

Neurogenic Bladder and the Role of O.T.

Presented by
Stacy McGinnis OTR/L, ATP, SMS

April 26th, 2024

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The Orlando Health Way



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Drive Growth
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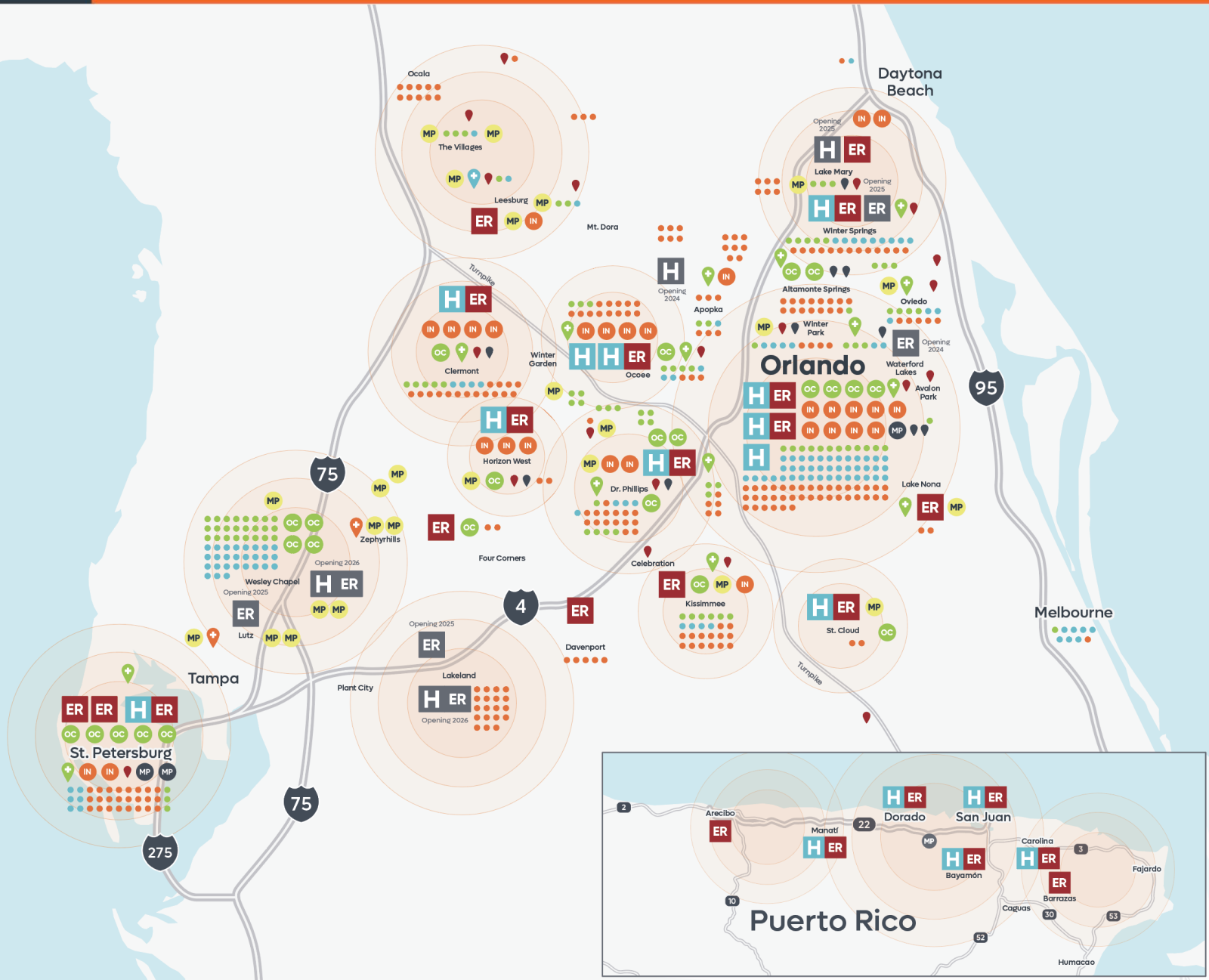


Strengthen
Economics



Serve Our
Customers Well

- H** Orlando Health Hospitals
 - ER** ERs & Pediatric ERs
 - OC** Outpatient Centers
 - MP** Medical Pavilions
 - IN** Institutes
 - +** Urgent Care (Care Spot)
 - +** Urgent Care
 - +** Walk-in Clinic
 - +** Cardiology Practices
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 - Primary Care Practices
 - Specialty Care Practices
 - Community Physicians
-
- H** Orlando Health Hospitals Coming Soon
 - ER** Free-Standing ERs Coming Soon
 - MP** Medical Pavilions Coming Soon



At-A-Glance

33
Hospitals
and ERs

16 Hospitals
10 Free-Standing ERs

+

Coming Soon
4 Hospitals
3 Free-Standing ERs

10
Specialty
Institutes

100
Outpatient
Centers

23
Medical
Pavilions

17
Urgent
Care
Centers

Central Florida's Only
Level One
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Trauma Center

4,950+
Physicians

100
Medical
Specialties

566,000+
ER
Visits

125
Primary Care
Practices

3,400+
Bed
System

\$1.3B
Total
Community
Impact
(FY22)

29,000+
Team Members

Plus 1,400
Employed
Physicians

197,000+
Inpatient
Visits

\$9.6B
of Assets
Under
Management

6.6M+
Outpatient
Visits

Awards and Recognitions

BEST REGIONAL HOSPITALS
US News & World Report
ORLANDO METRO
RECOGNIZED IN 18 TYPES OF CARE
2023-2024

BEST HOSPITALS
US News & World Report
HEART & VESSEL
2023-2024

ADMITTING VALVE SURGERY
COLON CANCER SURGERY
COPD
DIABETES
GASTROENTEROLOGY & GI SURGERY
HEART ATTACK
HEART BYPASS SURGERY
HEART FAILURE
KIDNEY FAILURE
KNEE REPLACEMENT
LEUKEMIA, LYMPHOMA & MYELOMA SURGERY
LUNG CANCER SURGERY
PULMONOLOGY & LUNG SURGERY
STROKE
UROLOGY

DIABETES
HEART ATTACK
HEART FAILURE
STROKE

BEST CHILDREN'S HOSPITALS
US News & World Report
RANKED IN 4 SPECIALTIES
2023-2024

BEST CHILDREN'S HOSPITALS
US News & World Report
ORTHOPEDICS
2023-2024

BEST CHILDREN'S HOSPITALS
US News & World Report
DIABETES & ENDOCRINOLOGY
2023-2024

BEST CHILDREN'S HOSPITALS
US News & World Report
PULMONOLOGY
2023-2024

BEST CHILDREN'S HOSPITALS
US News & World Report
NEONATOLOGY
2023-2024

BEST REGIONAL HOSPITALS
US News & World Report
ORLANDO METRO
RECOGNIZED IN 7 TYPES OF CARE
2023-2024

COPO
DIABETES
HEART ATTACK
HEART FAILURE
KIDNEY FAILURE
PNEUMONIA
STROKE

2024
MATERNITY CARE ACCESS HOSPITAL
US News & World Report
MATERNITY

Orlando Health - Health Central Hospital
Orlando Health Bayfront Hospital
Orlando Health Arnold Palmer Hospital for Children
Orlando Health Winnie Palmer Hospital for Women and Babies
Orlando Health South Lake Hospital

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NCOA
DIABETES

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ELITE LEVEL CENTER

MBS/QRIP ACCREDITED CENTER
QUALITY PROGRAM

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AMERICAN BURN ASSOCIATION
BURN CENTER

THE LEAPFROG
NATIONALLY RECOGNIZED
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STRAIGHT A'S 2023-2024

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STRAIGHT A'S 2023-2024

THE LEAPFROG
TOP CHILDREN'S HOSPITAL
2022

THE LEAPFROG
TOP TEACHING HOSPITAL
2022

THE LEAPFROG
TOP GENERAL HOSPITAL
2023

THE LEAPFROG
TOP TEACHING HOSPITAL
2023

Orlando Health South Lake Hospital
Orlando Health ORMC | Orlando Health Dr. P. Phillips Hospital
Orlando Health Arnold Palmer
Orlando Health Winnie Palmer
Orlando Health - Health Central Hospital
Orlando Health ORMC | Orlando Health South Seminole Hospital

