

SPINAL CORD MEDICINE

HANDBOOK FOR PATIENT AND FAMILY



Bladder Care



Frazier Rehab Institute

A service of Jewish Hospital & St. Mary's HealthCare

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TABLE OF CONTENTS

Chapter 1 Comprehensive Rehab

Your Spinal Cord Medicine Team
After Discharge from the Rehab Hospital
You and Your Family are Team Members

Chapter 2 Anatomy of Spinal Cord, Facts and Figures About Injury

Chapter 3 Bowel Care

The Digestive System and Bowel Function
Bowel Management Program

Chapter 4 Bladder Care

The Urinary System
Bladder Programs
Urinary Tract Infections

Chapter 5 Skin Care

Risk Factors for Skin Breakdown
Stages of Skin Breakdown
Treatment
Prevention of Skin Breakdown

Chapter 6 Medical Concerns

Autonomic Dysreflexia
Deep Vein Thrombus (DVT)
Heterotopic Ossification (HO)
Orthostatic Hypotension
Spasticity

Chapter 7 Lung Care

Normal Anatomy and Physiology
Pathology
Level of Injury and Respiratory Function
Pulmonary Hygiene
Warning Signs of Respiratory Problems

Chapter 8 Cognition, Communication and Swallow

Cognition and Communication
Swallowing
Preventing Pneumonia
Staying Hydrated
Quality of Life

Chapter 9 Nutrition

Soon After Injury
Once Medically Stable
Ideal Body Weight After Injury
Health Issues and Nutrition
A Primer on Nutrients

Chapter 10 Self Care and Activities of Daily Living

Dressing
Bathing
Toileting
Grooming and Hygiene
Feeding

Chapter 11 Mobility

Range of Motion
Pressure Relief
Transfers

Chapter 12 Equipment

Wheelchairs and Cushions
Splinting
Assistive Technology

Chapter 13 Home Modifications

Chapter 14 Psychological Care

Grief and Loss
How Families Can Help
Family Members Struggle Too
Caregivers
Depression
Substance Abuse
Brain Injury

Chapter 15 Human Sexuality

For Females
For Males
Fertility

Chapter 16 Recreation and Wellness

Chapter 17 Glossary

Chapter 18 Resource Guide

THE PATIENT AND FAMILY HANDBOOK

This Handbook is designed to give you the information to better understand spinal cord injury and the tools needed to manage your health care needs successfully. Information is intended for you and your family because, those who love you, will often be involved in assisting you with your care needs while in the hospital, and in the home environment. As you read through the Handbook, your rehab team at Frazier is available to address your questions and provide you more information pertinent to your needs.

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A BRIEF NOTE ABOUT THE FOUNDER OF FRAZIER REHAB INSTITUTE

In her early 20's, Amelia Brown of Louisville sustained a spinal injury in a car accident in the 1940's. With no rehabilitation services in Louisville, she traveled to New York for treatment. After returning to Louisville, she married a physician, Dr. Harry Frazier. Believing Louisville needed its own rehabilitation facility, Mrs. Frazier founded the Frazier Institute of Physical Medicine and Rehabilitation in the early 1950s. Her son, Owsley Brown Frazier, served as Chairman of the Fund Raising Committee for Frazier's new building, named the Frazier Rehab and Neuroscience Center, which opened in 2006.

