The story of a lost kidney

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- **Bladder dysfunction can be due to**

1. neurogenic causes- spinal injury

2. obstructive causes- PUV

3. non neurogenic causes-

a. overactive bladder

b. dysfunctional voiding

c. dysfunctional elimination syndrome

- **Voiding disorders can contribute to**

  a.persistence of VUR

  b. recurrent UTI with / without VUR

  c. cause VUR

  d. pyelonephritis & renal parenchymal damage .

- **Also known as “ Bladder Dysfunction”.**

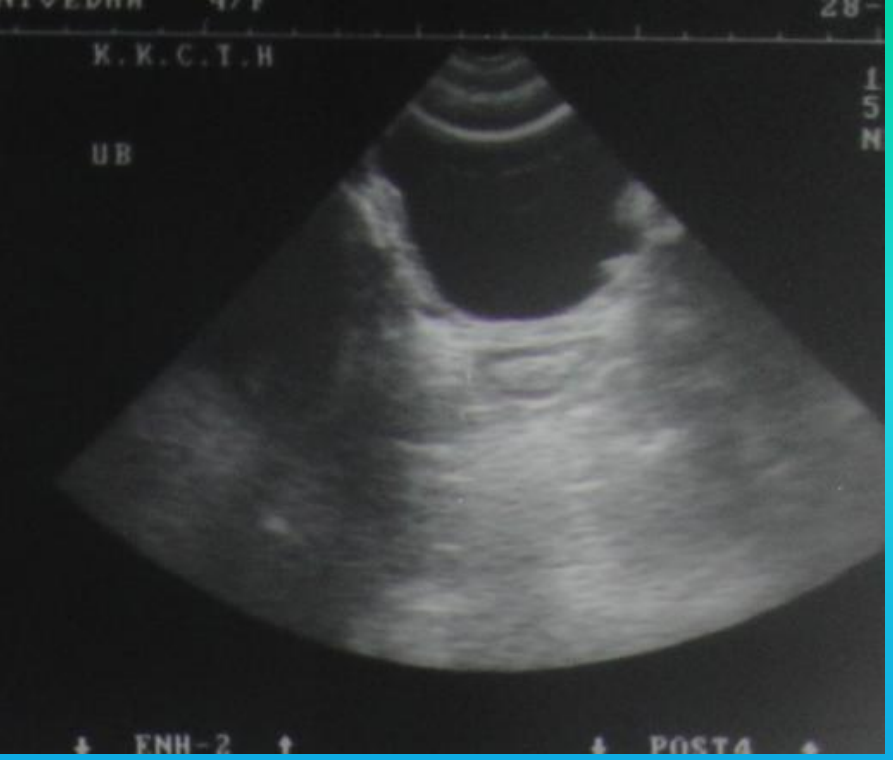
History

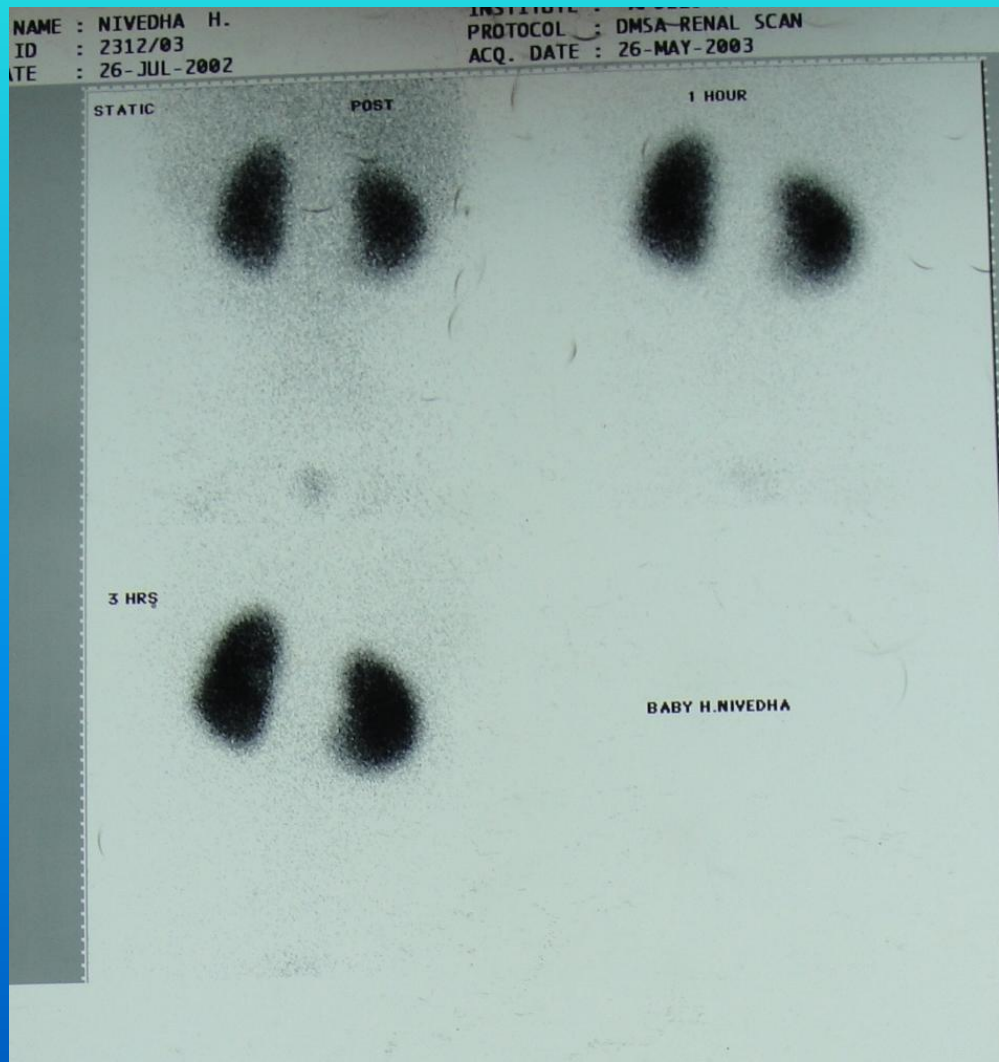
- **DOB: 26.7.2002**

- **1 yr (2003) - recurrent UTI**

- **Investigations –**

  1. urine C/S – E.Coli growth
  2. RFT – normal
  3. USG abdomen – normal
  4. MCU – grade 2 VUR right
  - spinning top deformity


K.K.C.T.H
UB
ENH-2
POST4


NAME : NIVEDHA H.
ID : 2312/03
TE : 26-JUL-2002
PROTOCOL : DMSA-RENAL SCAN
ACQ. DATE : 26-MAY-2003
STATIC
POST
1 HOUR
3 HRS
BABY H.NIVEDHA

