

MSA and the Bladder:

What are the issues and what can be done?



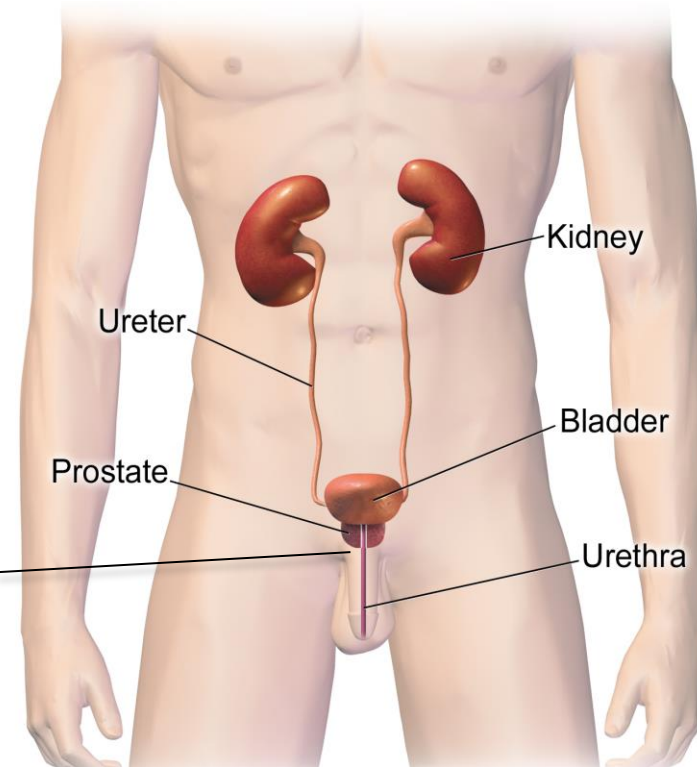
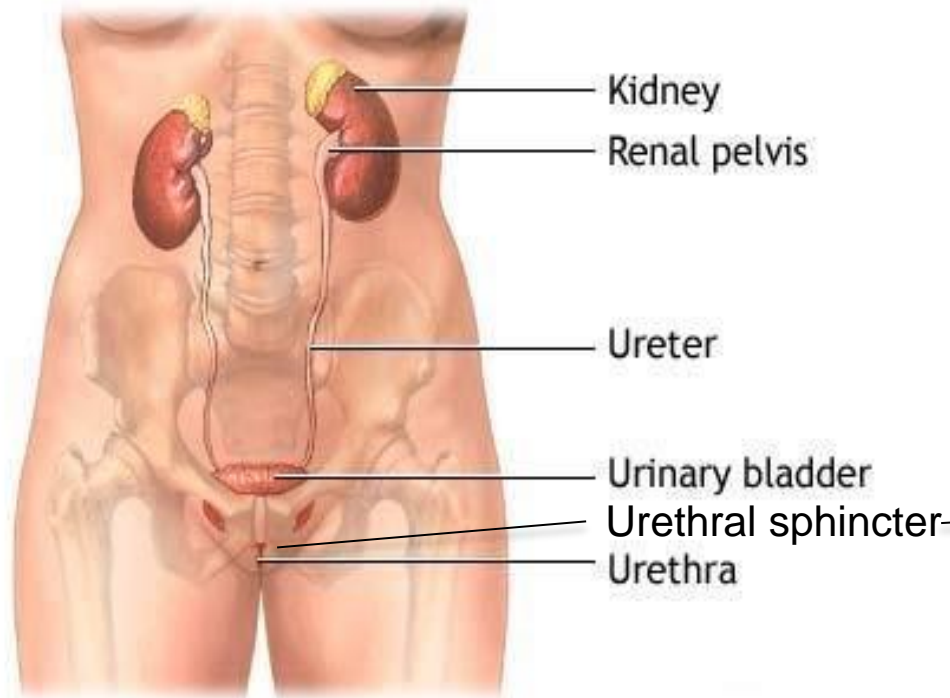
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Urinary Tract Anatomy