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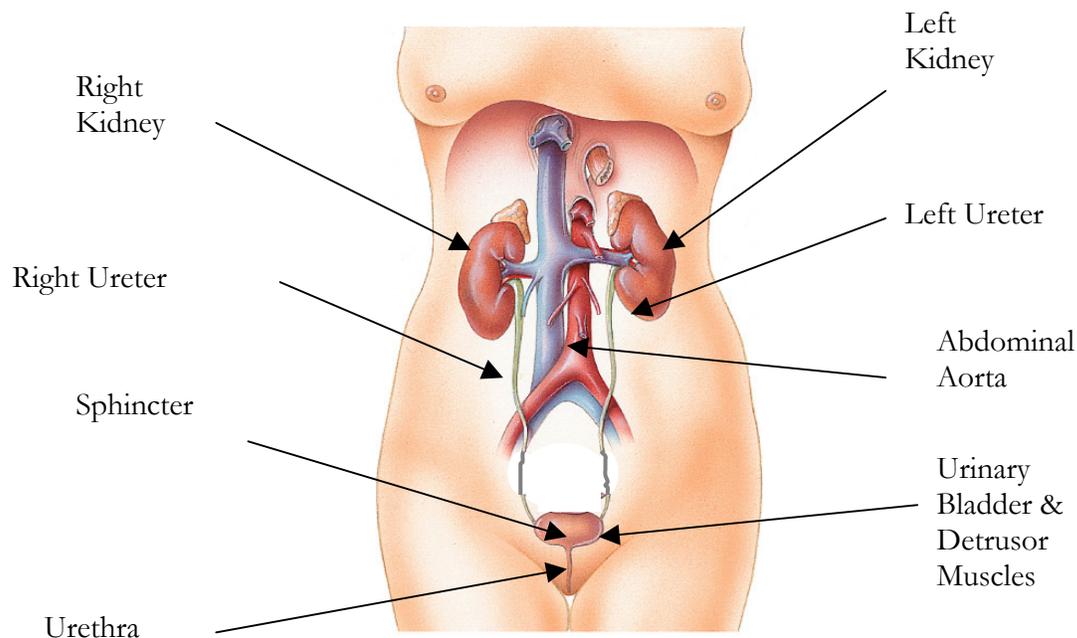
The information contained herein is intended to be used in accordance with the treatment plan prescribed by your physician and with the prior approval of your physician. You should not begin using any of the methods described in this publication until you have consulted your physician. Jewish Hospital & St. Mary's HealthCare, Inc. D.B.A. Frazier Rehab Institute, its affiliates, associates, successors and assigns, as well as its trustees, officers, directors, agents and employees are not liable for any damages resulting from the use of this publication.

NOTE: Words *italicized* in the text below are defined in the Glossary at the end of this Chapter.

BLADDER CARE AND SPINAL CORD INJURY

THE URINARY SYSTEM

The Urinary System consists of the *kidneys*, *ureters*, *bladder*, *sphincters* and the *urethra*. This system performs two major functions: (1) regulation of specific body chemicals called electrolytes that are needed for your body to function properly and (2) removal of waste products and excess water from your blood. Your two kidneys filter blood as it passes through by removing waste products and excess water, which creates urine. Once collected in the kidneys, urine leaves each kidney through a small tube, called a ureter, and drains into the bladder where urine is stored until it is released or eliminated from the body.



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NORMAL BLADDER FUNCTION BEFORE SPINAL CORD INJURY

As the bladder fills with urine, sensory nerves send messages through the spinal cord to the brain. As this happens, you become aware of a full bladder and know it is time to use the bathroom.

When you decide to empty your bladder, your brain sends messages down your spinal cord to the bladder and the *detrusor* and *sphincter* muscles. The detrusor muscles make up the walls of the bladder and help push urine out of the bladder. The sphincters are round, donut shaped muscles located at the bottom of the bladder that act like a valve to hold urine in the bladder.

When it is time to urinate, the detrusor muscles contract (tighten) to push urine out of the bladder. At the same time, the sphincter muscles relax (open) which allows urine to flow out of the body through the urethra.

BLADDER FUNCTION AFTER SPINAL CORD INJURY

After spinal cord injury, messages that pass through the spinal cord from the bladder to the brain and messages from the brain to the bladder may be disrupted or lost completely. As such, you may not be able to feel when your bladder is full nor be able to control when you will urinate.