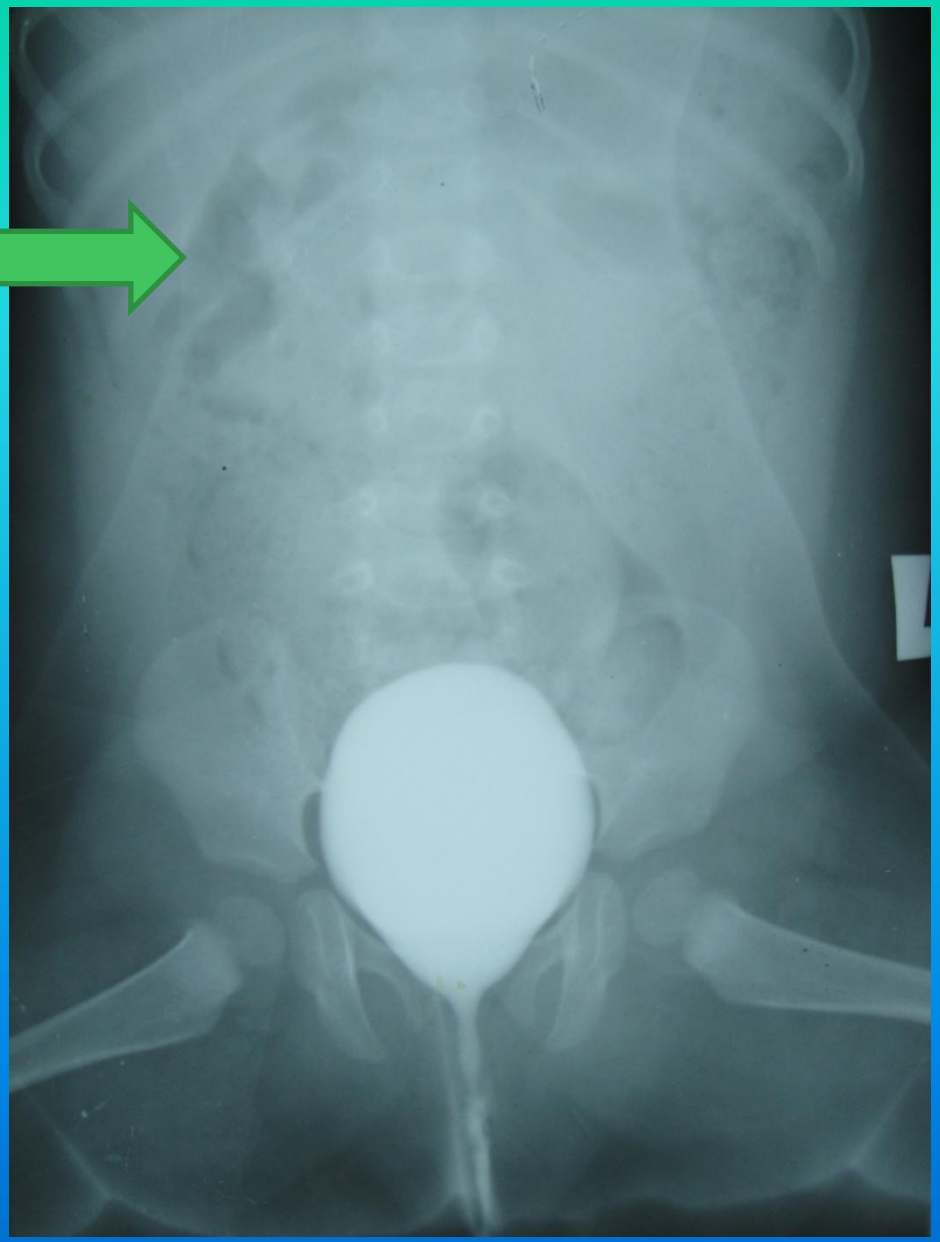
DMSA and USG

MCU -

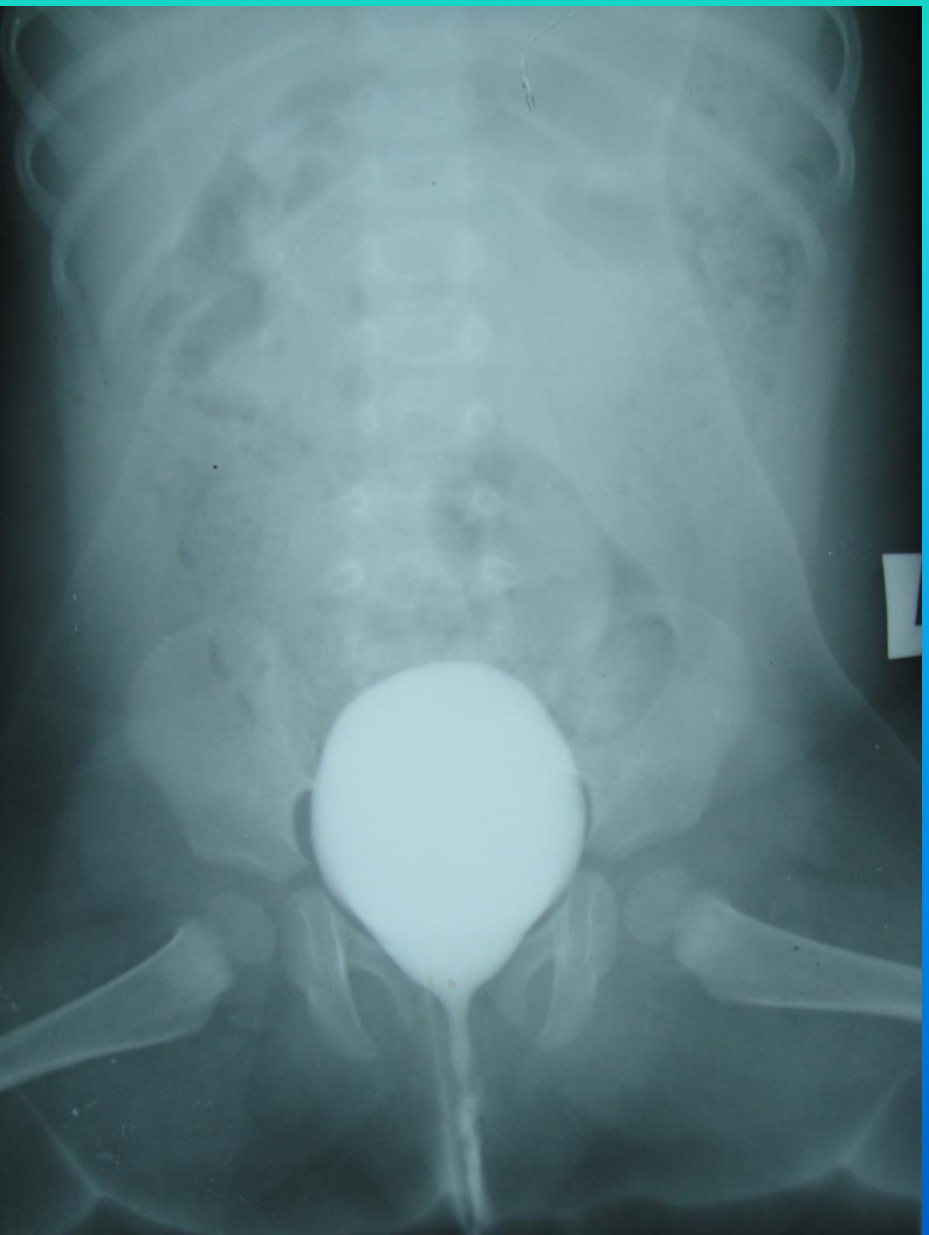
GD II VUR RIGHT

? Spinning top deformity

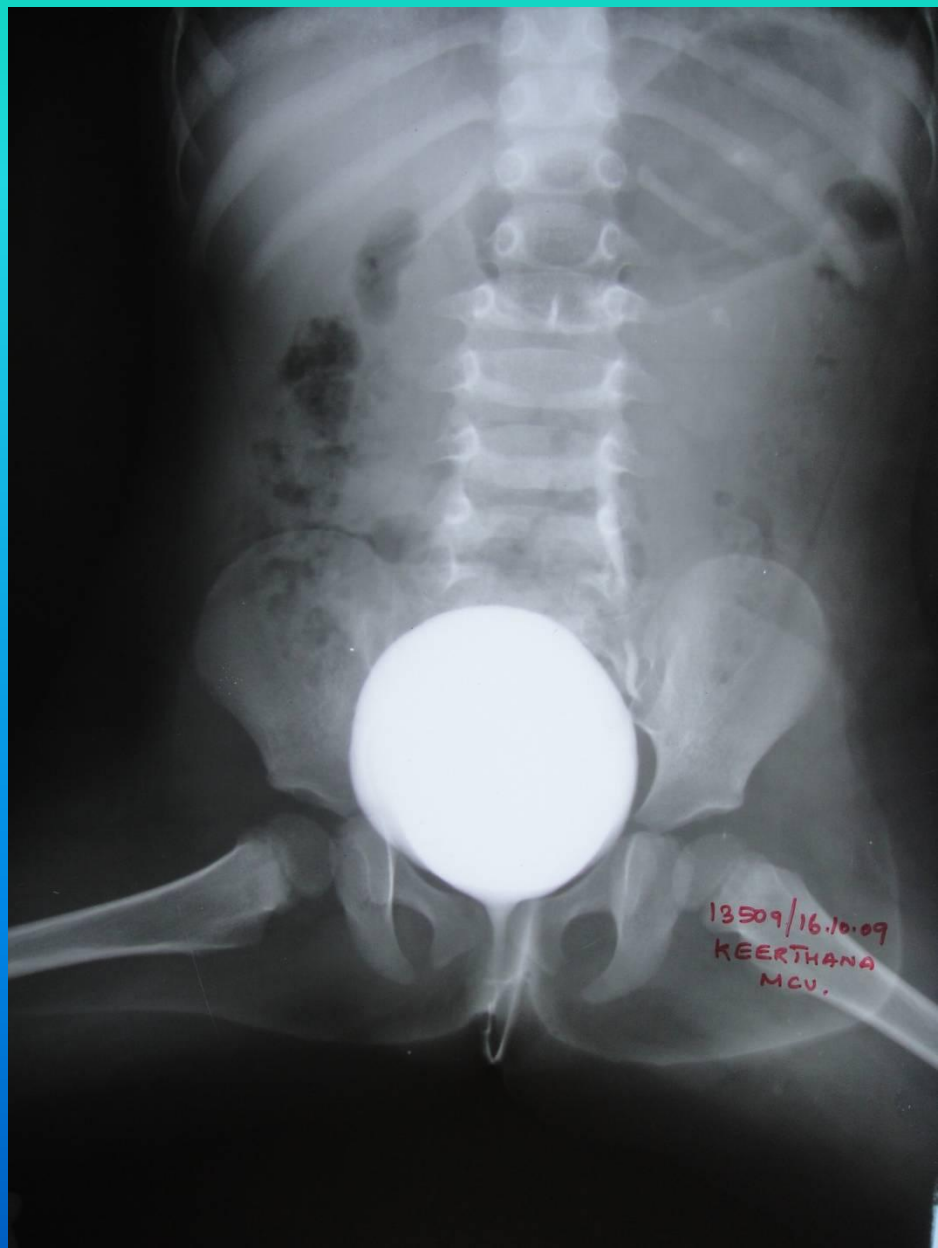
uroprophylaxis



Spinning top deformity



Normal bladder



After 3 yrs of uroprophylaxis

- NOV. 2006 - child was free of urinary infection.
- Hence investigated
    a. Urine no active sediments
    b. Urine culture -no growth
    c. USG not done