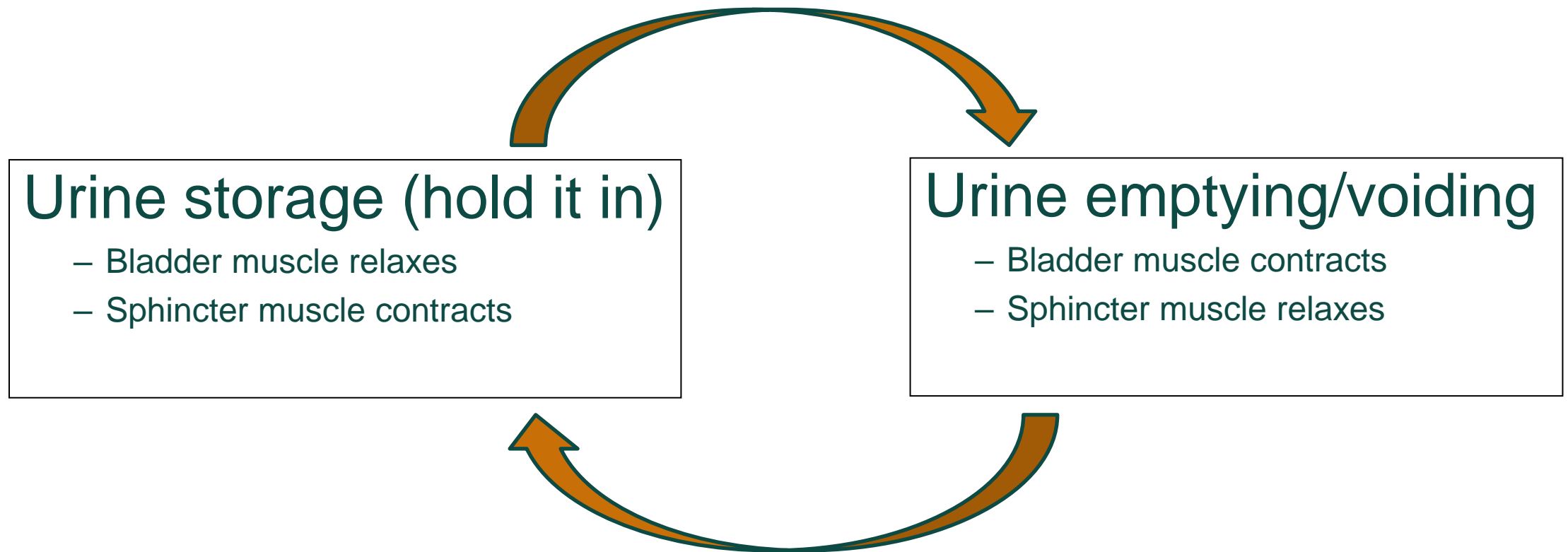


Bladder muscle (detrusor)
analogous to car engine

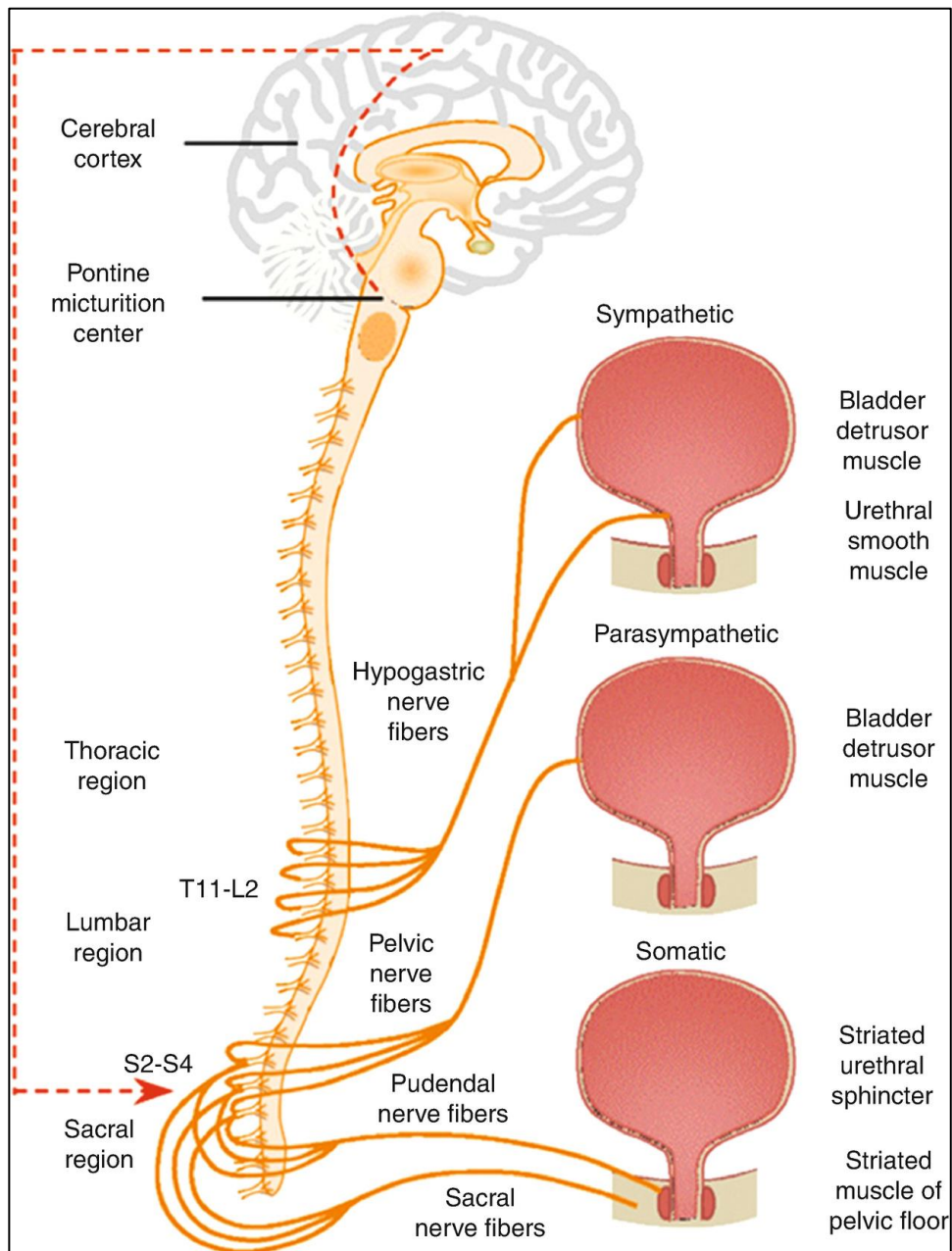
Urethral sphincter muscle
analogous to car brake