Depending on the level and severity of injury, you may experience what is called a *neurogenic bladder*. A neurogenic bladder describes impaired bladder function and control because of injury to the brain, spinal cord and/or nerves from the spinal cord to the bladder. A neurogenic bladder, in relation to spinal cord injury, is classified in one of two ways:

1. **Reflex Bladder.** Also known as a spastic or *upper motor neuro*(UMN) bladder, a *reflex bladder* can occur when the injury is above the L₁₋₂ level. If your injury is above L₁₋₂, when your bladder fills with urine, a reflex automatically triggers the bladder to empty as the detrusor muscles contract. In this situation, you may not know when or if the bladder is emptying or if it has emptied completely.
2. **Non-reflex Bladder.** Also known as a flaccid or *lower motor neuron* (LMN) bladder, a *non-reflex bladder* can occur when the injury is L₁₋₂ or below. If your injury is below L₁₋₂, and your bladder fills with urine, it may become distended (overfilled and over stretched) because the reflexes of the detrusor muscles are diminished or absent. This means the bladder muscles do not push urine out of the bladder. These muscles can be damaged from overstretching. Additionally, the urine can then back up through the ureters into the kidneys.

The sphincter muscles may also be affected after injury to the spinal cord. *Dyssynergia* occurs when the sphincter muscles do not relax when the bladder contracts thus preventing urine from flowing properly.

BLADDER PROGRAMS

If your bladder does not work as it once did before injury, a bladder management program may be necessary. An effective bladder program will help you empty your bladder properly, avoid bladder accidents and prevent complications such as infections and/or *autonomic dysreflexia*. Your rehab team will help you establish a bladder program that works best for you.

Intermittent Catheterization (IC), also known as “in and out” catheterization, is the method most often recommended. IC’s are typically done every 4 to 6 hours around the clock by using a small flexible tube called a catheter. You, your caregiver and/or your nurse insert the catheter through an opening called the *meatus* (located at the tip of the penis for males and above the vaginal opening for females). The catheter is passed through the urethra until it enters the bladder. Once the catheter is in the bladder, urine will flow until the bladder is empty. When the urine stream stops, the catheter is slowly removed. At this point, the catheter will either be thrown away or cleaned for reuse. The frequency (how often) you will need to do IC’s will vary from person to person.

A *Foley catheter* is another method of bladder management. A Foley catheter is an indwelling catheter that remains in the bladder 24 hours each day and allows the bladder to drain continuously into a collection device (bedside drainage bag or leg bag). The Foley is inserted as described above for intermittent catheterization. Once it is inserted into the bladder, a small balloon at the end of the Foley catheter is filled with normal saline (salt water) and holds it securely in the bladder. To remove a Foley, the normal saline (salt water) is emptied from the balloon using a syringe and the Foley is pulled out.

A *supra pubic catheter* is another type of indwelling catheter that may also be used for bladder management. This type of catheter is similar to the Foley but requires surgery for placement. A small opening is created in the abdomen by a surgeon and a catheter is inserted into the bladder through this opening. The catheter continuously drains urine from the bladder into a collection device (bedside drainage bag or leg bag). The Foley catheter and supra pubic catheter are effective in draining the bladder, but the risk of infection and other complications are higher for indwelling catheters than intermittent catheterizations. Thus, intermittent catheterizations (IC's) are usually recommended.

SPONTANEOUS VOIDS

Some patients experience spontaneous voids between intermittent catheterizations which can be voluntary or involuntary. A voluntary spontaneous void means that the urination is under your control. An involuntary spontaneous void is not controlled and the bladder will begin to empty without notice, possibly causing you to wet yourself (bladder “accident”). Depending on your level of injury, a spontaneous void may be caused by a reflex spasm of the bladder or from the overflow of a full bladder. Spontaneous voiding can also be a sign of urinary tract infection. There are several different brands of incontinence devices available and can be purchased at a local drug store/pharmacy or the Internet. Males may benefit from wearing an external catheter device. These external catheters are often referred to as Texas or condom catheters. They fit on the penis much like a condom and have an adhesive on the inside to hold them in place. A bedside drainage bag or leg bag is attached to the end of the external catheter so that urine may flow freely while keeping you dry. Females may wear external protection in the form of an incontinence pad or brief.