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Comprehensive Stroke Center
Quality & Patient Safety

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GOLD PLUS
STROKE

2023 GET WITH THE GUIDELINES
GOLD PLUS
STROKE

2022 GET WITH THE GUIDELINES
GOLD
AFB

2023 GET WITH THE GUIDELINES
SILVER
HEART FAILURE

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SILVER
RESUSCITATION

Orlando Health South Lake Hospital
Orlando Health - Health Central Hospital

Accredited by
Commission on Cancer® National Accreditation Program for Rectal Cancer

QCP
QOPI Certification Program
Quality Cancer Care: Recognizing Excellence

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ACCREDITED FACILITY
TAC
TECHNICAL ACCREDITATION COMMISSION
TECHNOCARDIOGRAPHY

2024 Becker's Hospital Review
Top Oncology Hospital

2024
America's Best-in-State Employers

2023
PEOPLE Companies that Care®

Becker's Top 150
Places to Work in Healthcare
2023

TOP WORK PLACES
2023
Orlando Sentinel

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Best Places to Work 2023™
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AUG 2022-AUG 2023
USA

ORLANDO HEALTH®

Neurogenic Bladder and the Role of O.T.

Presented by

Stacy McGinnis OTR/L, ATP, SMS

Orlando Health Advanced Rehabilitation Institute

Outpatient Neuro Rehab

April 26th, 2024

Learner Objectives:

1. Learners will consider the influence of neurologic symptoms and their impact on ability to successfully manage neurogenic bladder.
2. Learners will be able to identify 2-3 body positions for successful bladder management techniques.
3. Learners will be able to report 2-3 pieces of adaptive equipment to assist in successful bladder management.

Outline:

1. Demonstrate knowledge of basic anatomy and physiology of the male/female urinary system
2. Demonstrate knowledge of how the urinary system can be affected by SCI.
3. Demonstrate knowledge of neurogenic bladder.
4. Describe the assessments used to determine whether a patient presents with upper motor neuron vs. lower motor neuron dysfunction.
5. Discuss complications which may occur during bladder management
6. Demonstrate knowledge of equipment and medication recommendations for bladder management.
7. Describe functional expectations for bladder management by level of injury.

Definition

The normal function of the urinary bladder is to store and expel urine in a coordinated, controlled fashion. This coordinated activity is regulated by:

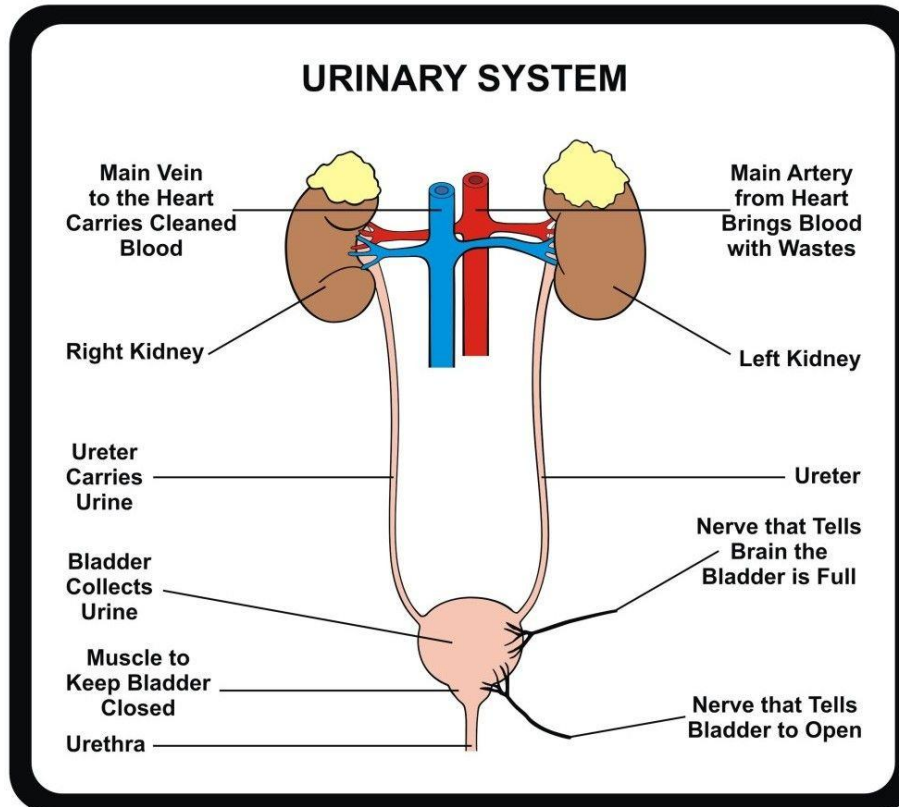
- the central: brain, spinal cord
- peripheral nervous systems: pelvic nerve, hypogastric nerve, pudendal nerve

A **neurogenic bladder** is a term applied to urinary bladder malfunction due to neurologic dysfunction resultant from internal or external trauma, disease, or injury.

Neuroanatomy

The body's urinary system has three major functions:

- Makes urine in the kidneys
- Stores urine in the bladder
- Removes urine from the body through the urethra



Kidneys: separate waste products from the blood (Inv)

Ureters: tube from each kidney to drain urine into the bladder (Inv)

Bladder: a hollow muscular organ that collects, stores, and expels urine (Vol)

Urethra: tube from base of bladder to the outside of the body from which urine is passed (Inv)

The urethra contains 2 sphincters:

- Internal Sphincter (Inv)
- External Sphincter (Vol)

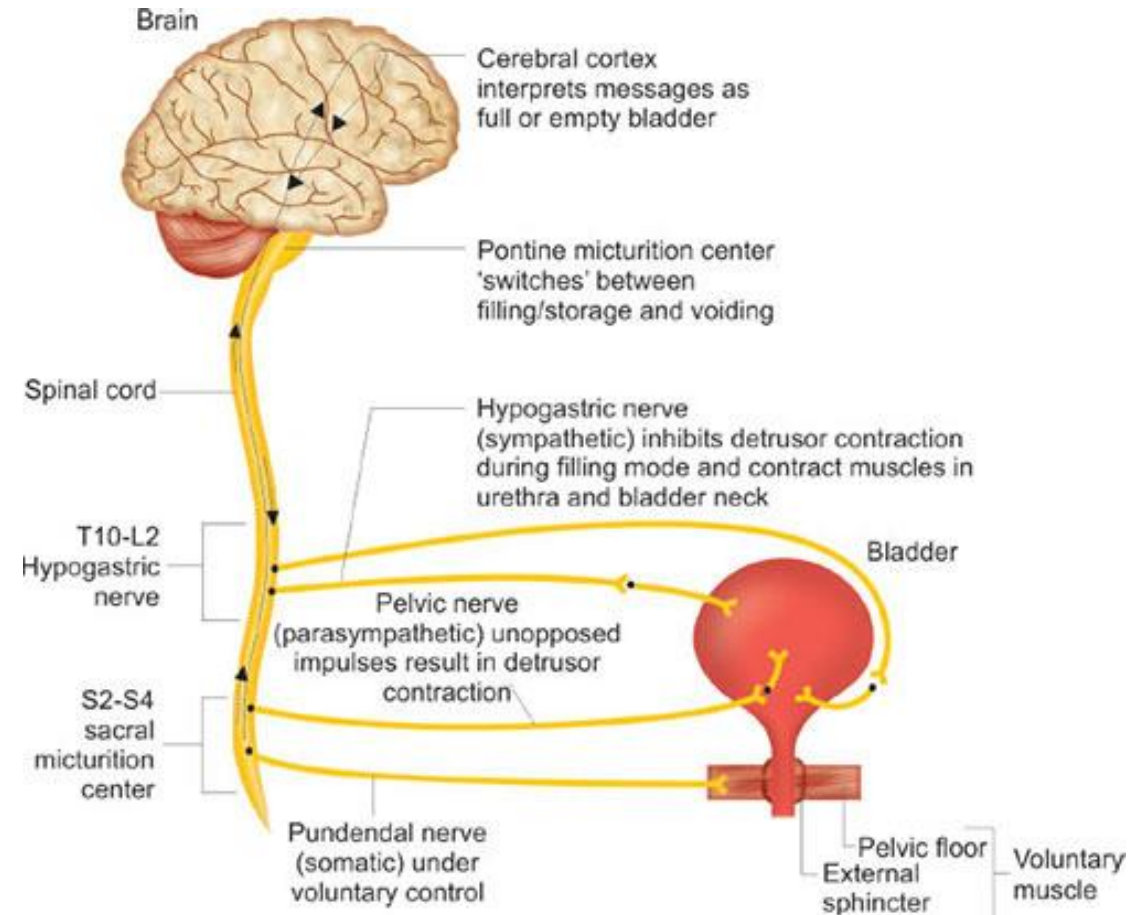
Neuroanatomy

Generalized Overview

The brain sends and receives signals through the spinal cord.

