Neurogenic Bladder: UTIs, Incontinence & Catheters

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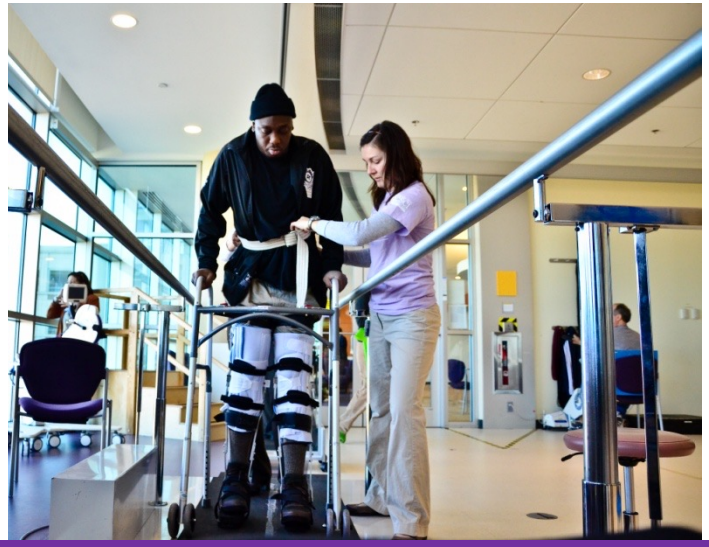


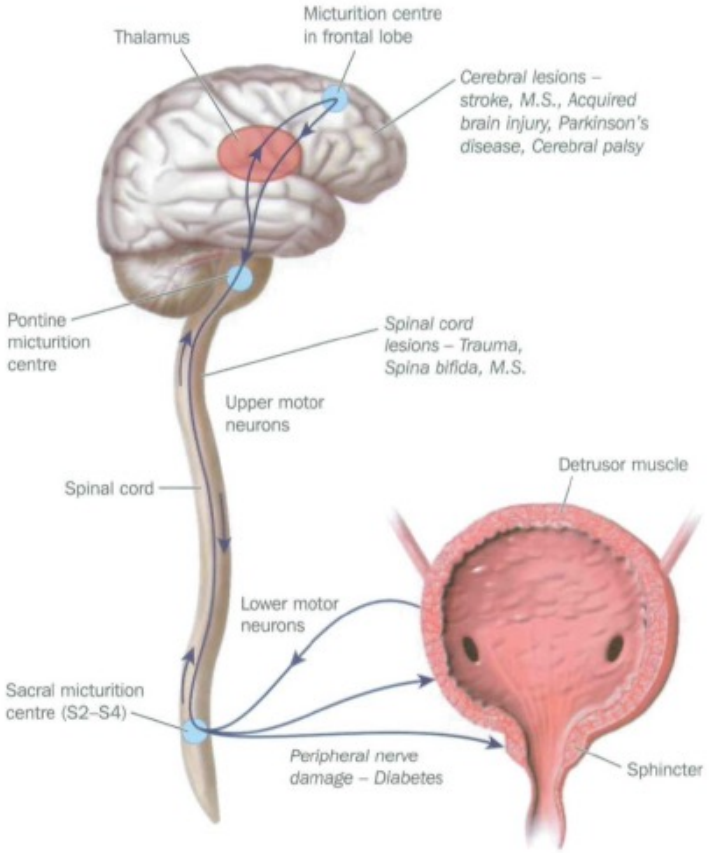
Kennedy Krieger Institute

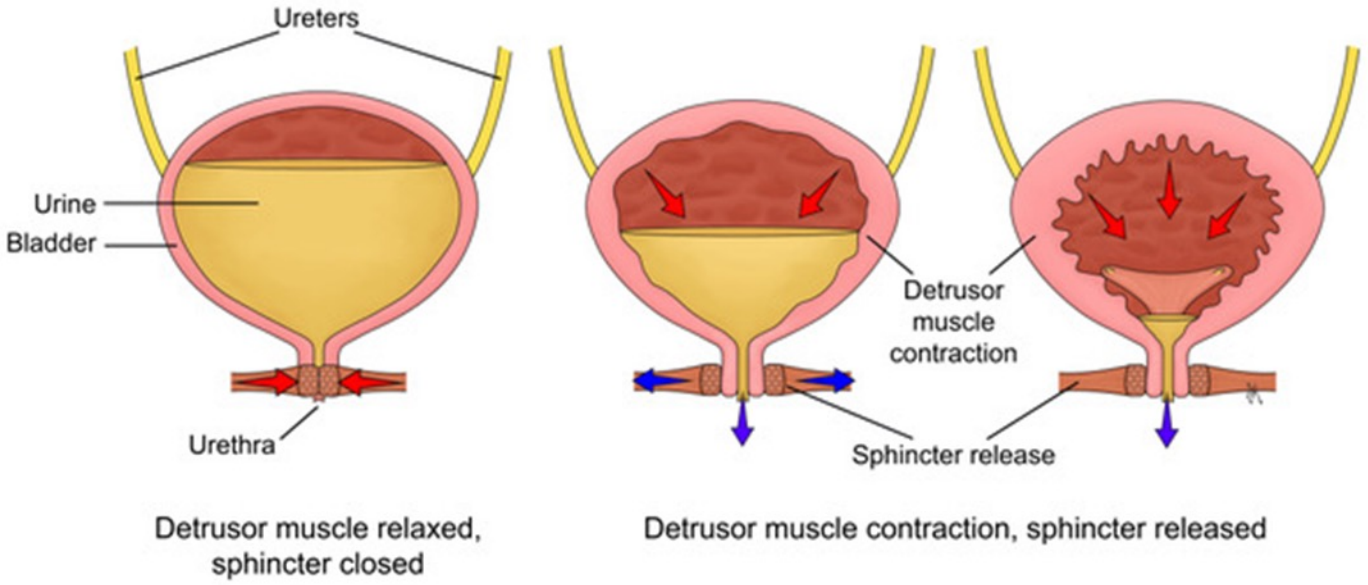
DISCLOSURES

- Neither I, nor any immediate family members have had in the last 24 months, or expect to have in the coming 24 months, any financial relationship or gift-in-kind with industry that is relevant to the subject matter of this presentation.