HOW MUCH FLUID IS NEEDED

It is recommended that you drink between 2000 and 2400ml(cc) of fluid a day (unless you have been told otherwise by your doctor). This is equivalent to approximately 8 to 10 (8oz) glasses of fluid a day. This may sound like a large amount but you probably drank close to that amount before your injury. Your fluid intake is important in helping keep your body functioning properly and minimizing complications such as dehydration and constipation.

Water is the ideal fluid for you to drink. However, you may still drink other fluids such as juices, soft drinks, coffee and tea in moderation. It is suggested that you switch to caffeine-free drinks if possible because caffeine stimulates the production of urine. Drinking caffeinated drinks may cause your bladder to become distended (overfilled) before your scheduled catheterization. You may also need to space your fluid intake throughout the day instead of drinking large amounts at one time. Restricting your fluid intake before bedtime may possibly minimize how often you have to

catheterize (IC) during the nighttime.

The amount of urine in the bladder during any 4-hour period should not exceed 400-500ml(cc) or 10 oz. If you have more than 400-500ml(cc) in your bladder at any one time, the bladder muscles can become damaged (overstretched) and/or urine may back up into the kidneys possibly causing an infection. You will need to perform your IC's more often (increase the frequency) if you are getting out more than 400-500ml(cc) or urine at one time. If you have an indwelling catheter and drink large amounts of fluid, the drainage device will need to be emptied more often. Keep in mind that ice, ice cream, applesauce, sherbet, Jell-o and soup are also considered fluids. Alcoholic beverages should be avoided, especially if you are taking medications. It is very dangerous to mix alcohol or other drugs with over the counter medications or medications prescribed by your doctor.

Keeping a daily journal or diary comparing your daily fluid intake and urine output may help you and your rehab team develop a successful bladder management program. In general, your urine output should be about equal to the fluid that you take in during the day.

CLEAN TECHNIQUE CATHETERIZATION

Because hospital environments are known to have many types of bacteria, all intermittent catheterizations (IC's) are performed by using a sterile technique. The sterile catheterization kit, which usually contains a collection tray, catheter, betadine swabs, gloves, drapes and water-based lubricant, is thrown away after one use. However, some of the catheters (such as red rubber catheters) from these types of kits can be saved, cleaned and reused in the home. In the home environment, it is not necessary to use the sterile kit/technique for catheterizations. Instead, patients and families typically use what is called the clean technique. Using clean technique, gloves do not have to be worn, the genital area does not have to be swabbed/cleaned with betadine ointment and the catheters can be cleaned for reuse. The clean technique is much more cost-effective as well as somewhat simpler to perform. If your bladder management program consists of catheterizations, you and your family/caregivers will be taught the clean technique prior to going home from the hospital.

The clean technique is performed as described below. Supplies needed includes a clean catheter, water-based lubricant (such as K-Y Jelly), washcloths or baby wipes, clean tray and antiseptic soap.

1. If in bed, lie on your back or side and raise the head of bed enough to see what you are doing. A mirror may be helpful in the beginning to help you see and become familiar with your genital area, especially for females. Females should lie on their back with legs in "frog-like" position if in the bed. With practice, catheterizations may also be performed in a seated position on the toilet, bedside commode or in your wheelchair.
2. Wash your hands with soap and water or a gel-type hand sanitizer.
3. Wash genital area thoroughly with a baby wipe or a damp washcloth and soap. Males should clean from the tip to the base of the penis and females should clean from front to back.
4. Apply lubricating jelly to tip of catheter and position tray between legs. The end of the catheter that drains urine should be aimed toward the toilet or collection tray so that you do not make a mess.