Bladder Has Simple Functions



This process is under complex regulatory control by the nervous system (central and autonomic - brain and spinal cord)



Nervous System control of the urinary tract is complex and still not fully understood

Adult Neurogenic Lower Urinary Tract Dysfunction (ANLUTD) – formerly neurogenic bladder (NGB)

- Nervous system is like the circuitry in your house and the bladder and sphincter are appliances (eg microwave and toaster)
- Pathology in the nervous system (brain, spinal cord, nerves) can result in abnormal functioning of the bladder and sphincter



When there's a problem with the circuitry in your house are you surprised when your appliances don't work properly?

Urine Storage Dysfunction (bladder doesn't hold urine well) aka Overactive Bladder (OAB)

- Urinary Frequency (day/night)
 - *Influenced by urine output*
 - Fluid intake
 - Edema (eg ankle swelling)
 - Diuretic medication
 - Sleep apnea
- Urinary Urgency
- Urinary Incontinence (accidental wetting)
 - Urge incontinence
 - Bed wetting (nocturnal enuresis)

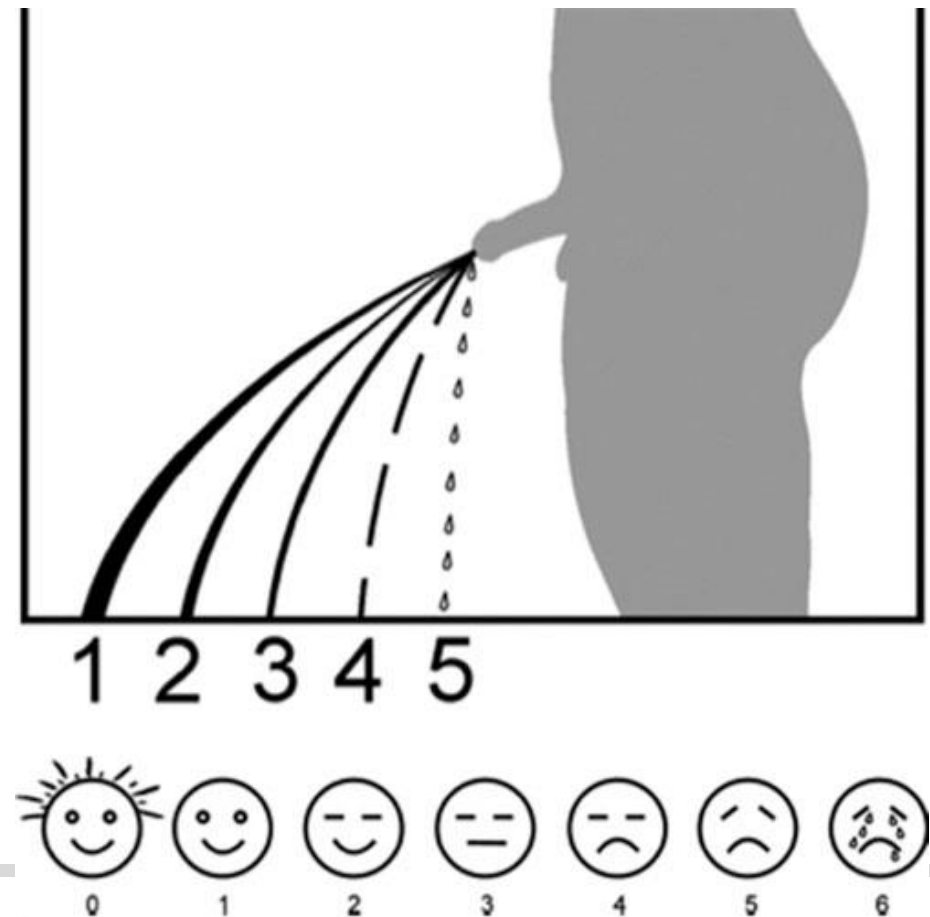


Urinary Emptying/Voiding Dysfunction (bladder doesn't empty well)