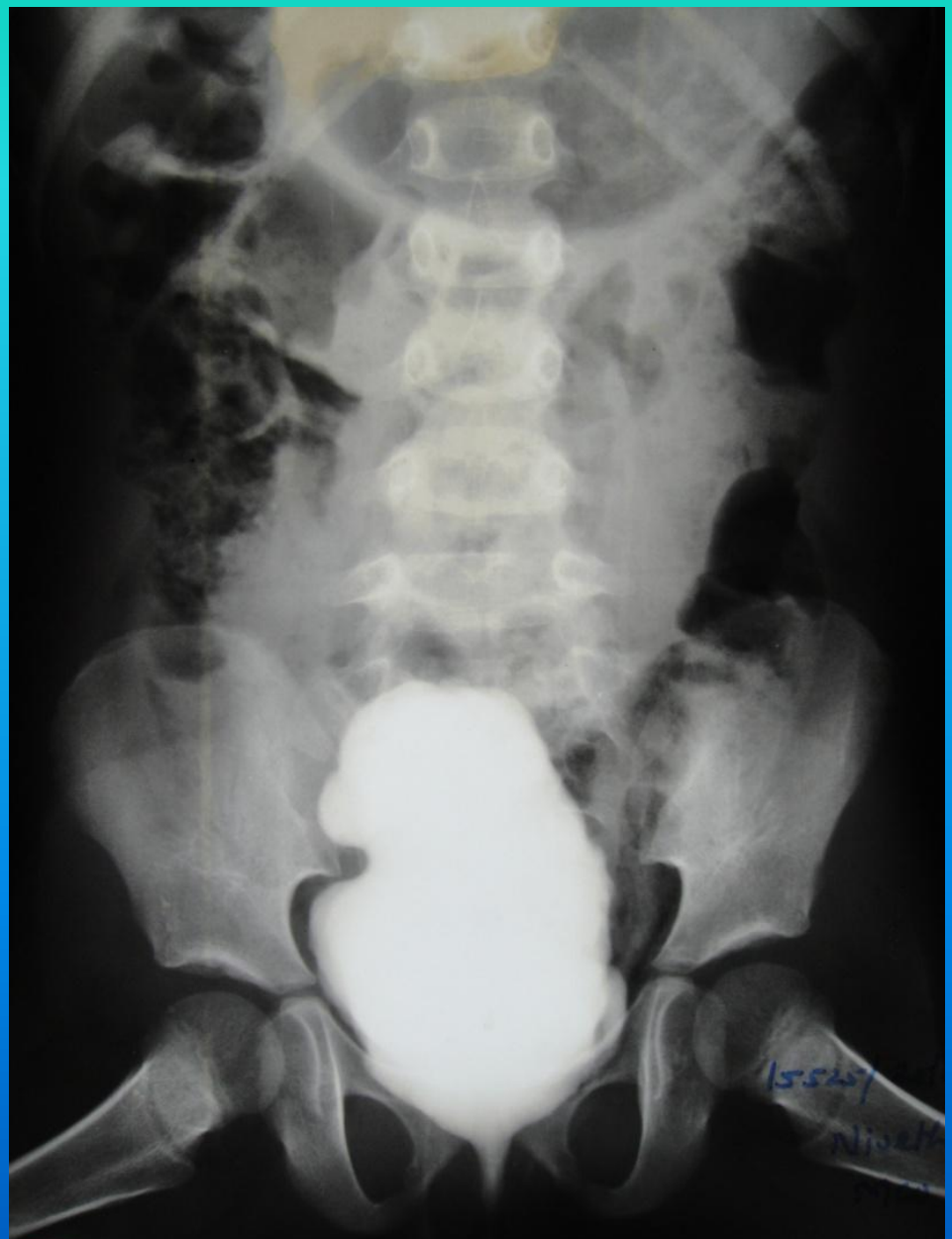
NOV. 2006

MCU done

- no reflux

- F/o Neurogenic bladder

-Stop uroprophylaxis



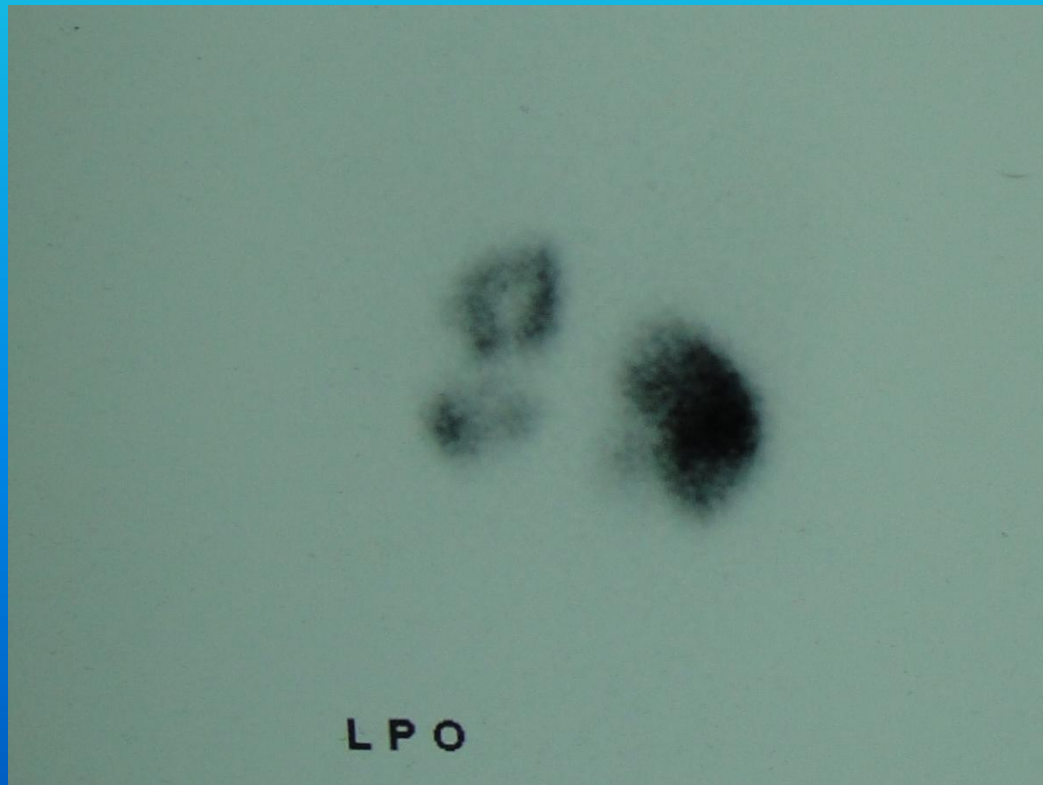
- **During the next 2 yrs –**
  - **recurrent UTI**
  - **urgency**
  - **Mild leak**
  - **straining to pass urine occasionally**
  - **holding back urine**
  - **constipation**

- **During the above period treated with antibiotics by family physician**

- **In march 2008**
  - **seen by urological consultant**
- **On evaluation**
  - **urine culture was positive**
  - **DMSA showed multiple cold areas in the left kidney**

- **Urodynamic study -6yrs**

  - severe urgency, pronounced sphincter activity
- **DMSA showed(25.3.08) 30-35%function of left kidney**



management

- Impression - voiding disorder –overactive bladder
- control of infection with antibiotics
- Uroprophylaxis
- Bladder training
- anticholinergic

- In aug 2008
  - continued to have recurrent UTI
  - Reevaluation
    - Urine culture positive
    - USG thickened and trabeculated bladder wall
    - MCU- VUR Gr. 3 to 4 on Left

      bladder contour -neurogenic bladder
  - Control of infection &Continued on same lines