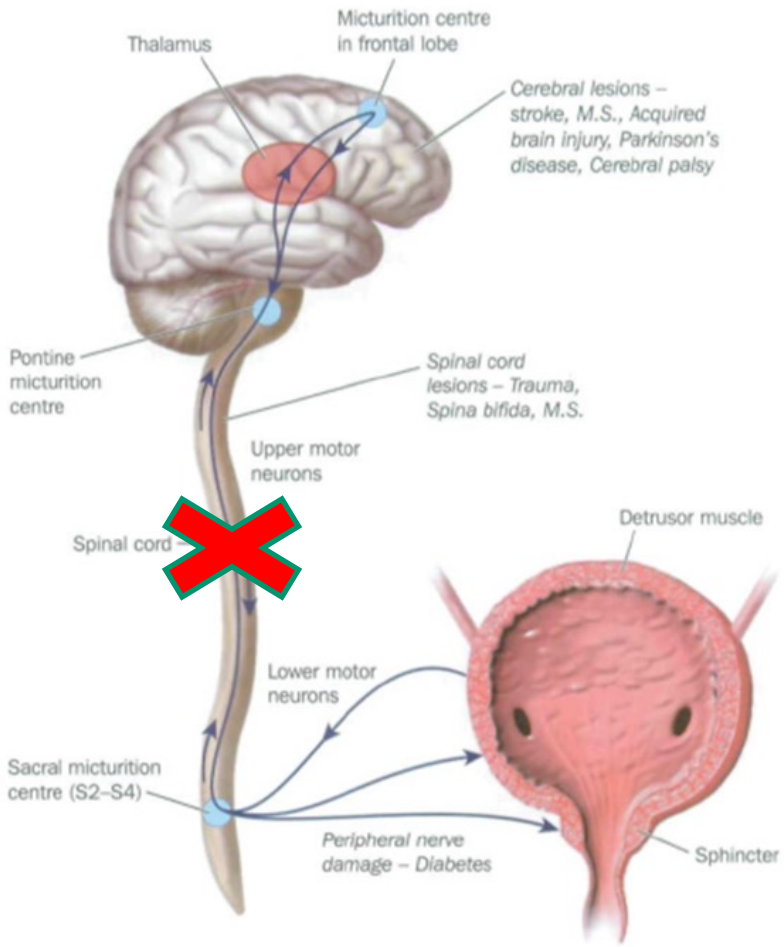
THE BLADDER

- Functions
  - Store urine
  - Release urine at the appropriate times
- Comprised of a
  - Muscular storage area
  - Outlet valve or sphincter
- Control
  - Voluntary
  - Involuntary




Ureters
Urine
Bladder
Urethra
Detrusor muscle relaxed, sphincter closed
Detrusor muscle contraction
Sphincter release
Detrusor muscle contraction, sphincter released

BLADDER DYSFUNCTION



- Rare Neuroimmune Disorders
  - Changes your bladder functioning
  - Disrupts sensation of having to urinate
  - Disrupt the coordination between the brain and the bladder
  - Voluntary control of sphincters is lost
  - Changes how you go to the bathroom

BLADDER DYSFUNCTION

BLADDER DYSFUNCTION

- UPPER
  - Spastic
- LOWER
  - Flaccid

NEUROGENIC BLADDER

Higher level of Injury (T12 and above)
Spastic

Bladder

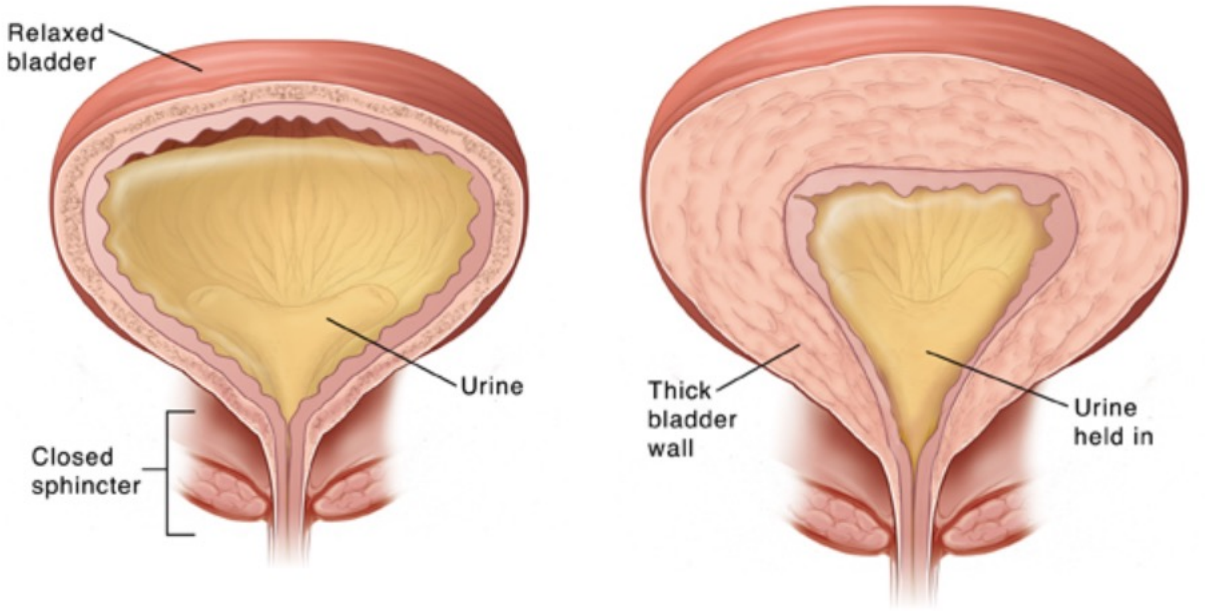
- Bladder is spastic and irritable
- Urinary sphincter is tight and does not relax voluntarily
  - Difficulty storing and releasing urine

Lower Level of injury (T12 and below)
Flaccid

- Bladder
  - Bladder will not contract when it becomes full
  - Urinary sphincter is loose and fails to contract
    - Difficulty storing urine

BLADDER PROGRAMS

- Goals
  - Prevent incontinence and accidents
  - Empty bladder at predictable times
  - Maintain health and prevent complications
    - Frequent urinary tract infections
    - Thick inelastic bladder
    - Kidney damage


Relaxed bladder
Urine
Closed sphincter
Thick bladder wall
Urine held in

CYSTOSCOPY

NORMAL BLADDER

https://dronuma.com.au/cystoscopy/

TRABECULATIONS

Huang et al. Taiwanese Journal of Obstetrics and Gynecology Volume 59, Issue 4, July 2020, pp 625-626.