The lower portion of the spinal cord contains the parasympathetic **sacral micturition center** at S2-S4 level, and the nerves attached to it that go to/from the bladder.

These nerves signal the brain when the bladder needs to be emptied and control the sphincter.



Brain Overview

The brain is the master control of the entire urinary system.

Higher brain centers determine whether it's socially appropriate to void.

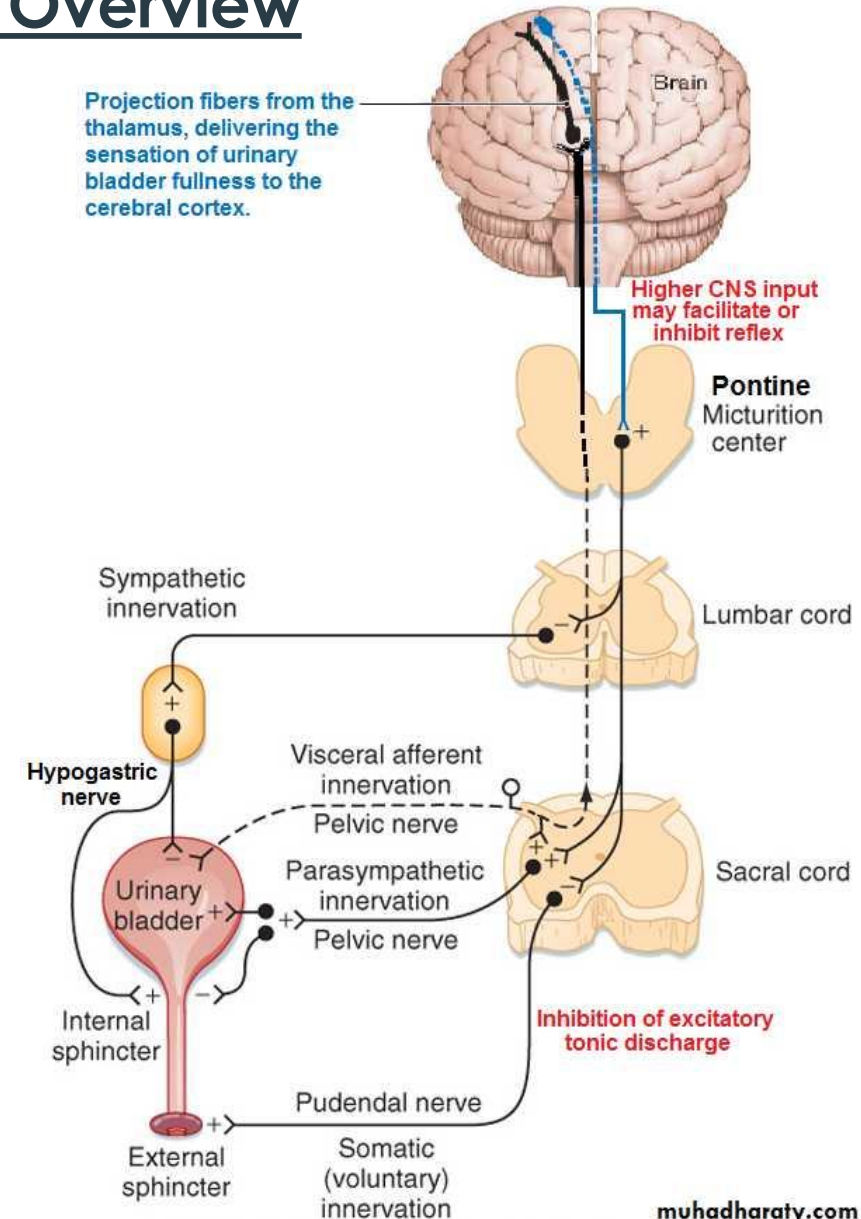
Cognitive control of micturition is achieved by communication from several higher level brain structures to..



- The **periaqueductal grey matter** (a relay station that collects higher brain center input and processes it), which exerts control over..



- the pontine micturition center in the **brainstem** ("PMC" in the **Pons**) to suppress or trigger a voiding reflex.



Neuroanatomy

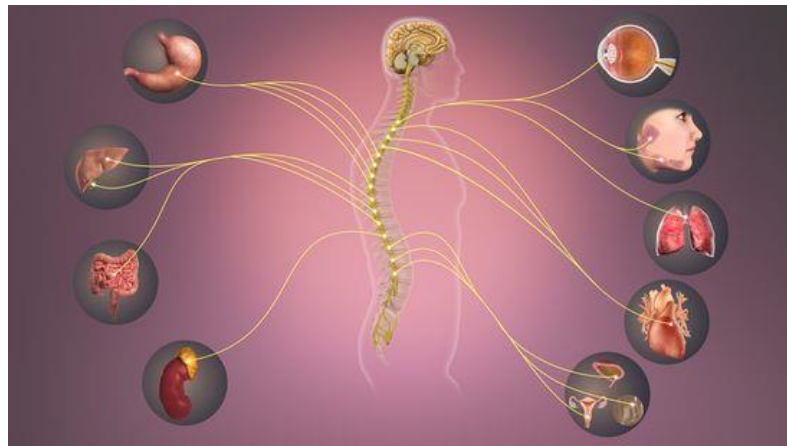
Neuroanatomy

Peripheral Nervous System Overview

**Somatic (voluntary) vs
Autonomic (involuntary)**

Autonomic nervous system:

- Lies outside of the central nervous system
- Regulates internal organs under involuntary control
- Divided into the sympathetic and parasympathetic systems.



**SNS and PNS work
unconsciously in opposite
ways to regulate the body.**

- Sympathetic: “fight or flight;” prepares the body for physical activity; innervates almost every organ system and provides physiological regulation over body processes such as gut motility and urinary output.
- Parasympathetic: “rest and digest”; conserves energy to be used later; regulates bodily functions like digestion and urination.

Neuroanatomy

Autonomic Nervous System Effects on Bladder:

Sympathetic activation:

- Originates from T11-L2; travels through hypogastric nerves
- signals relaxation of the detrusor muscle, increasing capacity without increasing detrusor resting pressure
- stimulates internal sphincter for contraction to help stop urine output.
- Prevents bladder contraction by inhibiting the PSNS.
- Micturition reflex is inhibited

Parasympathetic activation:

- Originates from S2-S4; travels through pelvic nerve
- Stimulates the detrusor and contracts the bladder, which squeezes it so urine can come out
- Is preceded by SNS suppression, allowing the internal sphincter to relax and open.
- Works in conjunction with the voluntary inhibition of the somatic pudendal nerve, causing the external sphincter to open
- Dysfunction results in retention

Healthy Bladder Function



- Normally, the bladder is able to store urine with detrusor muscle (bladder wall smooth muscle) relaxation, at low pressures (lower pressure in the bladder than in the urethra), until it is socially appropriate to go to the bathroom.
- In a normal bladder, as the relaxed bladder fills to approximately 250 mL to 300 mL, its stretching will signal the brain to coordinate volitional sphincter relaxation and detrusor contraction to empty the bladder in a low pressure environment.
- When it's time to release, your brain signals down your spinal cord to squeeze the bladder and relax the sphincter
- The ability to fill and empty the bladder under low pressure is very important in maintaining health of the kidneys, maintaining continence, and preventing urinary tract infections (UTI).