Weak (underactive) Bladder

Urethral Obstruction (eg prostate, hyperactive sphincter)

- Voiding difficulty
 - Weak stream
 - Hesitancy, straining
- Retained urine in bladder
 - Risk for infection (UTI)
 - Risk for stones (bladder)
 - Risk for kidney dysfunction
 - Frequent urination (bladder always partly full)



MSA Affects the Brain and Spinal Cord

→ Urinary Tract Dysfunction

- **Lower urinary tract symptoms (LUTS) very common in MSA**
 - >90% of patients
 - May precede the onset of other neurologic and orthostatic symptoms
 - May progress with time
- **Urine storage dysfunction and/or emptying dysfunction**

~40-50% have daytime urinary frequency
~60-70% have nighttime urinary frequency (nocturia)
~65-75% have urinary urgency and even urge incontinence

~60-70% have voiding difficulty
→ Incomplete bladder emptying/retention

Sakakibara et al. Clin Auton Res 2018

How Are Patients Assessed?

- **Symptom assessment and physical exam**
 - Questionnaires
- **Urine testing**
 - Rule out infection/blood
- **Bladder scanner (ultrasound)**
 - Assess emptying
- **Bladder diary/pad tests**
 - Assess urine production, urinary frequency, incontinence
- **Urodynamic testing**



3 Tiered Management of Overactive Bladder

1

Behavior Modification
Pelvic Floor Therapy

2

Medication

3

Procedural

Behavior Modification/Pelvic Floor Therapy

- **Fluid management**

- *Avoid excessive urine production*

- Appropriate intake/timing of fluids
 - Management of leg edema/swelling
 - Timed diuretics
 - Compressive stockings
 - Afternoon lie downs
 - Treat sleep apnea

- *Avoid bladder irritants*

- **Manage constipation**

- **Pelvic floor therapy**

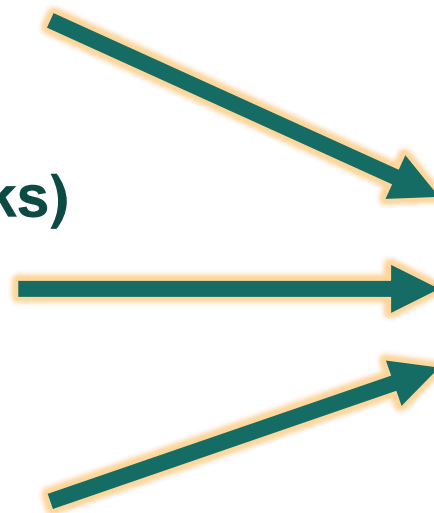
- Kegels
 - Physical therapy
 - Biofeedback
 - Electrical stimulation

- **Bladder retraining**

- Timed urination (prompted)
 - Delayed urination

Bladder Irritants

- Alcoholic beverages, including beer and wine
- Citrus juices and fruits
- Highly spiced foods
- Carbonated beverages (e.g. soft drinks)
- Caffeine (coffee, tea, chocolate)
- Sugar, honey
- Milk/milk products
- Corn syrup
- Artificial sweetener -- *Nutrasweet (Equal)*
- Smoking



Behavior Modification/Pelvic Floor Therapy

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Overactive Bladder Medications (oral, transdermal)

- Oxybutynin (Ditropan, Oxytrol, Gelnique), Tolterodine (Detrol), Solifenacin (Vesicare), Trospium (Sanctura), Darifenacin (Enablex)
- Mirabegron (Myrbetriq)
- ***All roughly equivalent in efficacy (improve urine holding)***
- **Some cause more side effects (less with extended release and esp transdermal formulations):**
 - Dry mouth
 - Constipation
 - Blurred vision
 - ***Potential for cognitive problems (eg memory)***
 - ***esp oral Oxybutynin***

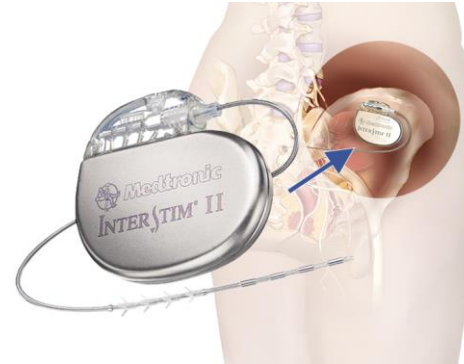


Procedural Management

- Nerve stimulation (technically not approved for neurogenic bladder)