HOW TO MANAGE BLADDER

- Healthy Habits
  - Healthy diet
    - Drink, Drink, Drink spread fluids out over the day
    - Fiber – help with stool constituency
  - Activity
  - Good hygiene
  - Do it yourself
    - Assistive devices
    - Positioning equipment
    - Direct own care
  - Establish a good routine

BLADDER MANAGEMENT

Spastic

- Frequent and urgent urination
- Medications to relax the bladder
  - Oxybutynin
- Intermittent Catheterization
  - Every 4 hours (5x/day)

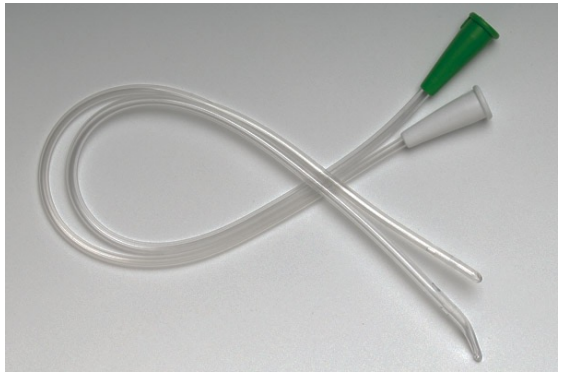
Flaccid

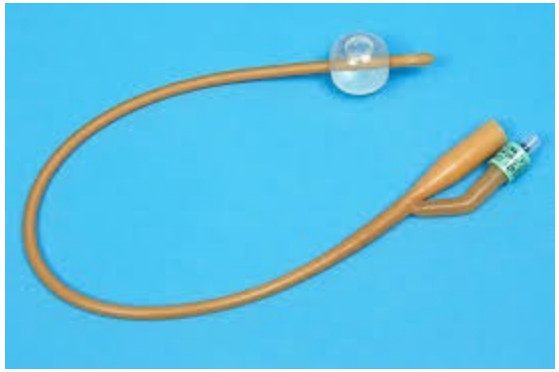
- Leaking of urine
- Medications not effective
- Spread fluids out
- Intermittent catheterization
  - Every 3-4 hours
  - Prior to doing activities that cause valsalva

BLADDER EMPTYING METHODS

- External catheter
  - condom
- Indwelling catheter
  - Foley
  - Suprapubic tube
- Catheterizable stoma