Healthy Bladder Function

Process of Micturition/Voiding

As urine fills the bladder, two events occur:

- 1. Stimuli are sent to the bladder reflex center (S2-4). The spinal cord then sends the messages back to the bladder that stimulate it to contract and to relax the internal sphincters, which can result in urination.
- 2. Stimuli also travel from the bladder up the spinal cord to the brain. If it is not a good time to void, brain sends a message to the external sphincter to stay contracted, preventing urination.

Normally messages traveling the bladder-brain loop override the messages from the bladder-spinal cord loop.

Contraction of the abdominal muscles and relaxation of the perineal muscles assist in the process of urination.

Bladder Function Following Brain Lesion

As a result of dependence upon higher brain centers, certain lesions or diseases of the brain can result in a **loss of voluntary control** of the normal micturition reflex as well as symptoms such as urinary urgency.

- Stroke
- Tumors
- TBI
- Dementia

Lesions of the brain **above the pons** interrupt higher conscious control of voiding.

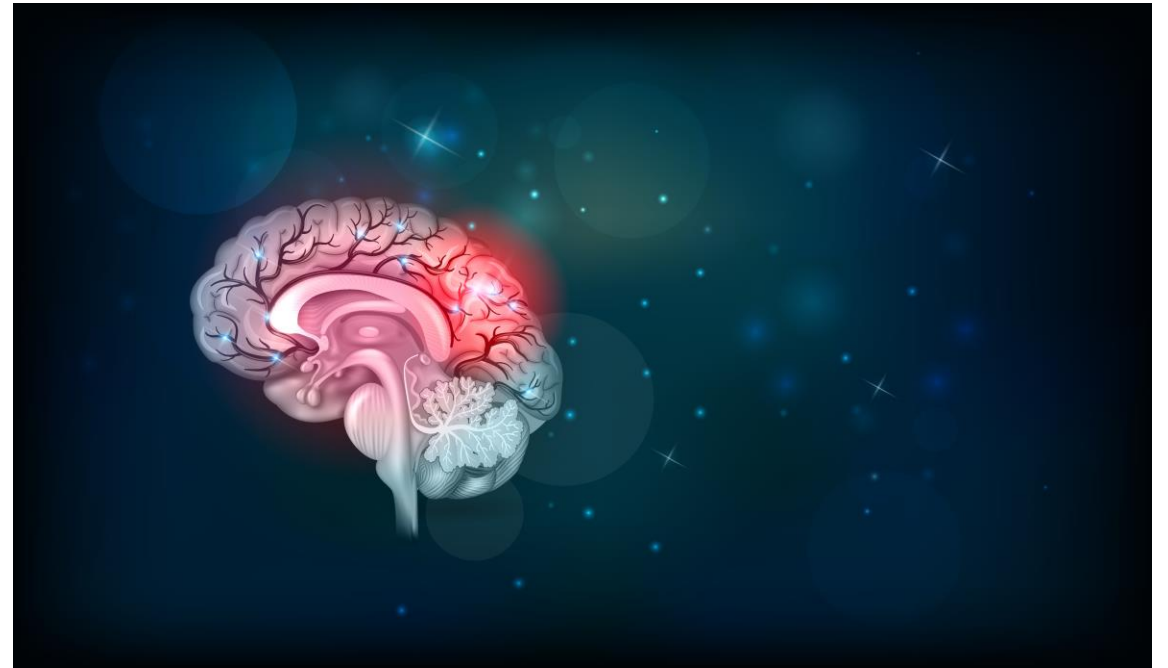
The **voiding reflexes of the lower urinary tract remain intact**. Affected individuals show signs of **urge incontinence and experience symptoms of overactive bladder**.

- The bladder empties **too quickly and too often**, with relatively low volumes of urine
- Deferring voiding or storing a large volume **becomes difficult**.

Bladder Function Following Brain Lesion

Stroke

- After a stroke, the brain may enter into a temporary acute cerebral shock phase, causing retention
- When the shock wears off, the bladder may demonstrate detrusor hyperreflexia with coordinated sphincter activity.
- Treated with medication to facilitate normal bladder filling/storage.



Bladder Function Following SCI

The **kidney, ureters and the urethra** continue to work the same, because they work involuntarily or **automatically**.

The bladder and sphincter muscles however, **require voluntary muscle control**.

When someone suffers a spinal cord injury (SCI), **the signals from the brain to the bladder do not work correctly**, and he/she may not be able to stop urine from flowing (incontinence), or may not be able to release (retention).

Depending upon the level of lesion, **an SCI can affect bladder function** in different ways such as:

- sensing a full bladder,
- over-activity or under-activity of the detrusor muscle and/or external sphincter,
- and dyscoordination between the two structures during urination.

After injury, the **urinary bladder and the sphincter are no longer coordinated** and both exert over-activity, a condition termed detrusor sphincter dyssynergia.

Bladder Function Following SCI

Spinal Shock: The immediate bladder response:

- **Immediate inability** for bladder to squeeze while the body is still in spinal shock. This generally lasts for a few days, but the bladder can be affected for 6-12 weeks or longer.
- During this phase, the patient experiences flaccid paralysis below the level of injury, and somatic reflex is either absent or depressed.
- **Absent BCR** (further described next). The return of this reflex often indicates the end of the spinal shock phase.
- Autonomic activity is depressed, and the patient will experience **urinary retention and constipation.**
- Patient presents with **areflexic detrusor and rectum**

Classifying UMN vs LMN

After spinal shock, signals to/from the brain may still be blocked by the SCI, which may be classified as an Upper Motor Neuron (UMN) or Lower Motor Neuron (LMN) Injury.

- Determined by presence or absence of:
- BCR reflex (further described next)
- Lower limb deep tendon reflexes below the NLI
- Babinski sign

Bladder function returns but the detrusor activity increases in reflex excitability to an overactive state.

Lesions above the sacral area may exhibit detrusor areflexia at initial injury, but progress to hyperreflexic over time.

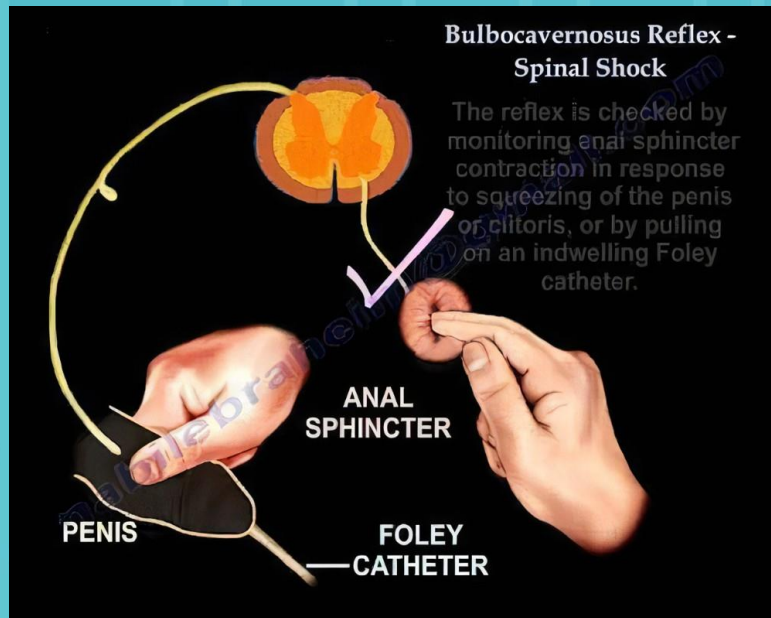
Sacral injuries are associated with areflexic bladders that may become hypertonic over time.

Classifying UMN vs LMN

The Bulbocavernosus Reflex:

The **BCR** consists of the contraction of the bulbocavernosus muscle in response to squeezing the glans penis or clitoris, and is mediated through the pudendal nerve.