Tibial (aka PTNS)



Sacral (aka InterStim)

- Botulinum Toxin injection into bladder (Botox)

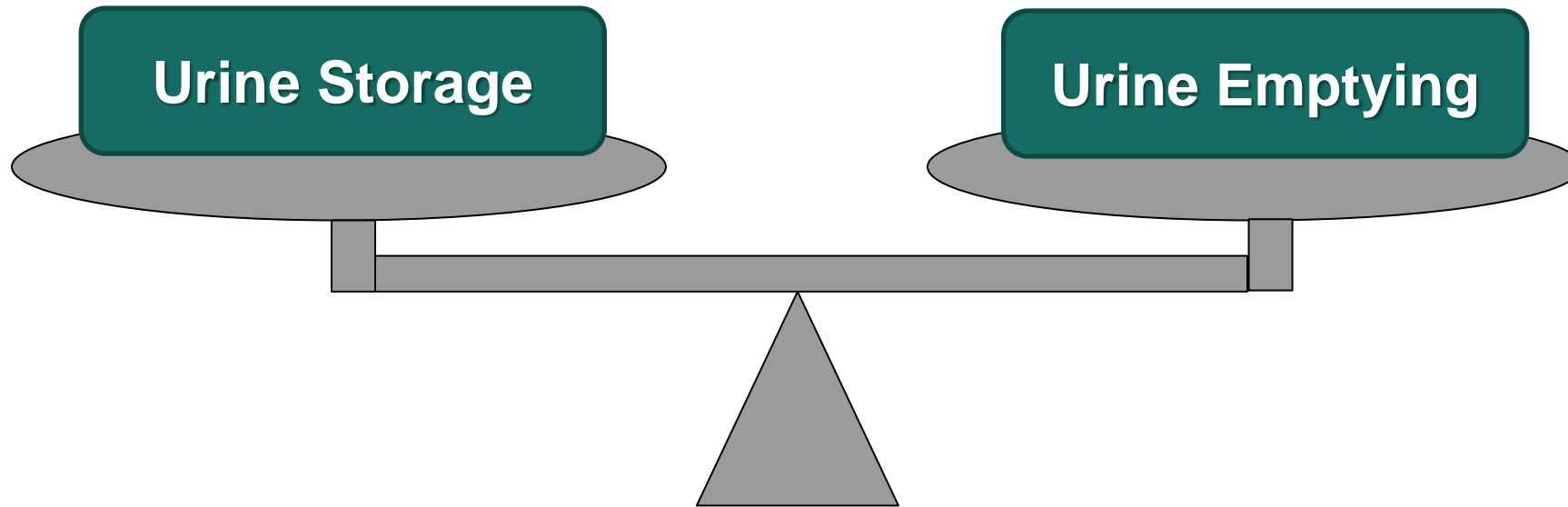


CAUTION

- Medications and some procedures that reduce bladder hyperactivity (to improve urine storage) have the potential to *worsen bladder emptying*
 - Akin to taking foot off gas pedal while driving car
 - Car slows down and may come to a stop



This Could Force A Compromise Between Urine Storage And Emptying



Some patients require catheterization to empty their bladders if they take OAB medications or use Botulinum toxin injections to improve urine storage

3 Tiered Management of Urine Emptying Dysfunction

1

Behavior Modification
Pelvic Floor Therapy

2

Medication

3

Procedural

At any time one may resort to the use of a catheter for bladder emptying

Medications for Emptying Dysfunction

- **Relax sphincter**
 - Tamsulosin (Flomax), Sildenafil (Rapaflo), Alfuzosin (Uroxatral)
 - Baclofen
- **Shrink prostate**
 - Finasteride (Proscar), Dutasteride (Avodart)
- **Strengthen Bladder (rarely used)**
 - Bethanecol (Urecholine)

Procedures to Improve Emptying

- **Nerve stimulation**
 - Sacral neuromodulation (aka InterStim)
- **Botulinum toxin (Botox) injection into sphincter**
- **Prostate Surgery**



Prostate Surgery and MSA

- Prostate surgery (TURP, HoLEP) is used to relieve urinary symptoms in BPH patients with enlarged prostates that obstruct the urethra
- *Generally in MSA the prostate is not the cause of urinary symptoms (it's a neurological condition affecting the bladder and sphincter)*
- Some patients initially thought to have BPH undergo prostate surgery with complications and are then later diagnosed with MSA
- *Prostate surgery doesn't necessarily improve bladder emptying and carries a significant risk for urinary incontinence in MSA patients*

Catheters

- **Can help manage both urinary storage (incontinence) and emptying dysfunctions**
 - **Lessen incontinence**
 - **Ensure bladder is empty**
- **Indwelling vs Intermittent vs External**
- **Can have down sides (esp indwelling catheters):**
 - **Bladder irritation**
 - **Urinary infection**
 - **Urinary stones**