CATHETERS





External Female Catheter

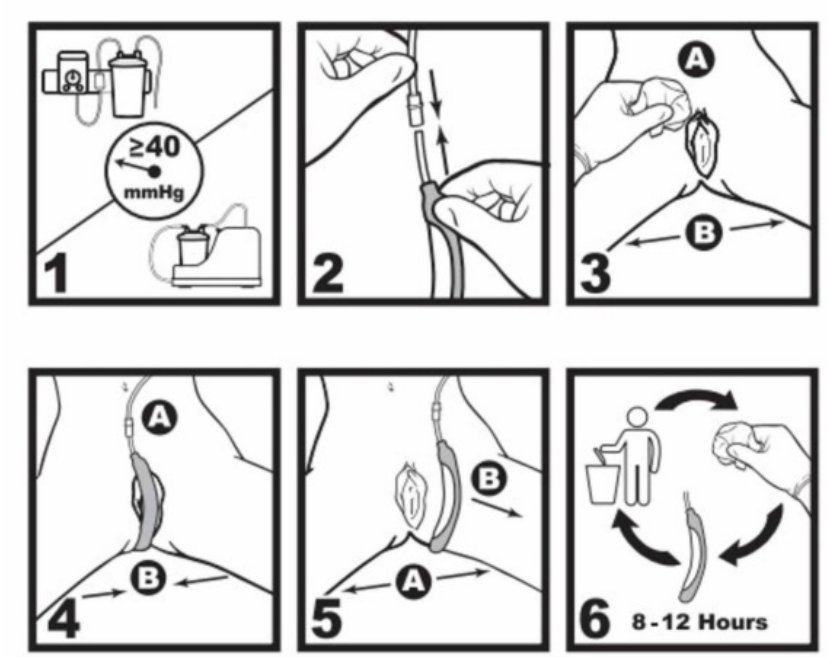


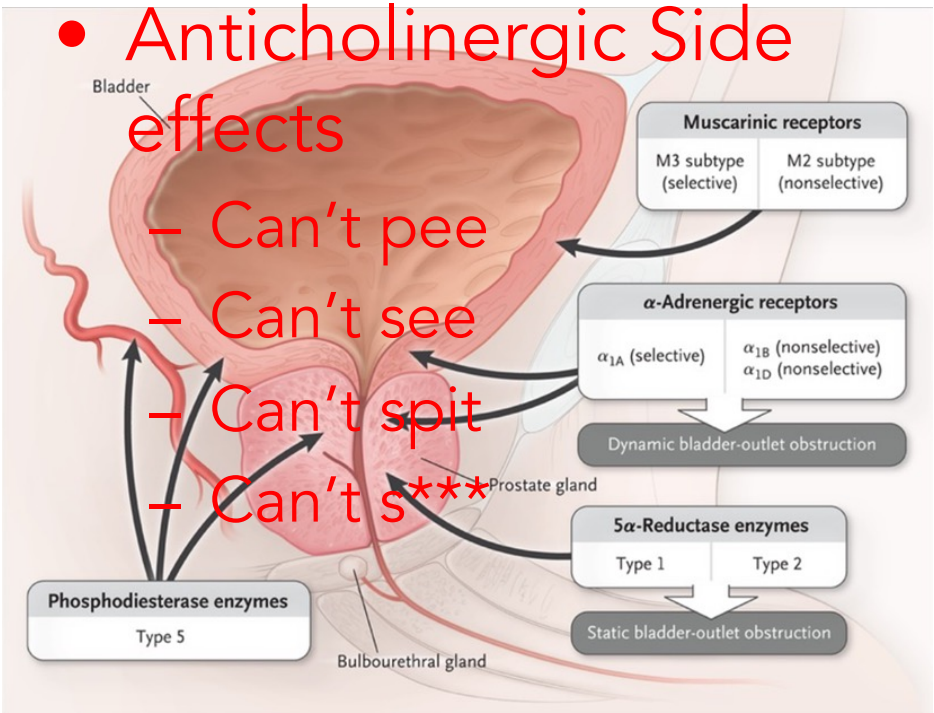
FIGURE 1: Schematic of the PureWick Urinary Collection System

 mmHg = millimeters of mercury

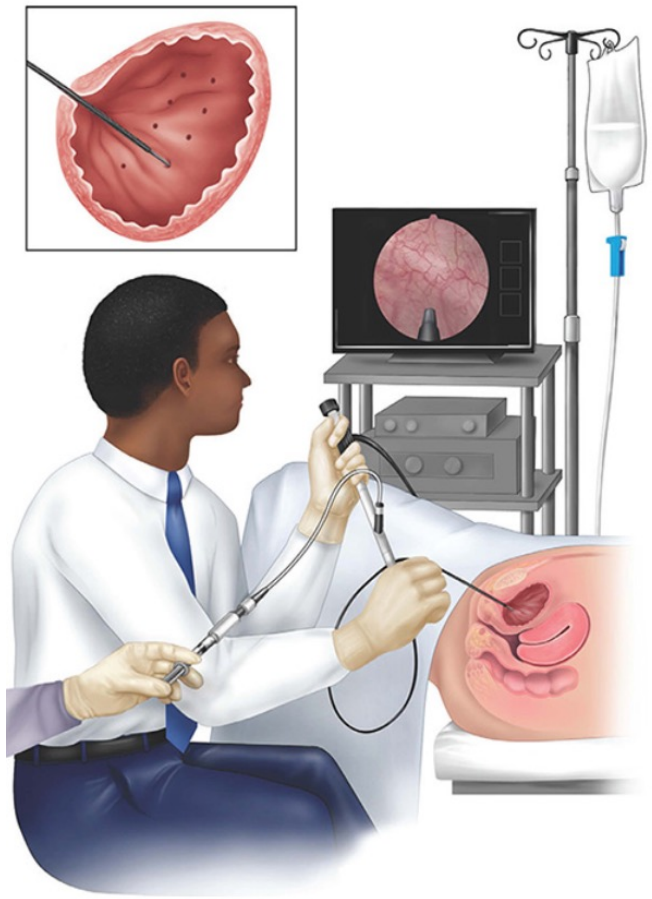
BLADDER MEDICATIONS

- Oxybutynin (Ditropan XL)
- Oxybutynin as a skin patch (Oxytrol)
- Tolterodine (Detrol, Detrol LA)
- Oxybutynin gel (Gelnique)
- Trospium (Sanctura)
- Solifenacin (Vesicare)
- Darifenacin (Enablex)
- Fesoteridine (Toviaz)
- *Mirabegron (Myrbetriq)*
- Tamsulosin (Flomax)

- Anticholinergic Side effects
  - Can't pee
  - Can't see
  - Can't spit
  - Can't s***



Bladder Botox

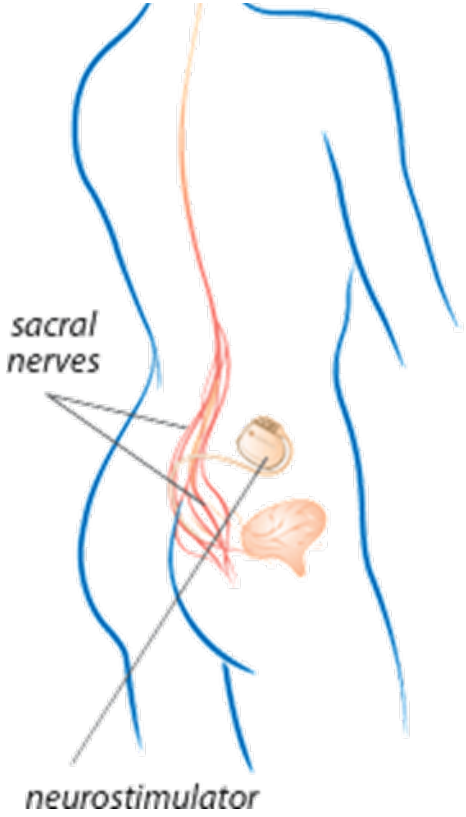


https://www.iowaclinic.com/treatments-and-conditions/botox-injections/

- For overactive bladder or NDO
- Can improve incontinence, decrease UTIs, decrease use or anticholinergics
- Lasts 6 months
- Side effects: bleeding, infections, distal spread