The BCR **helps distinguish UMN lesions from LMN lesions**, which has important prognostic and therapeutic implications for bowel, bladder, and sexual function. It is complementary to the voluntary contraction of the external anal sphincter which gives information on the sacral motor sparing.



- In case of a complete lesion, the **presence of BCR** is indicative of intact S2-S4 spinal reflex arcs and loss of supraspinal inhibition, determining an upper motor neuron (UMN) lesion,
- The **absence of BCR** indicates a lower motor neuron (LMN) lesion.
 - Although absent during spinal shock, the persistent loss of this reflex often indicates conus medullaris syndrome or **cauda equina syndrome** as the most likely cause of the problem.

Classifying UMN vs LMN

Upper Motor Neuron Versus Lower Motor Neuron Injury

UMN:

- Nerves within the SC
- Carry messages back and forth from the brain to the spinal nerve along the spinal tract
- Injury results in loss of coordinated and integrated control of reflex activity below the level of injury.
- Results in spasticity of the limbs, bowel, and bladder

LMN:

- Spinal nerves that branch out from the spinal cord to other parts of the body
- Injury destroys the reflex arc and interrupts communication to the UMN.
- Results in paralysis of lower limbs and loss of bowel and bladder function

Classifying UMN vs LMN

Upper Motor Neuron Versus Lower Motor Neuron Injury

Study: Prevalence of UMN vs LMN lesions in complete lower thoracic and lumbar SCI's, (Doherty et al), J Spinal Cord Medicine, 2002:

- Lesions classified as LMN, UMN, or mixed on the basis of the presence or absence of:
 - BCR reflex
 - Lower limb deep tendon reflexes below the NLI (neurologic level of injury)
 - Babinski sign

Incidences:

- T7-T9: 7.3% LMN, 85.5% UMN, 7.3% mixed
- T10-T-12: 57% LMN, 17.7% UMN, 25/3% mixed
- L1-L3: 99.5 % LMN, 0.0% UMN, 4.5% mixed

Conclusions:

- “One cannot determine the type of lesion on the basis of the NLI. A detailed clinical examination, including sacral reflexes is required.

Bladder Function Following SCI:

“Spastic” or “Reflexive” Bladder

Usually results from injury above T12; typically Upper Motor Neuron

- Lack of intentional control of voiding and unaware of bladder fullness.
- Those with UMN injury SCI frequently have *small bladder capacities* with involuntary (uninhibited) bladder contractions.
- When level of injury is above the reflex voiding center in the spinal cord; there is still an intact reflex arc below, however there is also disruption to the inhibitory impulses from the cerebral cortex.
- The sacral micturition center may start sending reflex signals on it's own to tell the bladder to squeeze or relax, causing **incontinence**.
- Involves reflex or automatic bladder emptying in response to stretching fibers in the bladder wall as bladder fills with urine.
- The bladder might try to squeeze, but the external sphincter muscle may tighten at the same time, causing inability to urinate and high-pressure build-up in the bladder. This is called **Detrusor Sphincter Dyssynergia**. This can also over-stretch the bladder and cause bladder infections, kidney infections, and kidney stones.
- When the SCI is at the level T6 or higher, **Autonomic Dysreflexia** can result.

Bladder Function Following SCI

“Flaccid” or “Areflexive” Bladder

Usually at T12 and below; typically Lower Motor Neuron

- When the bladder muscles lack tone and are sluggish or absent.
- The bladder loses the ability to empty automatically and without tone, it cannot empty, fill, and hold urine effectively, therefore may leak urine continuously.
- Involves ablation of the reflex arc with disorganized, ineffective spinal segmental control.
- The patient will not feel when his/her bladder is full, nor be able to squeeze the bladder, causing:
 1. Over-distention of the bladder
 2. Bladder overflow if the urinary sphincter is weak, or
 3. Inability to release urine, causing back-up into kidneys if a strong urinary sphincter is still present.

Bladder Function Following SCI

Other Bladder Dysfunction:

○ **Mixed Bladder:**

- Injuries in lumbar or lower thoracic and incomplete spinal cord injury
- May be aware, but have no control
- External sphincter may be spastic, but bladder is flaccid

○ **Motor Neurogenic Bladder:**

- Lesion involving the bladder motor fibers
- Bladder fullness sensation but inability to control urination

○ **Sensory Neurogenic Bladder:**

- Lesion involving the bladder sensory fibers
- Absent sensation for bladder fullness but ability to control urination.

Goals of Bladder Management

- achieving regular bladder emptying and avoiding stasis
- **avoiding high filling** and voiding pressures
- **maintaining continence** and avoiding abnormal frequency and urgency
- **preventing and treating complications** such as UTI, autonomic dysreflexia (usually only in those with injuries at or above T6), reflux, stones, and strictures.
- Ideally want to mimic normal bladder function- **allowing the bladder to fill and empty** periodically.

Bladder Management Techniques

Common Medications:

- Urinary Antiseptics: lower the pH of urine to increase acidity
- Antibiotics: suppress or destroy bacteria
- Cholinergics: strengthen bladder contractions and initiate voiding
- Anticholinergics: decrease hyperactivity of the bladder muscle, antispasmodic effects on bladder, and increase bladder capacity
- Alpha-adrenergic blockers: reduce bladder neck and sphincter spasticity/resistance
- Alpha-adrenergic stimulants: increase bladder neck and sphincter spasticity/resistance
- Central Acting muscle relaxants: effects striated external sphincter

Bladder Management Techniques

Botox:

A Physician may consider the use of Botox injection into the sphincter to help improve voiding in patients with detrusor sphincter dyssynergia.

It also may be considered for injection into the detrusor muscle in patients on CIC with detrusor overactivity.



Bladder Management Techniques

Common management techniques:

Indwelling catheters (foley, suprapubic)

External Condom Catheters for Reflex Void

Intermittent catheterization (CIC)

Surgical Procedures:

- Ileal Loop urostomy – uses ostomy device
- Mitrofanoff- stoma created from appendix that can be cath'ed



Crede/Valsalva maneuver

Triggered voiding

Timed voiding



Bladder Management Techniques

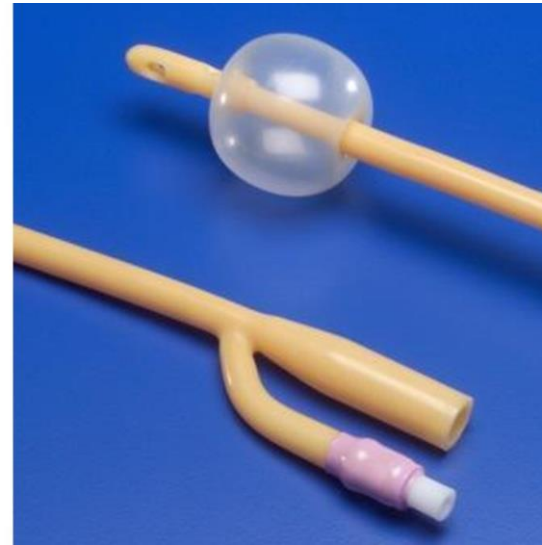
Suprapubic (Indwelling Foley) Catheters

These are sometimes used for the following reasons:

- Some **wheelchair users or people who can't** self-catheterize find this method simpler to manage.
- Patient's with **limited hand function** after SCI, or who require a caregiver to complete bladder management.
- Small bladder capacity with **forceful uninhibited contractions** despite tx
- **Urethral trauma** (damage that has been caused to the urethra – the tube where urine comes out)
- People who require **long-term catheterization** and are sexually active
- After some **gynecological operations** e.g. surgery for prolapsed uterus or bladder, or surgery for stress incontinence
- Long-term catheterization for incontinence, to **avoid skin problems or other medical complications.**

Bladder Management Techniques

Suprapubic (Indwelling Foley) Catheters



Pros: continuous gravity drainage, less caregiver help, good for high urine outputs, unrestricted fluid intake, good option for patients with high LE spasticity, larger body habitus, or difficult transfers; acceptable for patients with small bladder capacity and low PVRs

Cons: bladder size shrinks, increased risk for infection, need for a collection device, risk for bladder or kidney stones, recurrent UTI; not good for patients with decreased hand skills; not good if patient having high PVRs despite tx; skin break down

Bladder Management Techniques

External Condom Catheters for Reflex Voiding:

- Used when a male presents with the ability to produce *reflex voiding*.
- Available in many sizes, so accurate measurement is required for proper fit.
- Condom catheters are a good way of collecting urine in men who have no urinary retention or urinary obstruction and can use their hands well enough to be able to use the catheter themselves. With condom catheters, the risks of damaging the urethra and of infection are less.

