approximately 15 to 25 uroflows per day
- A uroflow summary includes:
  - maximum flow, average flow, voiding time, flow time, time to peak flow, voided volume, flow at 2 seconds, acceleration, nomogram and residual volume

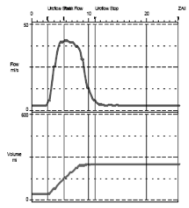
Uroflow Curve: Bell



Uroflow Summary

Maximum flow:	38.0	ml/s
Average flow:	24.2	ml/s
Voiding time:	8.4	sec
Flow time:	8.4	sec
Time to peak flow:	3.0	sec
Voided volume:	203.9	ml
Flow at 2 seconds:	36.3	ml/s
Acceleration:	11.6	ml/s/s
Residual Volume:	5	ml

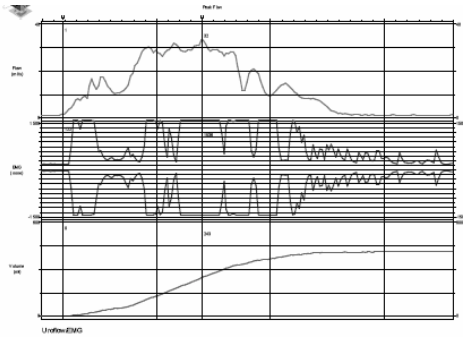
Tower Curve



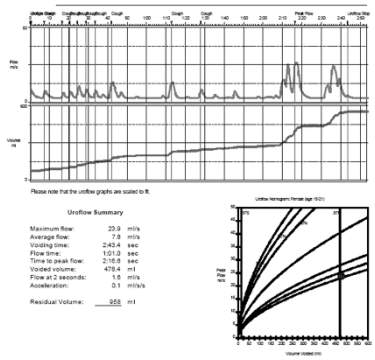
Uroflow Summary

Maximum flow:	38.0	ml/s
Average flow:	24.2	ml/s
Voiding time:	8.4	sec
Flow time:	8.4	sec
Time to peak flow:	3.0	sec
Voided volume:	203.9	ml
Flow at 2 seconds:	36.3	ml/s
Acceleration:	11.6	ml/s/s
Residual Volume:	6	ml

Staccato Curve



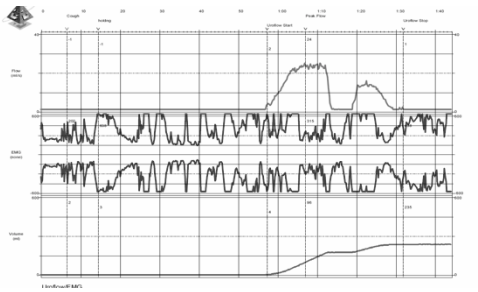
Interrupted Curve



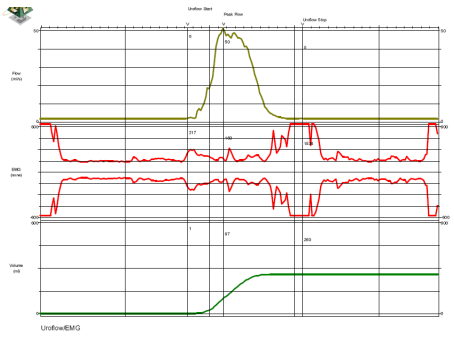
Uroflow Summary

Maximum flow:	23.9	ml/s
Average flow:	7.8	ml/s
Voiding time:	2:43.4	sec
Flow time:	1:01.0	sec
Time to peak flow:	2:16.8	sec
Voided volume:	478.4	ml
Flow at 2 seconds:	1.6	ml/s
Acceleration:	0.1	ml/s/s
Residual Volume:	968	ml

Uroflow with Pelvic Floor EMG Tracing



After Two Biofeedback sessions



Thank you!