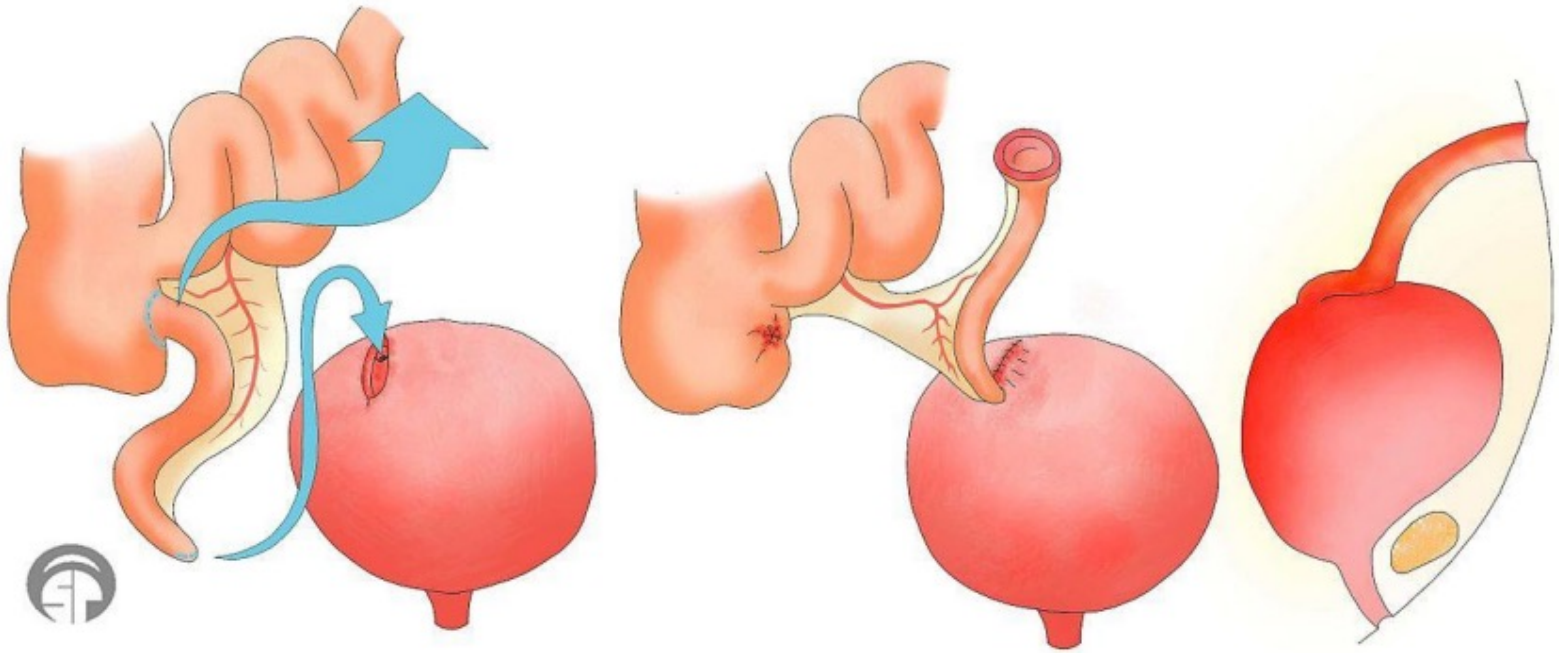
NEUROMODULATION: POSTERIOR TIBIAL NERVE STIMULATION