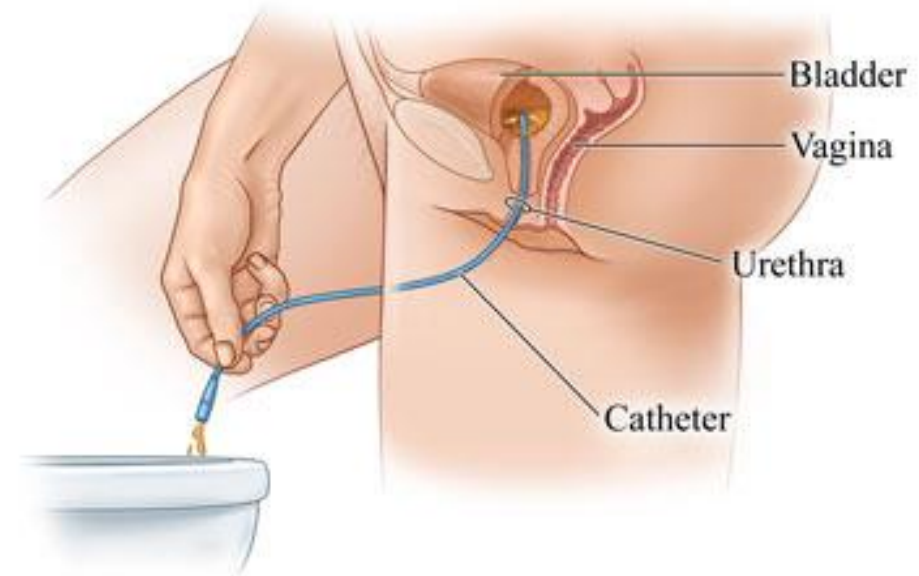
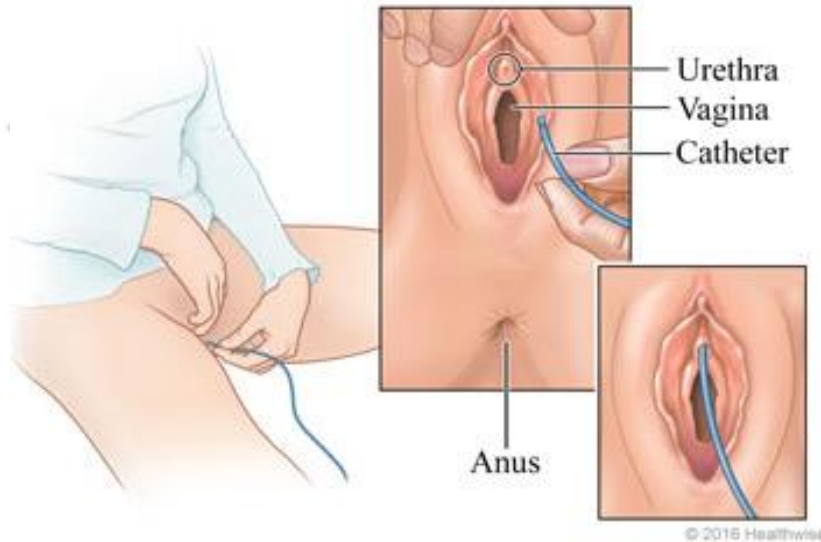
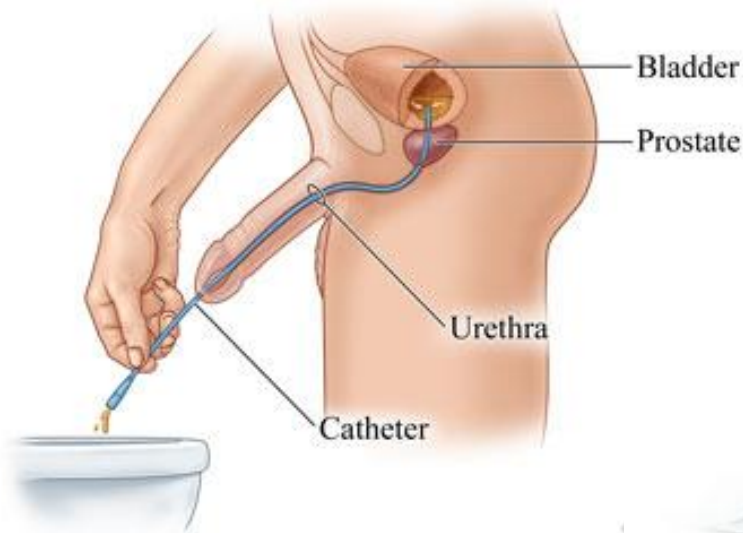
Intermittent (Self) Catheterization