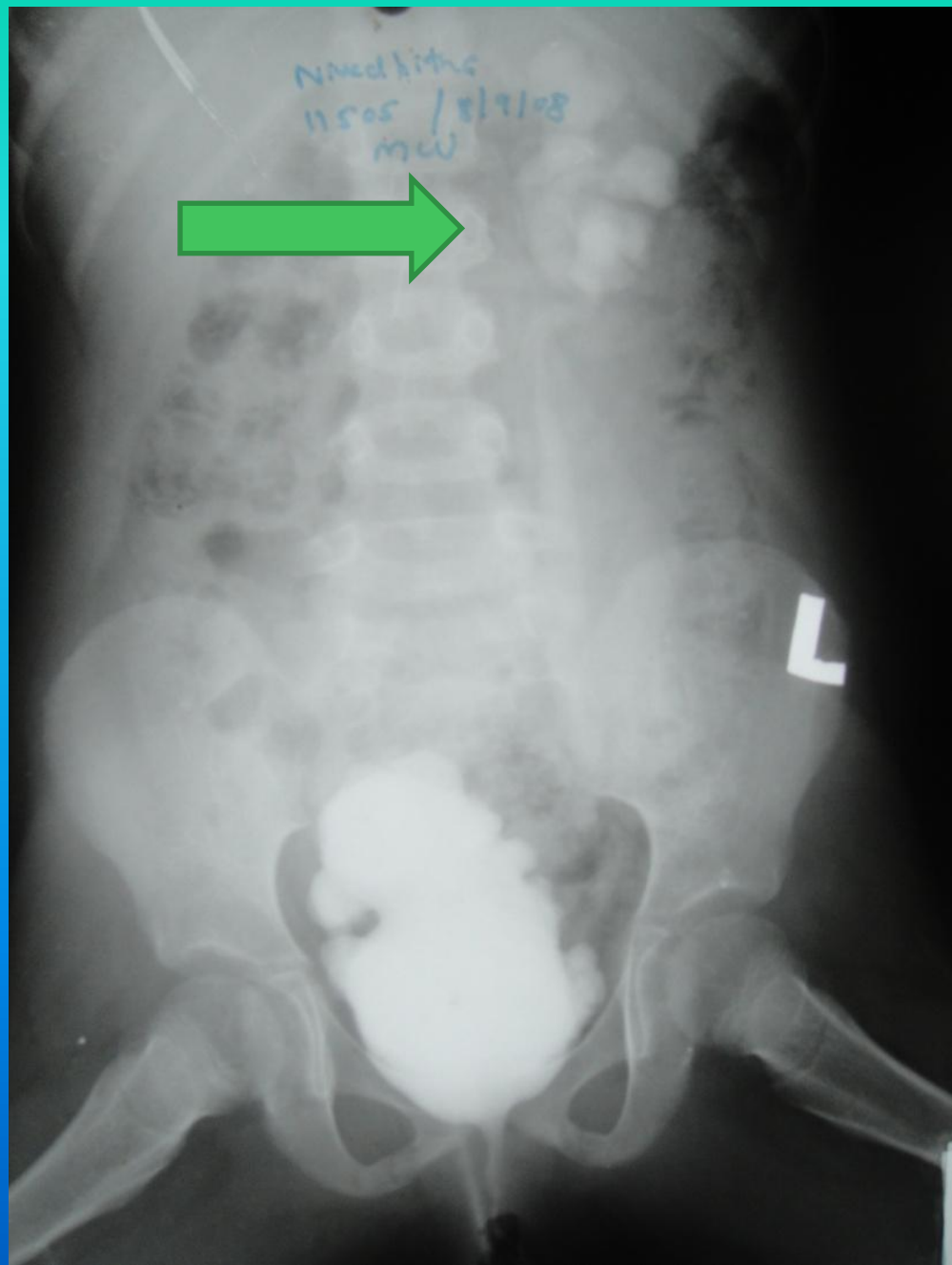
MCU at 2008

- **Left side grade IV**

Reflux

- **F/O Neurogenic changes**

In bladder

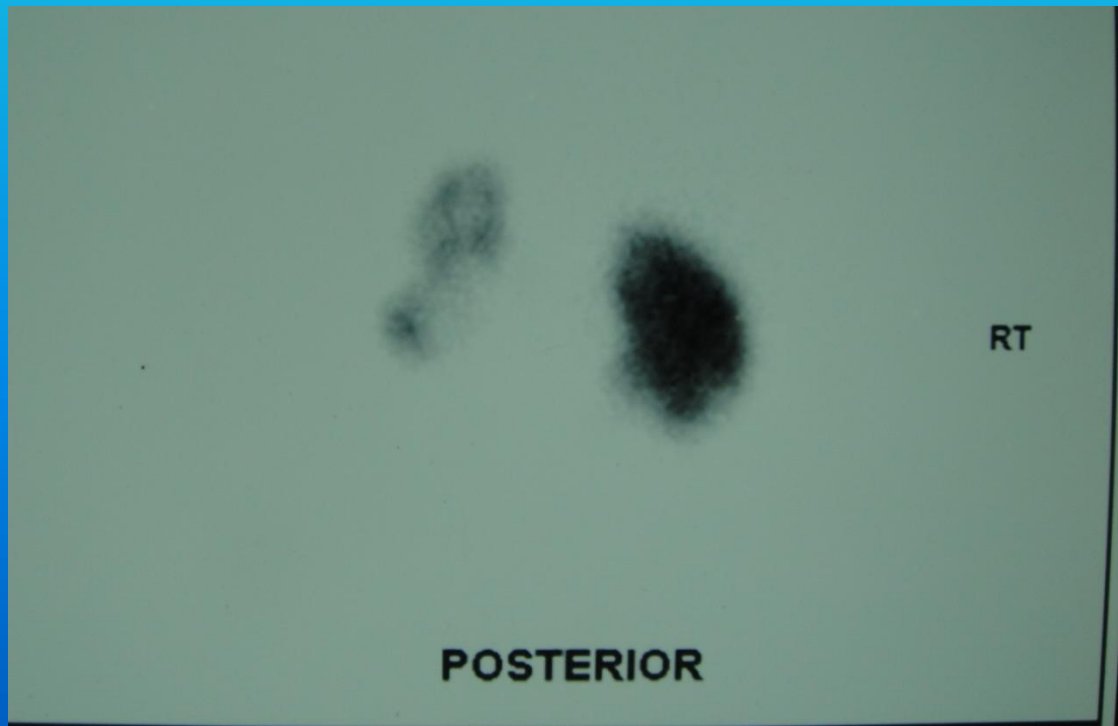


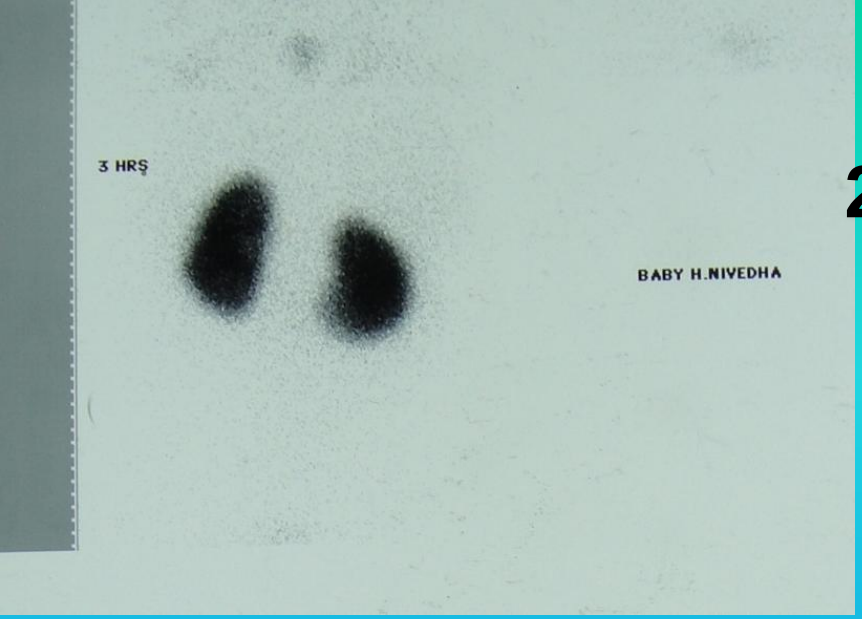
Follow up

- **At jan 2009(7 yrs)**
- **Recurrent UTI even though on earlier therapy**
- **Re evaluation**
  - **urine culture positive**
  - **USG** Thickened &trabeculated bladder