NEUROMODULATION:
Interstim Device



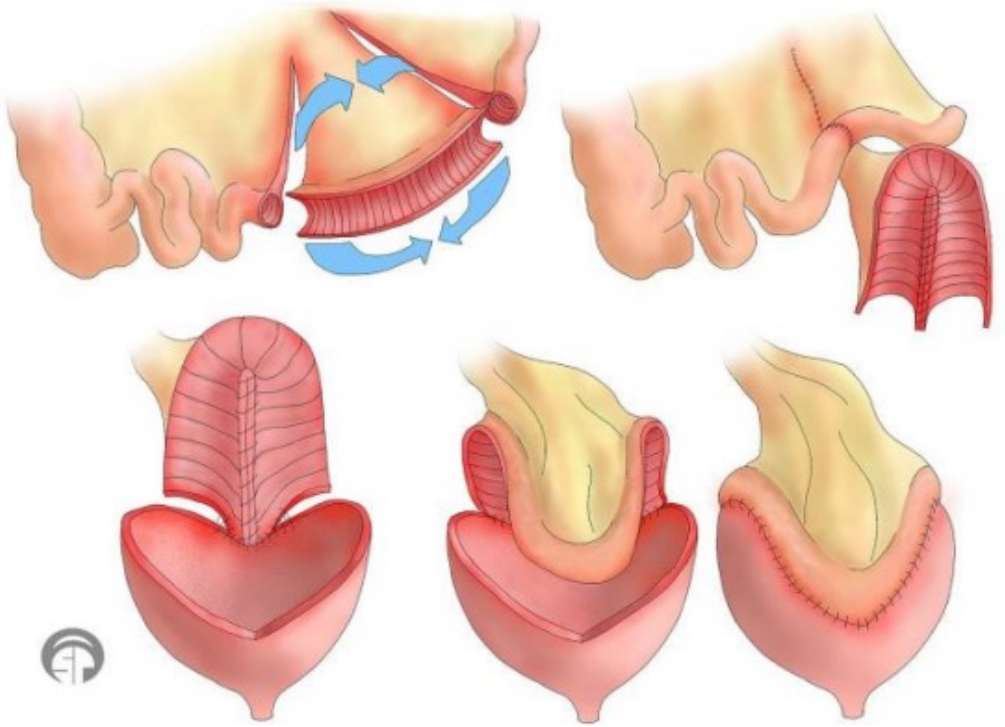
SURGICAL INTERVENTIONS

Mitrofanoff Procedure



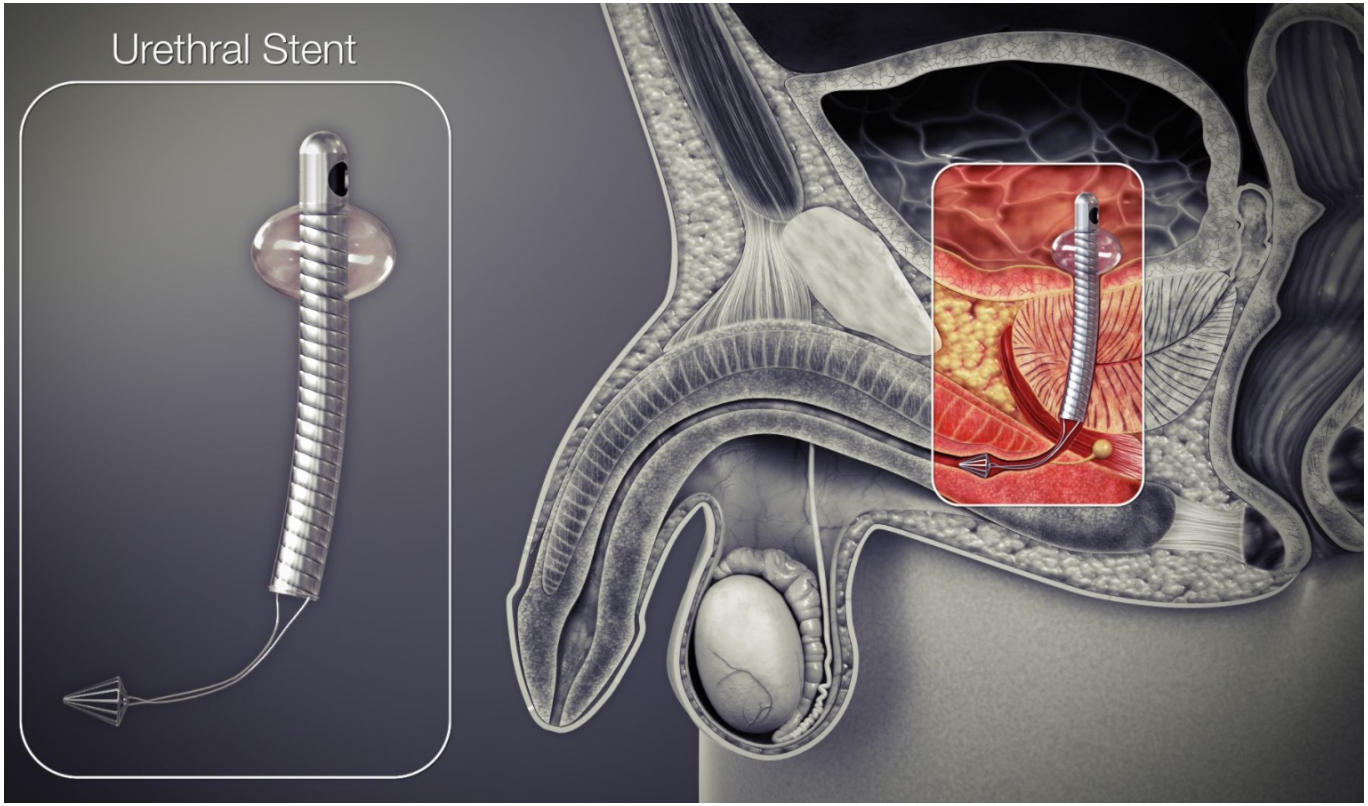
http://scireproject.com/community/topic/bladder/

BLADDER AUGMENTATION



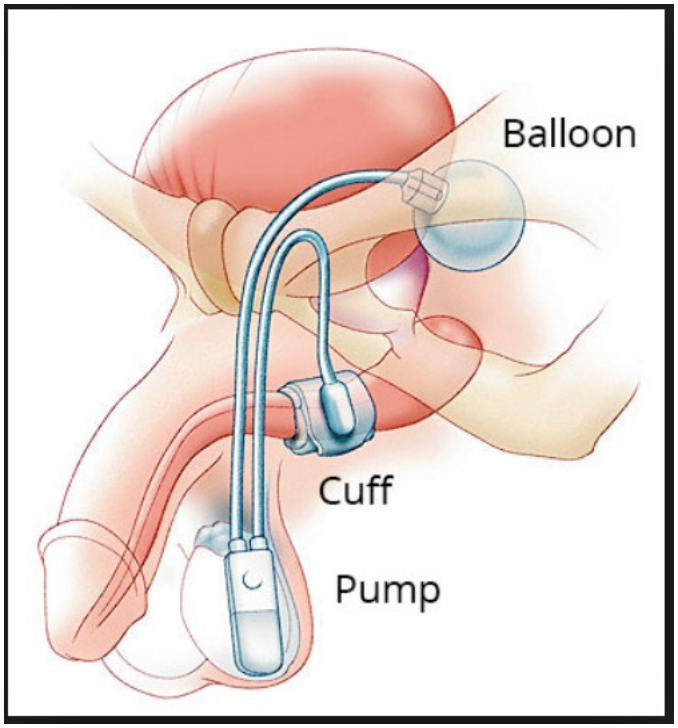
http://scireproject.com/community/topic/bladder/