Pros: decreased infections, can be used in conjunction to CIC to decrease incontinence/moisture on skin between catheters when leaking is present

Cons: require a collection device, penile skin breakdown, can have issues with keeping on, not an option for women; recommend new ECC each time needing to CIC to avoid cross contamination- can request daily increased supply from vendor

Bladder Management Techniques

Condom catheter fitting/application:

1. Use the manufacture's fitting kit to measure for correct size of condom catheter. (For the measurement to be accurate you must measure around the shaft of the penis and not the tip of the penis. The penis should make contact with the measuring tool at all sides without causing an indentation. Each manufacture uses different sizes, so if your client is in between sizes for one manufacture consider changing manufactures)
2. Wash your hands
3. Wrap a damp warm wash cloth around the base of the penis for 10 seconds to loosen the adhesive to allow safer removal of the old condom catheter.
4. Confirm that the client's pubic hair is short enough to not get caught in the condom catheter (this is a guaranteed leak)
5. Wash the penis with soapy washcloth and rinse with wet wash cloth, rinse as many times as needed to be sure to remove all soapy residue. Pull back skin to clean all areas. **Please do not use any type of wipes that leave residue as the condom catheter will not stay in place
6. Dry penis well
7. Use Skin Prep/adhesive prior to applying the catheter (skin prep can be used, however for most of our patients it is too cost prohibitive for use once discharged and the clients learns to use without the skin prep.).
8. Put funnel end of condom catheter over tip of penis; be sure that the tip of the penis is inserted deep enough into the condom catheter that there is no adhesive around the tip of the penis. If the head of the penis is covered by skin when the patient is at rest then the condom catheter is placed over the skin "as it is" otherwise the skin will push off the condom catheter later. Roll the condom catheter down to the base of the penis. If there is still unrolled condom catheter once you are at the base you need to switch to a shorter version of that catheter.
9. Use self-adhesive condom catheter, place your hand around the shaft for 3-5 seconds to "set" the adhesive with your body heat not pressure
10. Connect condom catheter to bag, making sure that the tubing is connected to a leg strap so the bag does not pull directly from the condom catheter.

Bladder Management Techniques

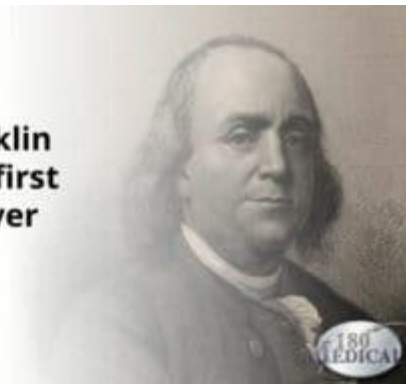
Intermittent Catheterization:

- Sterile Technique
- Clean Technique

Risks

- UTI
- Bladder over distension
- Urinary incontinence
- Urethral trauma with hematuria
- Urethral false passages
- Urethral strictures
- AD (<T6)
- Bladder Stones

Benjamin Franklin was one of the first to create a silver catheter.



Types of Catheters:

Hydrophilic versus Non-hydrophilic

Straight versus Coude Tip

Introducer Tip

Sizing selection

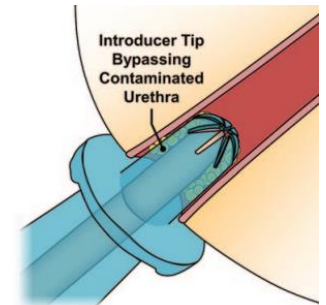
Tubing material and flexibility

Open system versus Closed system

All-in-One System

Kit Supplies: gloves, drape, lubrication, disposal bag

Catheter extensions



Practical Bladder Management: CIC

Intermittent Catheterization:

The advantage of intermittent catheterization is that you do not have to wear a catheter and urine bag all the time. It is done on an “**as needed**” basis.

Intermittent catheterization can be more convenient and healthier, and when completed properly, urinary tract complications are less common with this bladder management method.

Many people who use intermittent catheters **limit fluids after dinner** to avoid having to catheterize in the middle of the night.

It is important not to allow the bladder to become too full because that will increase the risk for pain, infection, autonomic dysreflexia, and harm to the kidneys from elevated bladder

People who use intermittent catheterization **need to keep track of their fluid intake** and make sure that the catheterization is done on time. (Bladder Diary- see next)

Practical Bladder Management: CIC

Staff initials: 7a-7p____ 7p-7a____ **Bladder Diary**

24 hour period

Patient Label

Date: _____

Some things to consider when completing your program:

- Who is doing the catheterization?
- Was correct handwashing performed?
- Who adjusts clothing to cath?
- Is catheterization performed in the bed, chair or toilet?
- Who disposes of the urine?
- Who disposes of the catheter/materials?
- Who performs hygiene?

Time	How much urine? (mL/cc) (Recommended vol 400-600mL)	Did you feel an urge to urinate?	Did you leak urine? If so, how much? A lot or a little?	Who did the catheterization?
		<input type="checkbox"/> yes <input type="checkbox"/> no		
		<input type="checkbox"/> yes <input type="checkbox"/> no		
		<input type="checkbox"/> yes <input type="checkbox"/> no		
		<input type="checkbox"/> yes <input type="checkbox"/> no		
		<input type="checkbox"/> yes <input type="checkbox"/> no		
		<input type="checkbox"/> yes <input type="checkbox"/> no		
		<input type="checkbox"/> yes <input type="checkbox"/> no		
		<input type="checkbox"/> yes <input type="checkbox"/> no		

How many times were you above/below the recommended volume? _____

What product(s) did you use today to perform catheterization? _____

Are you satisfied with your bladder program today? yes no

Practical Bladder Management: CIC

Clean Intermittent Catheterization Male

.....

1. Gather all needed supplies. This may include:
 - the catheter
 - a urine collection device
 - lubrication
 - gloves
 - cleaning supplies
2. Remove enough clothes to give yourself full access to the penis.
3. Wash your hands just prior to insertion of catheter.
4. Put on gloves.
5. Wash the tip of the penis.
6. Hold the shaft of your penis with your non-dominant hand with the tip of the penis slightly pointed up towards your belly button.
7. If the catheter has an insertion tip, insert the tip into the urethra before advancing the catheter. Hold the insertion tip against the urethra. Advance the catheter gently until you see urine draining into the collection device. Once the urine stops flowing slowly remove the catheter from the bladder. This will allow the rest of the urine to drain.
8. You can now clean the tip of the penis and put on your clothes.
9. Once you are done, drain the urine into the toilet. Throw the collection container in the trash.

Tips:

1. Hold the penis with your middle, ring, and small fingers. Hold the insertion tip with the thumb and index finger of your non-dominant hand.
2. If resistance is felt as you insert the catheter, apply gentle pressure and exhale until you slide past the resistance. **DO NOT FORCE** the catheter as damage will occur.

Practical Bladder Management: CIC

Clean Intermittent Catheterization Female

.....

1. Gather all needed supplies. This may include:
 - the catheter
 - a urine collection device
 - lubrication
 - gloves
 - cleaning supplies
2. Remove enough clothes to give yourself full access to the urethra which is located just above the vagina.
3. Wash your hands just prior to insertion of catheter.
4. Put on gloves.
5. Wash the urethra towards the anus to prevent infection.
6. If the catheter has an insertion tip, insert the tip into the urethra prior to advancing the catheter. Hold the insertion tip against the urethra and advance the catheter gently until you see urine draining into the collection device. Once the urine stops flowing, slowly remove the catheter from the bladder to allow the rest of the urine to drain.
7. You can now clean the urethra and replace your clothes.
8. Once you are done, the urine can be drained into the toilet and the collection container thrown in the trash.