DMSA at 7yrs(2009)

- impaired function of left kidney – 21%
- multiple renal scars
- small renal cortical scars in upper and lower poles on the right side

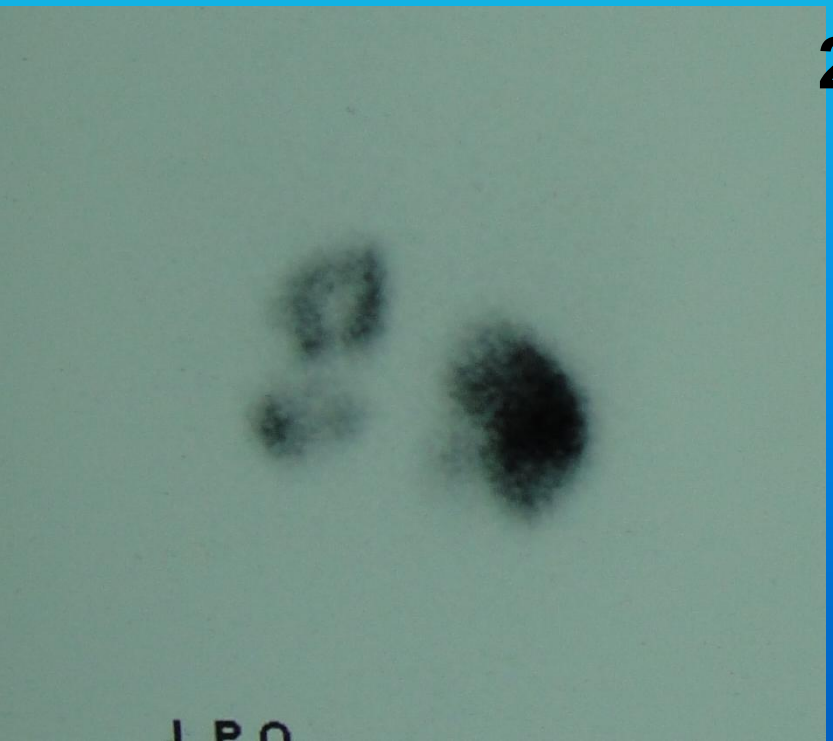


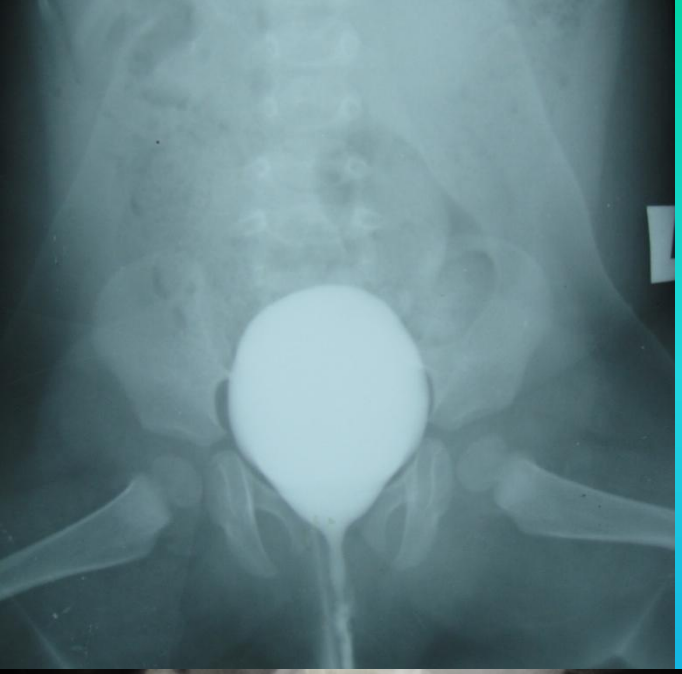


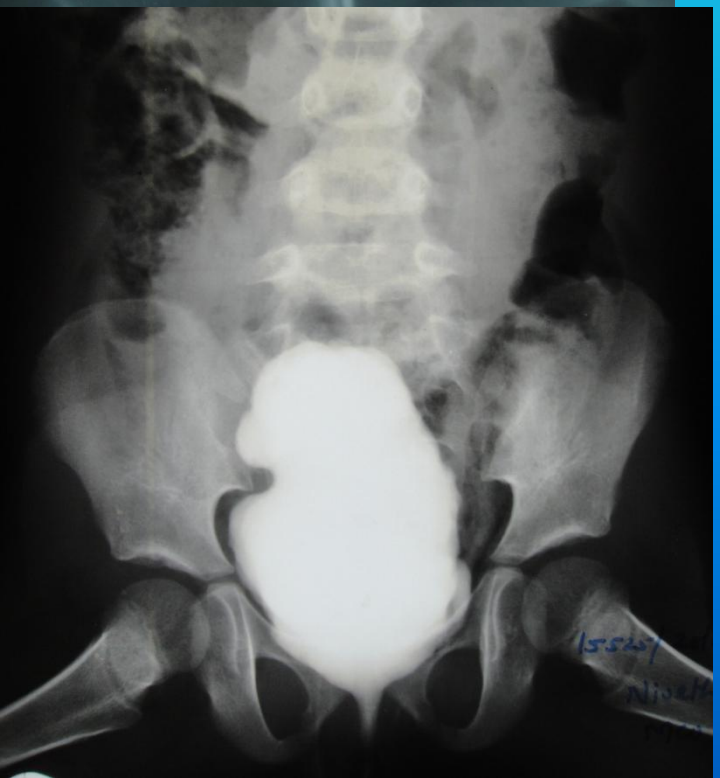
2003

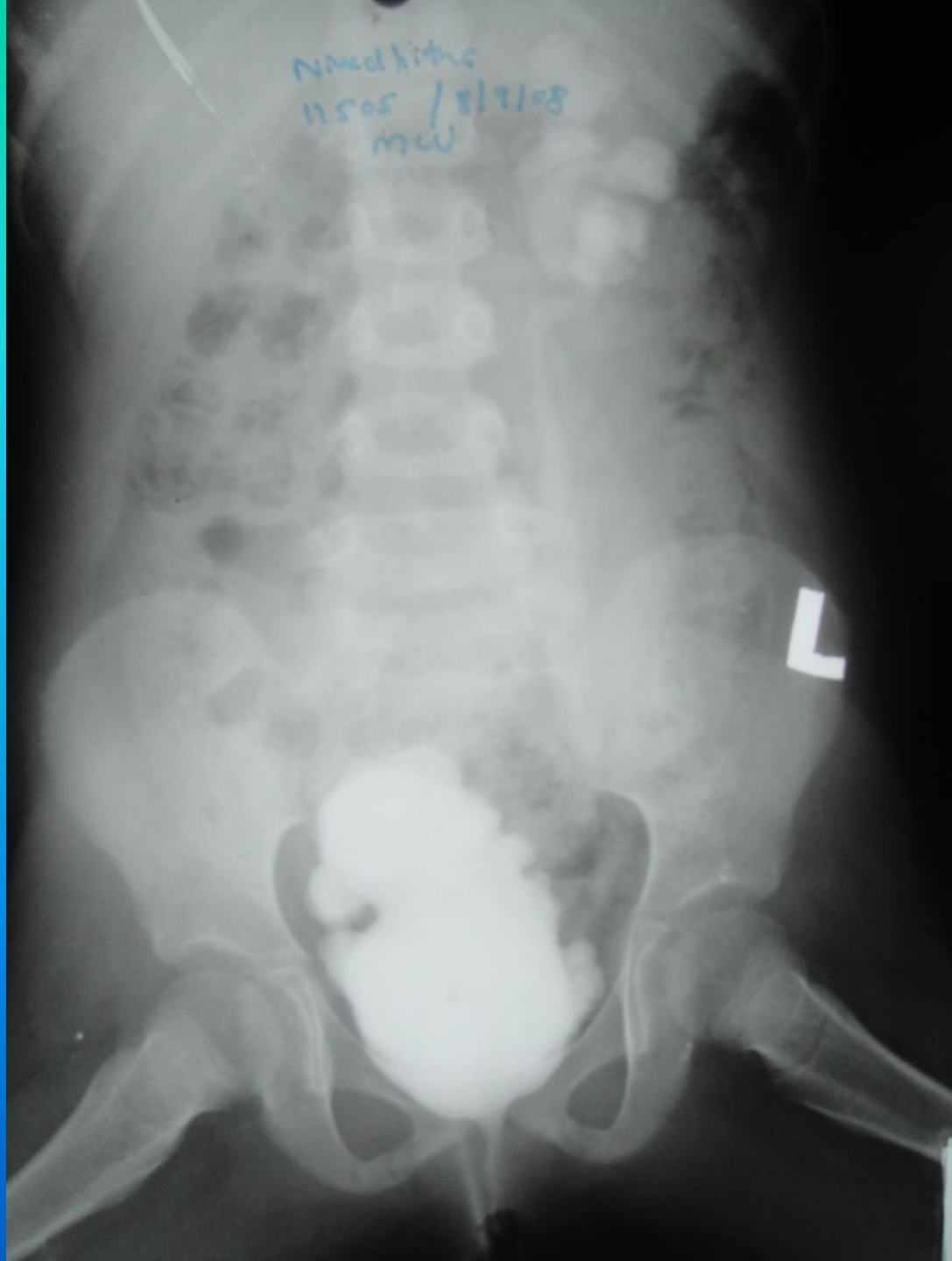
2009

2006









Period	USG	DMSA	MCU
10mo (May03)		LK:52%,RK48% Good cortical function	Bladder contour normal VUR grade 2 right
4.5 yrs (Nov.06)	Bladder wall thickened trabeculated Post void scan normal		Bladder contour-neurogenic phenomenon no VUR
6yrs (Mar 08)		LK 30-35%, RK 65-69% active pn	
6.5yrs (Aug 08)	RK 8.9 ,LK 8.9 thickened and trabeculated bladder wall		bladder contour neurogenic bladder VUR Gr. 3 to 4 on Lt Urethral outline normal

Period	USG	DMSA	MCU
6.8yrs(Jan 09)	Rk 8.9 lk 8.1 Thickened &trabeculated bladder regression in size of kidneys	LK 21% ,RK adequate function and small scars in upper & lower poles	
7.5 yrs(dec09)	Rk 8.2 lk 8.3 Significant trabeculation &thickening of bladder wall		