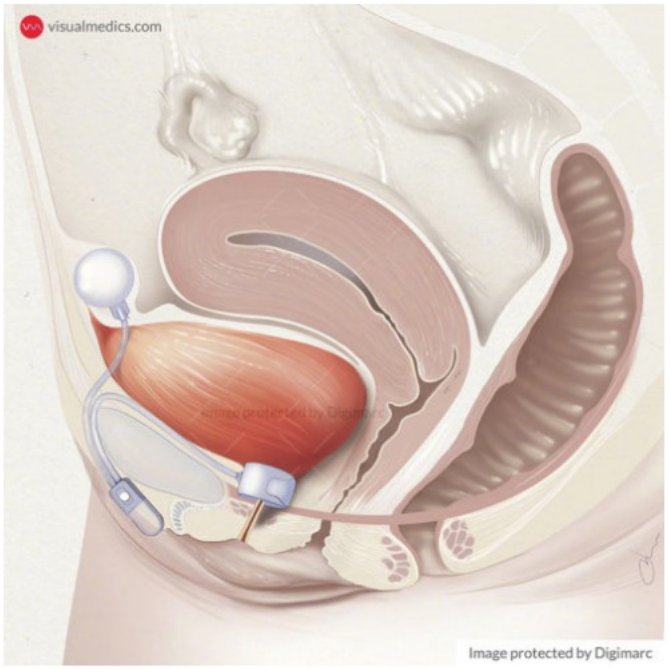
Urethral Stent



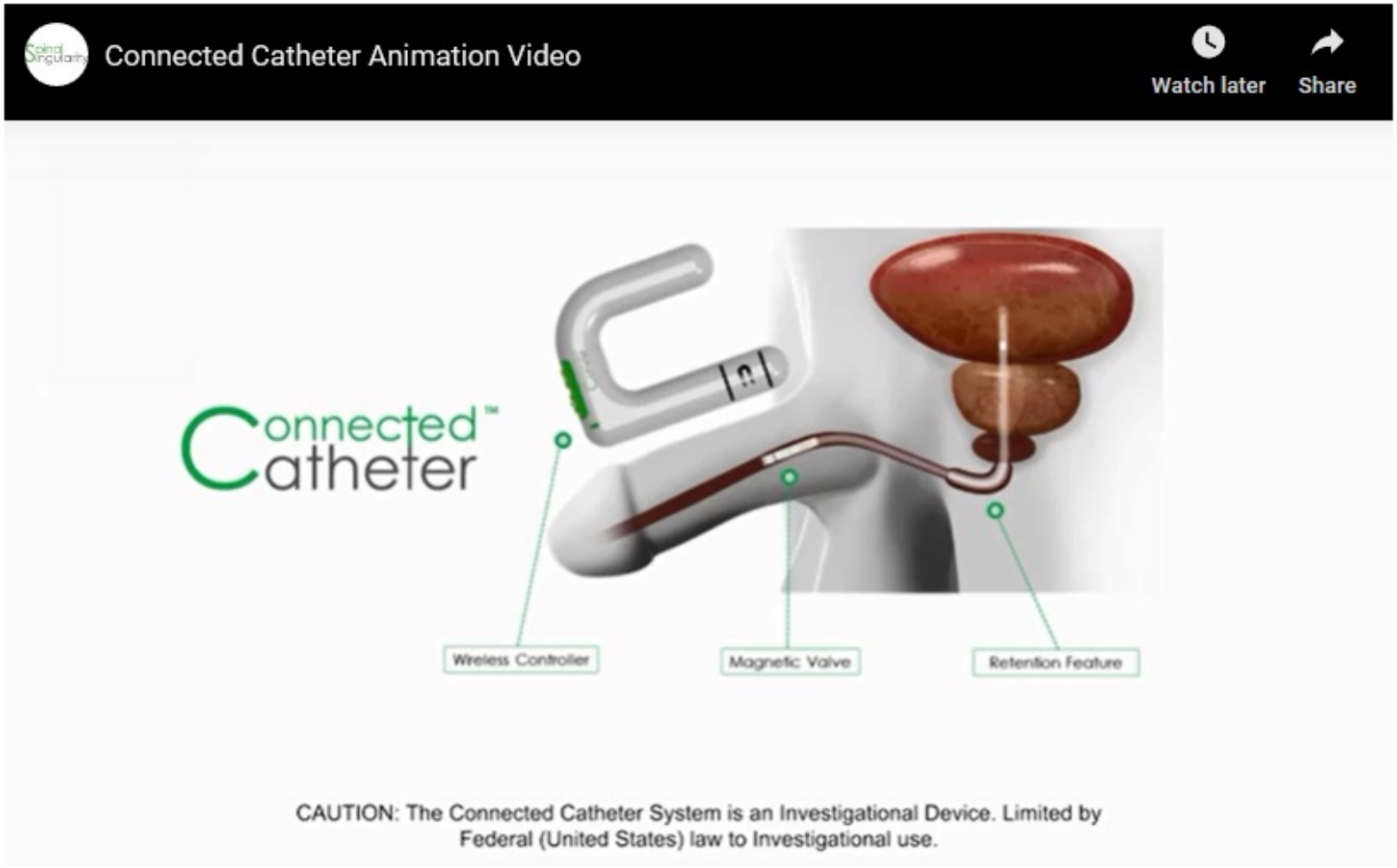
https://upload.wikimedia.org/wikipedia/commons/4/4b/3D_Medical_Animation_Urethral_Stunt.jpg