Tips:

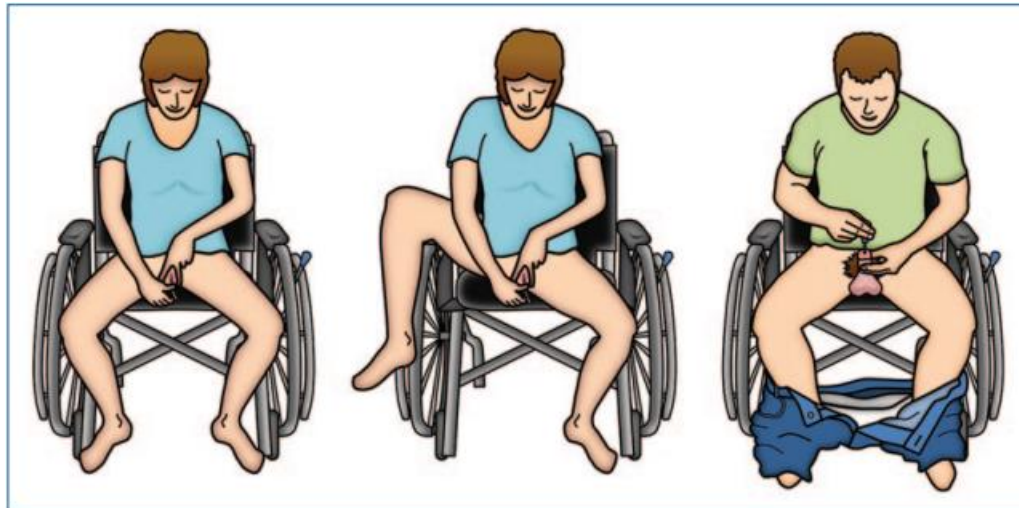
1. You may find it easier to insert the catheter into the urethra if you use a mirror to increase visibility.
2. You may need to use the non-dominant hand to hold open your labia majora to expose your urethra and insert the catheter with your dominant hand.

Practical Bladder Management: CIC

Positioning

Mobility and Flexibility may determine where the patient performs IC

Identify the most appropriate position (sitting, standing, lying) and environment (toilet, bed, wheelchair, chair)



Practical Bladder Management: CIC



Paraplegia/Females:

Initial training to begin supine with head of bed elevated, wedge or pillow under pelvis for posterior tilt to visualize using knee spreader and/or mirror. Adjust head of bed elevation and educate in anatomy through visualization and touch. Practice set-up of supplies and catheter insertion.

Progress to sitting in wheelchair or over toilet using touch technique.

Tetraplegic Females:

In supine with head of bed elevated, pillow or wedge to position pelvis into posterior tilt. Use knee spreader mirror to visualize anatomy.

If able, a caregiver may be able to use power features of a PWC to position the patient appropriately in supine and complete clothing and cath management from the reclined wheelchair

Other Options:

Sitting forward on the toilet or facing the back

For those able, squatting or standing over container or toilet;

Elevating one leg on a chair or step to improve access

Practical Bladder Management: CIC



Paraplegia/Males:

Initiate training in bed with head of bed elevated.

Progress to sitting in wheelchair using pants holder or bungee cord to maintain position of pants.

Tetraplegic Males:

Scoot pelvis forward in manual chair or use recline in power wheelchair.

Use pants holder to clear clothing obstruction.

Appropriately position penis for catheter insertion, or, if grip is poor, a penile support can be used to elevate the tip of the penis for easier insertion.

Practical Bladder Management: CIC

Perform every 4-6 hours, 4-6 times/day

Maintain volumes less than 500 mL for an adult bladder

- We want to prevent bladder distension (over-stretching of the detrusor muscle)

For children >1 year old, capacity (mL) is approximately (2+age in years) x 30. Although other formulas are also noted to be published.



Practical Bladder Management: CIC

Troubleshooting

Don't insert a catheter that has been in contact with a potentially contaminated surface.

If a spasm occurs during catheterization, stop and wait for the spasm to pass before continuing to insert.

If the catheter is meeting resistance during insertion into a female, do not force it. Call the doctor for advice.

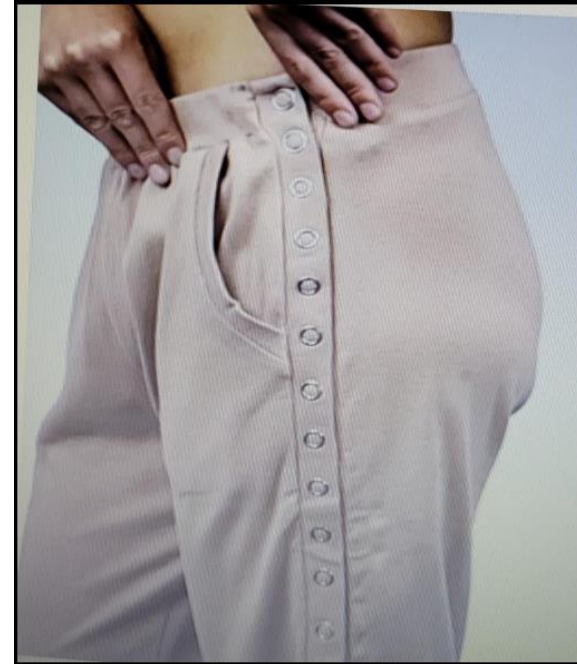
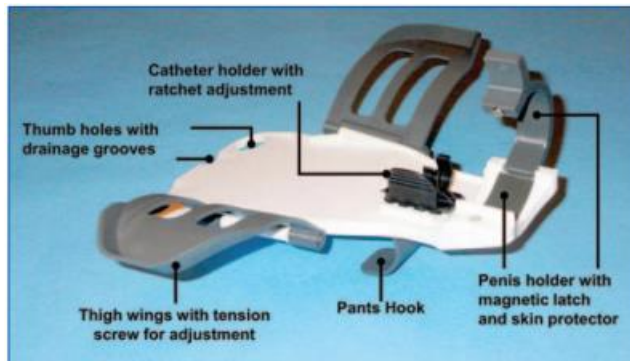
If mistakenly inserted into the vagina, use a different catheter and try again.

- Sometimes it can help to leave the catheter in the vaginal canal as a “placeholder” or “marker” to help identify where the urethra is located superiorly.
- Can also trial a tampon to serve as a placeholder. But ensure it is removed so as not to elicit AD

If the catheter is meeting resistance during insertion into a male, ask the person to take a deep breath. While they are exhaling, try to re-insert the catheter. If that doesn't work, gently pull penis up toward the belly and try to re-insert. If that doesn't work, wait 10 minutes and try again. If still no success, call the nurse or doctor.

Practical Bladder Management

- Adaptive Equipment:
- Knee Spreader Mirror
- Angle Adjustable mirror
- Pant holder/clip versus bungee cord
- Quad cath clip
- Leg bag and management
- Adaptive Clothing Fasteners
- Eagle Board



Practical Bladder Management

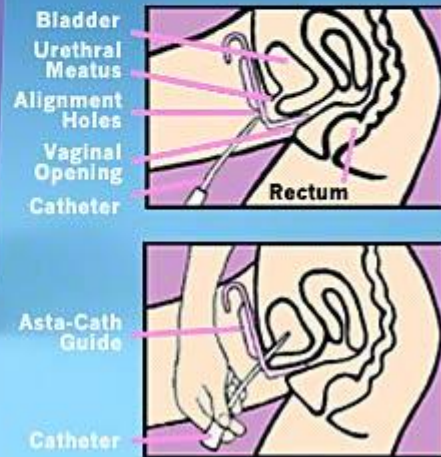
The Asta Cath Female Catheter Guide:

Designed by Linda Asta RN, for intermittent self catheterization is an elegantly simple device which assists women in locating their urethral opening.

As the guide is inserted into the vagina, it spreads the labia and one hole aligns with the urethral opening.