- At jan 2010
  - Continues to have recurrent UTI
  - Continues to have symptoms of voiding dysfunction
  - Readmitted for control of infection
- Urodynamics
- Uroprophylaxis
- Bladder training
- Change of medications depending on UDS

DISCUSSION

Terminologies

- **Dysfunctional voiding-sense of a dysfunction during the voiding phase, char by increased activity in the pelvic floor during voiding**
- **Dysfunctional elimination syndrome - abnormal pattern of bladder and bowel movements characterised by withholding, often with incontinence**

- **The voiding phase begins with contraction of detrusor muscle with simultaneous relaxation of internal sphincter when the bladder is full**
- **Followed by relaxation of external sphincter via pudendal nerve**

Physiology of voiding phase

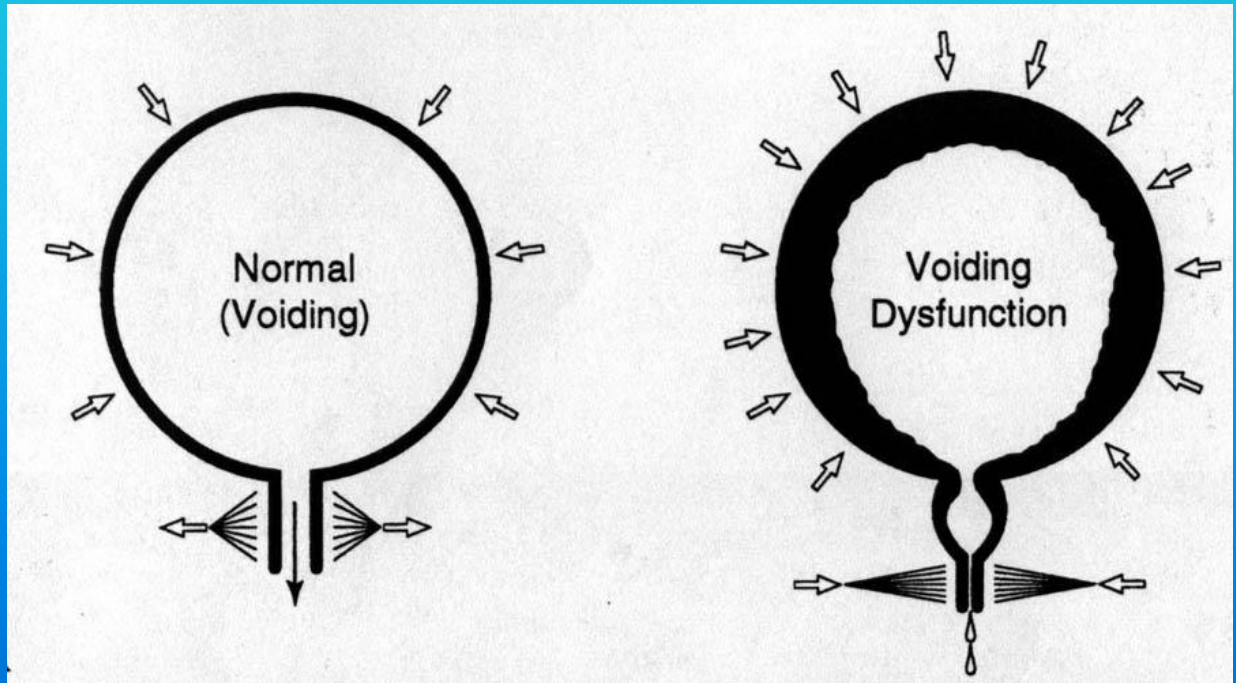


Fig. 11-1. Schematic of normal coordinating voiding (A) and dysfunctional voiding (B). (Courtesy of the National Kidney Foundation of Texas. A Parent's Primer to Normal and Abnormal Voiding in Children, Dallas, TX)