Artificial Urinary Sphincter



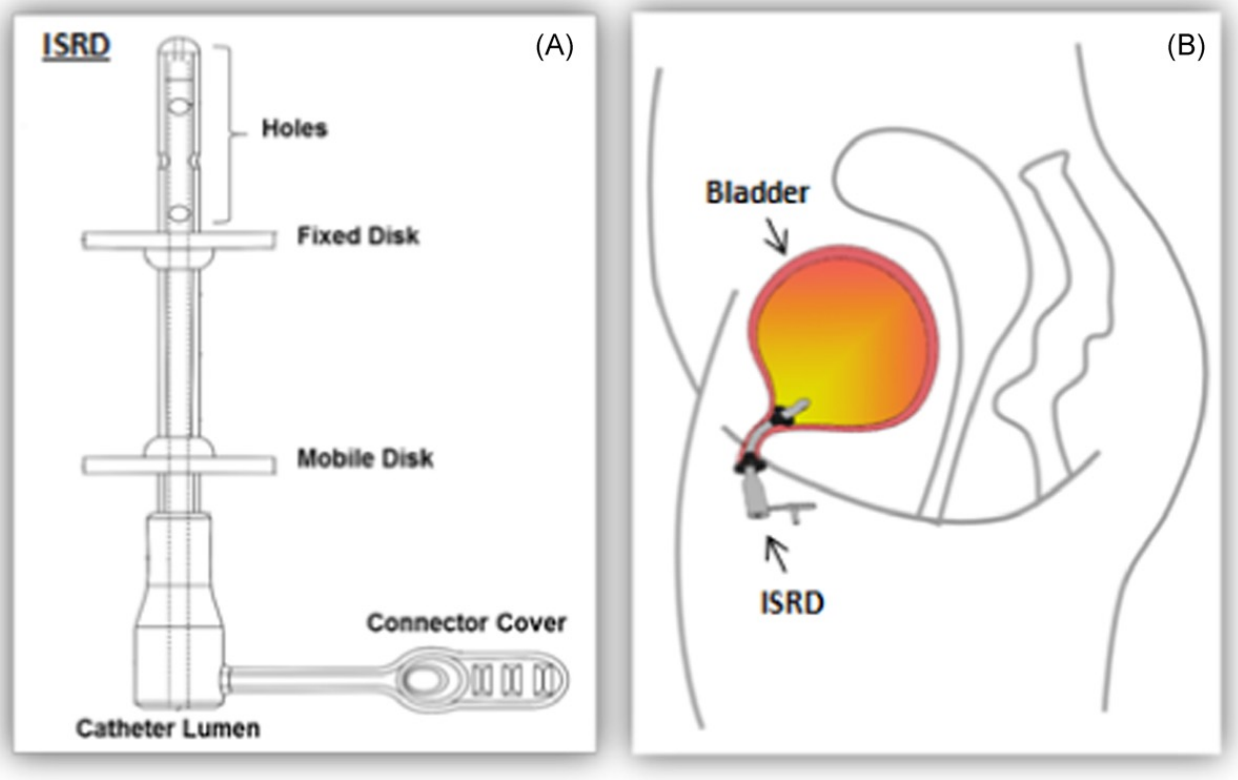


INVESTIGATIONAL DEVICES



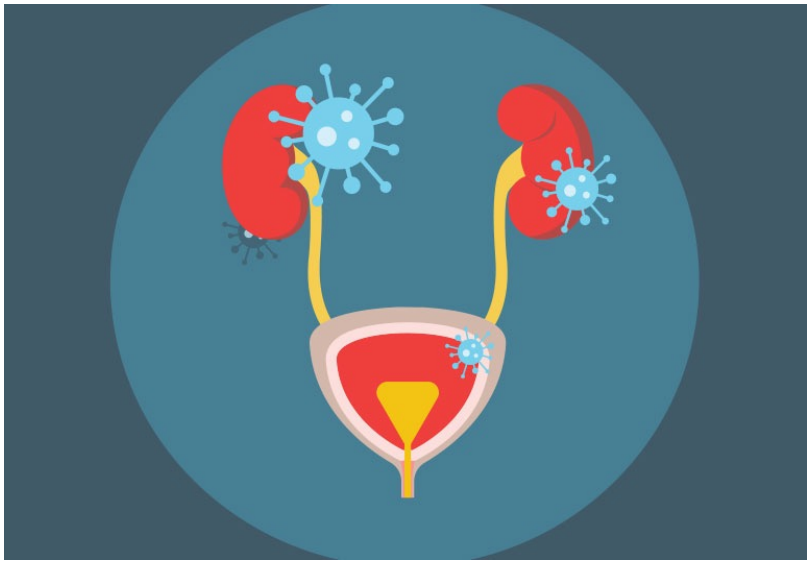
www.spinalsingularity.com

INVESTIGATIONAL DEVICES



A new bladder-emptying method in females with neurogenic bladder: A randomized, phase II trial

Neurourology and Urodynamics, First published: 04 June 2019, DOI: (10.1002/nau.24048)



URINARY TRACT INFECTIONS

UTI in Neurogenic Bladder

- m/c secondary health condition following SCI and major cause of illness
- Most prevalent risk indicator:
  - Indwelling catheter
  - Increased duration of catheterization
- **IS IT REALLY A UTI?**

TRUE OR FALSE

- Urine is sterile
  - **FALSE**
- Asymptomatic Bacterial Colonization should be treated with antibiotics
  - **FALSE**

UTI in Neurogenic Bladder

SIGNS

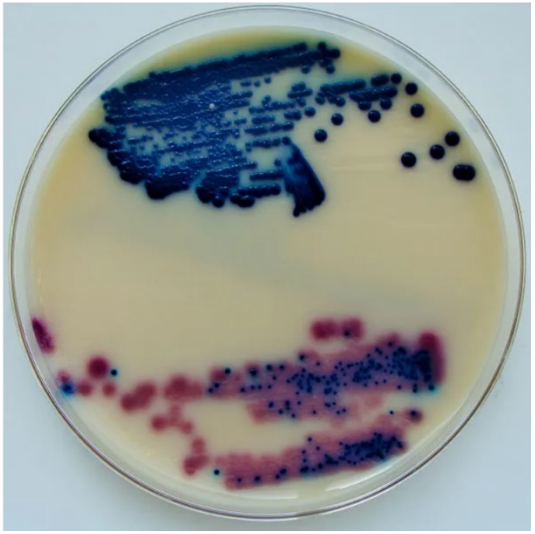
- Bacteriuria (increased colony counts)
- Pyuria (increased WBC's)
  - Fever
  - Lethargy

SYMPTOMS

- Bladder / kidney discomfort or pain
- Dysuria
- ↑ incontinence or leakage around catheter
- Fever or chills
- Anorexia
- Cloudy, dark urine with odor
- AD
- Malaise, lethargy, sense of unease
- ↑ spasticity

DIAGNOSING A UTI

- Take a good urine sample
- Dipstick test
- **Urine culture**



TREATING A UTI

- Antibiotics
  - Dependent on type of uropathogen
  - Common antibiotics you may have heard of: nitrofurantoin, trimethoprim-sulfamethoxazole, ciprofloxacin, amoxicillin, ampicillin
- Length of treatment
  - indwelling Foley catheters and catheter-associated UTIs:

    7-day to 14-day treatment course with **culture-specific antibiotics**

Preventing a UTI

- Catheterization method
  - Indwelling versus intermittent catheter
  - Single versus multiple use cathter
- Catheterization schedule
  - Usually 4-6 times a day, depending on output, fluid intake
- Genital hygiene
- Fluid intake and diet
- Exercise

Preventing a UTI

- Prophylactic antibiotics
- Oral Antiseptics
  - Cranberry supplements
  - D-mannose
  - Vitamin C?
- Probiotics?

YOUR BLADDER CHECKLIST

- Review bladder management at least yearly
  - Is it adequate?
  - Are your meds working?
- Check creatinine and electrolytes yearly
- Ultrasound every 1-2 years
- Keep track of UTIs (is it a true UTI?)
- Consider establishing care with a urologist
- May need a cystoscopy
- Males: Consider PSA testing after age 50 years

THANK YOU!

International Center for Spinal Cord Injury
Kennedy Krieger Institute