A 14 French or smaller catheter can then be passed into the bladder for emptying.

The three alignment holes allow for most anatomical differences



Promoting Bladder Health

Regular Emptying:

- Avoids reflux, prevents bladder overdistension.

Adequate Fluid Intake:

- Dilutes urine, properly flushes bladder to prevent stasis, UTI and calculi formation, at least 2000mL/day, limit alcoholic beverages and caffeine which leads to bladder irritability and diuretic.

Adequate Diet:

- maintaining acidic urine helps protect against UTI and stone formation: meats, cheeses, prunes, cranberries, whole grains. Limit dairy intake to avoid hypercalciuria to have an acidifying effect.

Adequate Physical Activity:

- promotes calcium metabolism and prevents stone formation.

Adequate Personal Hygiene:

- daily perineal washing to rid harmful skin bacteria, indwelling cath care/cleaning, hand hygiene and proper cleaning before CIC, cleansing daily prior to condom cath application, cleaning of urinary drainage bags.

Promoting Bladder Health

Cleaning your Drainage bag

Cleaning your drainage bag is a common way to prolong the life of your bag and prevent infection. Two commonly used cleaning solutions are available to be mixed at home. Use **one** of these solutions to clean your drainage bag:

1. Bleach Recipe (diluted 5.25% sodium hypochlorite)*

- 1 part bleach to 10 parts tap water
- 1 tablespoon (15 ml) of bleach + 2/3 cup (150 ml) of tap water

2. Vinegar Recipe (0.25% Acetic Acid)

- 1 part vinegar to 3 parts water
- ½ cup (125 ml) of vinegar + 1 ½ cup (375 ml) of tap water

Procedure

1. Wash your hands.
2. Disconnect the drainage bag from your catheter.
3. Empty urine from the bag into the toilet.
4. Fill the bag with 200 mL of cold tap water by using a plastic squirt bottle through the connector for leg bags or through the top tubing for night bags.
5. Shake the water in the bag vigorously while counting slowly to ten.
6. Empty the water out through the bag's drainage spout into the toilet
7. Repeat steps 4 to 6. **Rinsing must be done twice.**
8. Using a plastic squirt bottle or funnel, put approximately 30 ml or 2 tablespoons (1oz) of the premixed cleaning solution into the bag.
9. Shake the bag well to make sure that the cleaning solution touches the entire inner surface of the bag.
10. Drain the cleaning solution into the toilet.
11. Rinse the bag with tap water (steps 4 to 6).
12. Hang the bag on a hook and allow to air dry until the next use.

Example of a night bag



drainage spout

Example of a leg bag



connector

*Urol Nurs. 2003 Oct;23(5):334, 339

Contact your Nurse for more information.

Created by: Edurijes Pasqua

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Client Name:

Date given:

SEL-BLA09

Promoting Bladder Health

Recommend newly dx neurogenic bladder to be assessed by a Urologist with familiarity with SCI or other dx responsible for neurogenic bladder; recommend annual follow-ups

UDS (urodynamic study) can be ordered to determine how well the bladder, sphincters, and urethra hold and release urine.

- Urodynamics are a means of evaluating the pressure-flow relationship between the bladder and the urethra for the purpose of defining the functional status of the lower urinary tract.
- UDS studies should assess the filling and storage phase, as well as the voiding phase of bladder and urethral function.
- Simple UD tests involve performing non invasive uroflow studies, obtaining a PVR urine measurement, and performing single-channel cystometrography(CMG) to assess the first sensation of filling, fullness, and urinary urge. Bladder compliance and the presence of uninhibited detrusor contractions can also be noted during this filling CMG.

KUB (kidney ureter and bladder) xray can be ordered to examine the urinary system and its surrounding structures

Bladder Complications

- **UTI**
- **Detrusor Sphincter Dyssynergia (bladder outlet dysfunction)**
- **Autonomic Dysreflexia**
- **Urinary stones**
- **Hydronephrosis- back up of urine into kidney**
- **Reflux- back up of urine into the ureters**

Bladder Complications

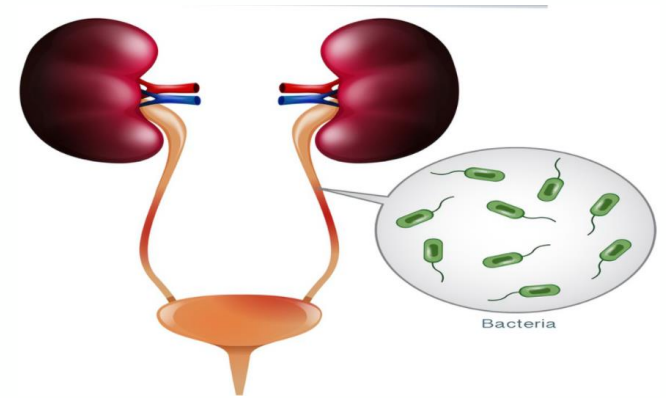
UTI

Signs:

- Cloudy, odorous urine with or without sediment
- Increased spasticity, especially legs/abdomen
- Fatigue, fever, chills
- Autonomic dysreflexia
- Incontinence

Risk Factors:

- Inadequate fluid intake
- Poor perineal hygiene, fecal incontinence
- Irregular cath schedule or poor technique
- Reflux
- Inadequate urinary drainage bag cleaning
- Bladder not completely emptied



Bladder Complications



UTI

Prevention and Treatment:

- Increase fluids to max allowed 3000-4000mL/day – 2000mL if on CIC
- Perform perineal hygiene daily and after bowel care
- Handwashing before cathing or handling urinary drainage bag
- Maintain regular cathing schedule
- Clean urinary drainage bags regularly
- Change external catheters daily
- Recommend yearly medical check up with ultrasound or abdominal xray to monitor kidney function.
- If symptoms appear, urinalysis and culture & sensitivity may be indicated
- Antibiotics: recommend getting f/u UA and C&S after completion of Abx to ensure infection is gone; some users will always have a low level of bacteria in the bladder however.

Bladder Complications

Detrusor Sphincter Dyssynergia

Seen commonly in UMN bladders

Signs: Difficulty in emptying bladder/poor urinary stream; AD; persistent UTIs

Causes: bladder detrusor muscle contracts at same time as external urinary sphincter contracts, causing incoordination of bladder emptying.

Prevention/Tx: medications that relax the sphincter; may require Botox or surgery to decrease tension in the sphincter

Bladder Complications

Urinary Stones/Urolithiasis

Signs: grit or gravel in urine, hematuria, produce sweating not controlled by medication, increase of spasms in bladder and LE's, nausea, vomiting

Risk Factors/Causes: neurogenic bladder with catheter use, inadequate fluid intake, immobility and increased calcium excretion in urine, urinary tract stasis, recurrent UTI, reflux

Prevention/Tx: increased fluid intake, increase activity, reduce milk/dairy, regular bladder emptying every 3-4 hours, increase urine acidity, abx, possible removal, KUB (kidney, ureters, urinary bladder) x-ray to dx



Functional Outcome Expectations

C4-C6:

- Patient should be able to independently verbally direct their bladder program to nurse and caregiver prior to discharge.
- Clothing management dependently performed in bed or power wheelchair in tilt and recline position.
- Progress caregiver independence to include manipulation of clothing from wheelchair level.

C7-C8:

- Patient should be able to independently verbally direct their bladder program to nurse and caregiver prior to discharge.
- Patient may be able to assist with clothing management from bed and progress to some clothing management in the wheelchair (males).
- Potential for physical assistance with incorporation of assistive devices due to decreased hand function.

Functional Outcome Expectations

T1-L5:

- Full hand function is present, but trunk control and balance will be impaired in higher thoracic level injuries.
- Males should be able to learn and complete bladder management from wheelchair level into catheter bag/urinal, or into toilet.
- Females can initiate instruction of self IC from bed using mirror and positioning strategies, then progress to over toilet using mirror or touch technique to locate anatomy (work closely with O.T.).
- A supportive padded commode seat may be recommended to provide trunk support when cathing over the toilet.
- Some women can progress to perform IC from the wheelchair through pelvic positioning, however.

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Questions?

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