Urologic presentation
Signs & Symptoms which suggest voiding dysfunction

- Infrequent voiding
- Frequent voiding
- Urgency
- Dysuria
- Holding maneuvers
- Straining
- Poor stream
- Intermittent stream
- Incomplete emptying
- Incontinence
- Urinary tract infections
- VUR

Holding Maneuvers

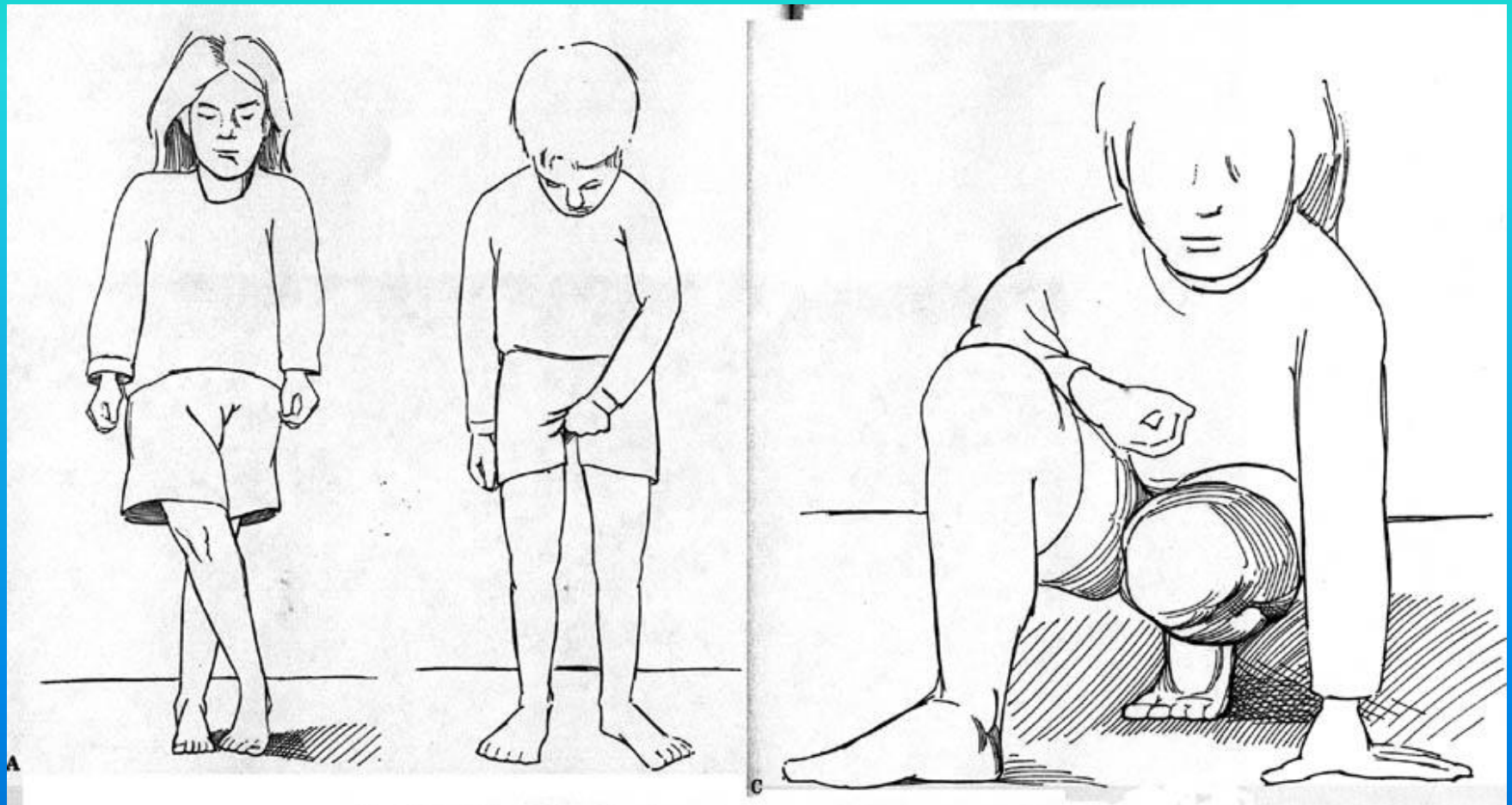


Fig. 11-2. Schematic of various posturing in children with dysfunctional voiding (A) "Vincent's Curtsy" (B) holding (C) squatting with heel in perineum

GI Presentation
Signs & Symptoms which suggest voiding dysfunction

- Fecal staining of undergarments
- Fecal incontinence
- Constipation
- Encopresis
- Obstipation (i.e., severe constipation causing obstruction)
- Abdominal pains

OCCULT NEUROLOGIC PRESENTATION

Spinal cord tethering suggested by

- **Lower back abnormalities such as nevus, dermal sinus, or dimple**
- **Pain in the lower back during stretching of the lower extremities**
- **Gait abnormalities**
- **Worsening symptoms during growth spurts**
- **Severe stool incontinence**
- **Complex enuresis refractory to routine Rx**

treatment

- Early recognition and counselling at the age of bladder control
- Timed voiding, relaxed voiding, double voiding
- Treatment for constipation
- Cognitive and biofeedback treatment
- Pharmacotherapy with anticholinergics
- Correction of urethral meatus anomalies when suspected

PROTOCOL

Child with Suspected Voiding Dysfunction
Day Time wetting/Incontinence
Recurrent UTIs
Persistant or worsening VUR

Rule out Organic Pathology
History, physical
UA/Culture
Renal Bladder US, VUCG if UTIs

Improved
Follow up

Elimination Diary
Treat Constipation
Consider Antibiotic Prophylaxis for UTIs
Intiate timed voiding plan

Continued Problems
Urology referal
Flowmetry
Urodynamic Studies

Urge Syndrome	Bladder/Sphincter Dysfunction	Lazy Bladder	Normal Study
Anticholinergic Timed Voiding	Biofeedback Timed Voiding	Check Compliance with Timed Voiding Program	Assess motivation Consider psychological evluation

Take home message

- Voiding dysfunction cause of renal parenchymal damage- CKD
- preventable form of CKD
- Detailed history about the voiding patterns & constipation in any examination of a child who has developed bladder control
- Important in the presence of UTI
- Early recognition is important to save the kidney.

Thank you