Advantages:

- No need to carry drainage bag
- Less irritation than indwelling
- Less infection than indwelling

Disadvantages:

- Needs to be done multiple times a day
- Potential for infection
- Discomfort/difficulty with insertion



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Indwelling (Foley) Urethral Catheter

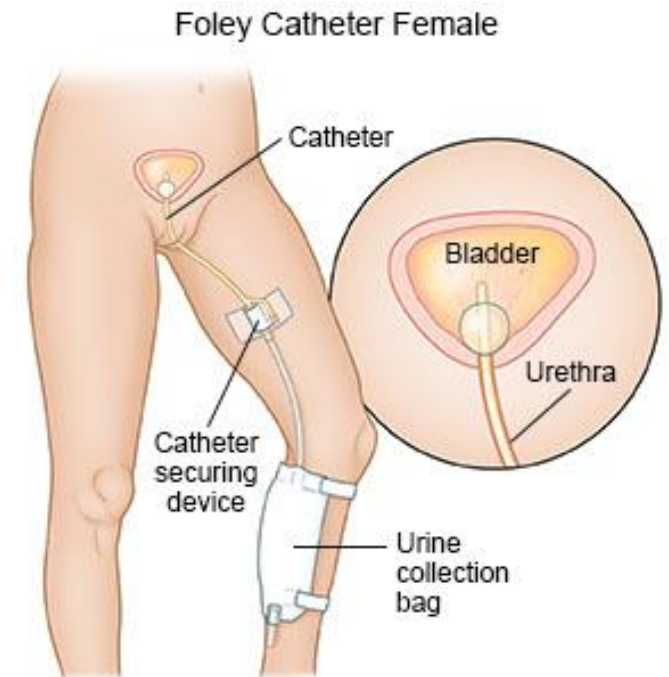
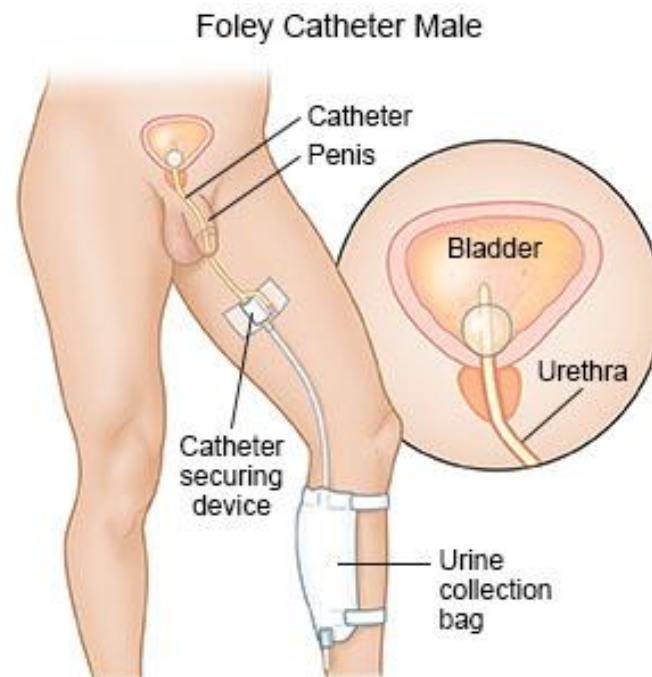


Advantages:

Simplifies bathroom habits
May lessen incontinence
(balloon plugs urethra)

Disadvantages:

Irritation of bladder
Infection
Stones
Urethral trauma/erosion



Suprapubic Catheter

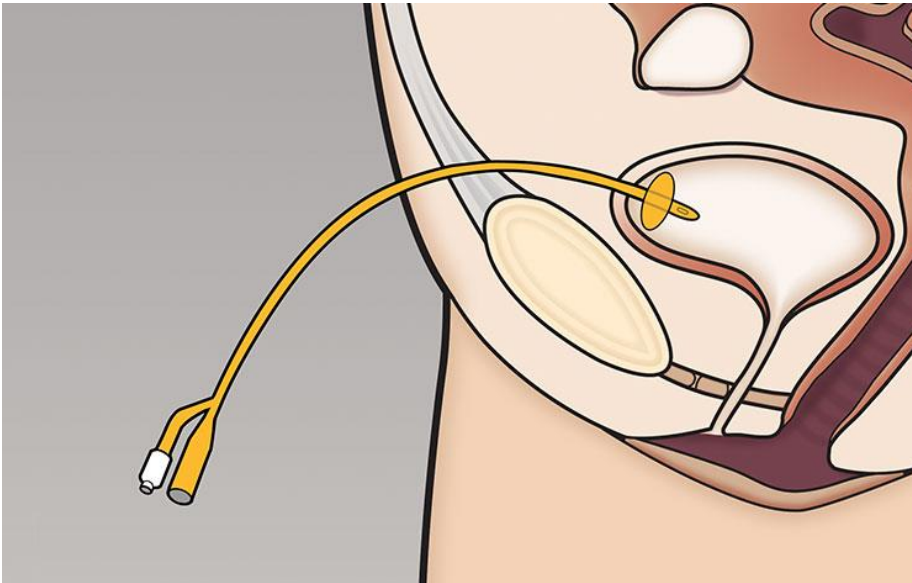
Advantages:

Avoids urethra (no trauma)

May be more comfortable

? Less infection

Larger catheter size drains better



Disadvantages:

Skin irritation (esp if obese)

Can leak urine per urethra

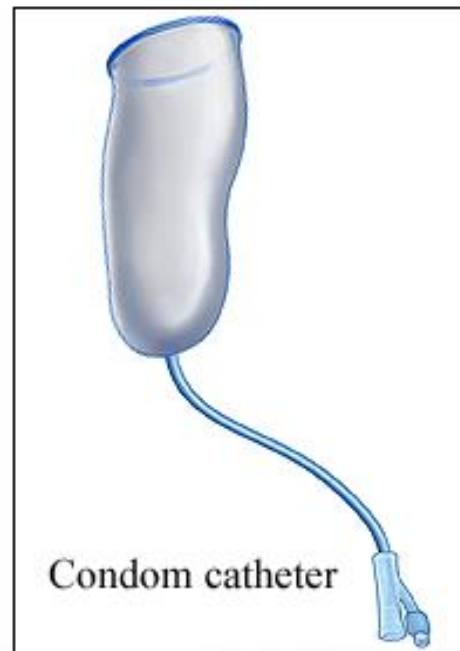
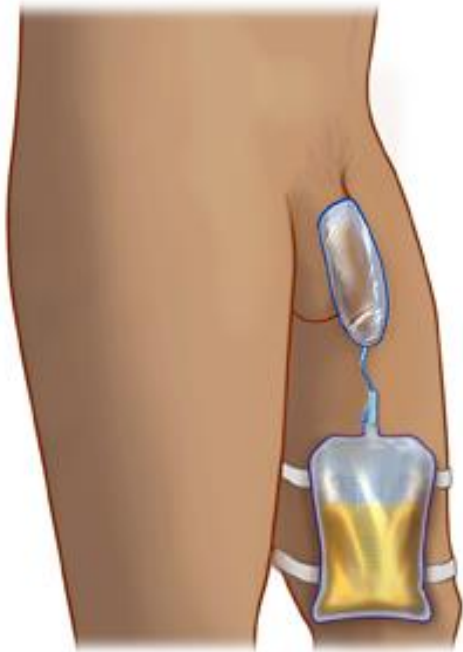
Requires minor surgical procedure



External Catheter

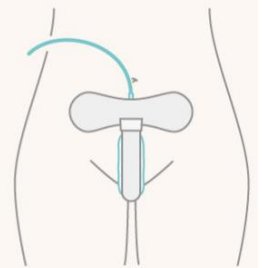
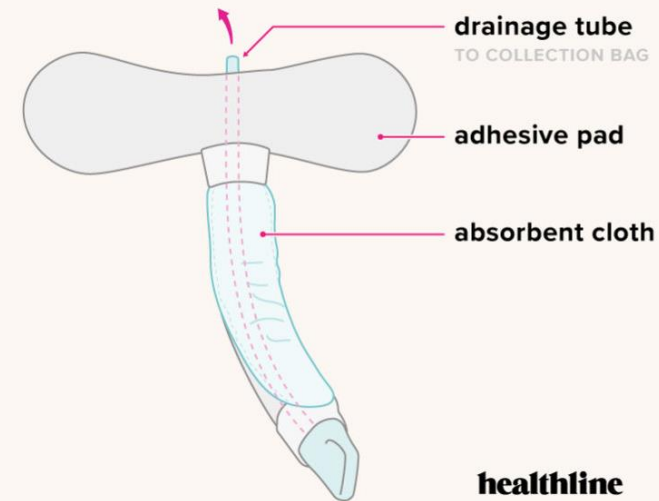
Manages Urinary Incontinence (Not Urinary Retention)

- Can be worn as needed
- Less infection than indwelling catheters
- Need to have adequate bladder emptying
- May not stay on well if penis retracts into fat



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female external catheter



Keys to Keeping Catheters “Happy”

- High fluid intake – at least 2-3L (70-100oz)/day
 - Irrigation might be needed
- Change catheter regularly
 - At least every 4 weeks for indwelling catheters
 - New catheter each time for intermittent catheters
- More frequent emptying is better than less frequent for intermittent catheterization
- Don't force it – avoid trauma to urethra