5. Males should hold the penis with one hand. Females need to expose the meatus by spreading the outer skin folds of the vagina with a forefinger and middle finger of the same hand. The hand that touches the genital area is now considered “dirty”.
6. The catheter should be inserted with the other hand, the “clean” hand with the end of the catheter that drains urine pointed toward the collection tray or toilet. Insert the catheter until urine flows. Then, advance (push in) the catheter about 1-2 inches further.
7. When the stream of urine starts to a trickle, gently massage your abdomen. This type of massage is called the Crede’ maneuver and it helps to gently push any remaining urine from your bladder. Continue the Crede’ maneuver as you slowly remove the catheter from your urethra. Do not remove the catheter until the bladder is completely empty. You will know that the bladder is empty when urine is no longer flowing out of the catheter.
8. Place the used catheter in a storage container or bag to be cleaned later.
9. Inspect your urine. Urine volumes should not exceed 400-500ml(cc). Note the color, volume (amount in ml or cc) and if there is an odor or sediment (small particles floating in urine) present. If your urine has a strong odor or contains sediment, see section on urinary tract infections below.
10. Rinse genital area or *perineum* with a baby wipe or damp washcloth and soap.
11. Wash your hands when finished!

CLEANING CATHETERS AND DRAINAGE DEVICES, ONCE USED AT HOME

Once a catheter is used at home, it needs to be cleaned before it is used again. It is a fairly simple process that could be done daily or even multiple times a day if needed. Most people choose to collect several used catheters before the cleaning process is started. Proper cleaning of catheters is described below:

- After using a catheter, wash the inside and outside of the catheter with antibacterial soap and water. Make sure to rinse well with water and drain the inside of the catheter by holding upright until water no longer drops out.
- Dry the catheter thoroughly by laying on a clean towel.
- When completely dry, you may store the catheters in a self-sealing plastic bag (Ziploc), a paper bag or plastic container. Some individuals prefer to wrap each catheter in aluminum foil as well.
- Always inspect each catheter after cleaning. Throw away any catheter that becomes brittle, cracked or does not drain well.
- After the cleaning/drying/inspection process is completed, the catheters may be reused.

If you have frequent urinary tract infections (see below), or if you currently have a urinary tract infection, you may want to use the following additional steps when cleaning your catheters:

- Thoroughly clean and rinse catheters as directed above.
- Place several catheters in large pan of water, cover and boil for 15-20 minutes. Before boiling several catheters at once, you may try boiling one or two catheters to make sure that damage does not occur to the particular type of catheter you are using.
- Drain the catheters and allow them to cool and dry completely on a clean towel.
- The catheters are now ready for reuse and may be stored as directed above.

Urinary collection devices such as leg bags and bedside drainage bags should be cleaned at least once a day or when disconnected from your catheter. In order to properly clean the collection device, you will need antibacterial soap, water, white vinegar and a clean towel. The cleaning procedure is as follows:

- Empty any urine from the collection device.
- Wash the inside and outside of the drainage bag with soap and water. Make sure to rinse well with water.
- Drain/empty bag.
- Mix a solution consisting of 2 parts white vinegar to 3 parts water which is equivalent to one cup of vinegar to one & one-half cups of water.
- Pour the vinegar solution into the drainage bag making sure the solution is also in the tubing.
- Agitate or swish the solution around in the bag and tubing for at least 30 seconds.
- Drain/empty bag completely.
- Lay on clean towel to air dry.

Using a diluted bleach solution is equally effective in cleaning these collection devices. However, bleach may be irritating to the skin and/or respiratory tract (due to the fumes) and can also remove color from clothing. Thus, a vinegar solution is often preferred.

Your collection devices should be discarded after approximately one month of use (or sooner if they are no longer functioning appropriately) and be replaced with a new one at that time.

URINARY TRACT INFECTION

Urinary tract infections (UTI's) are an ever-present concern for those with spinal cord injury. The source of UTI's is bacteria which are tiny, microscopic organisms that can quickly reproduce and multiply. Bacteria in the bladder and kidneys can cause disease and infection.

Preventing Urinary Tract Infection. You can drastically cut the risk of UTI by preventing the spread of bacteria into the bladder. There are several things you can do to help yourself avoid a UTI.

- **Maintain a healthy fluid intake.** Drinking the proper amounts of fluid helps to wash out bacteria and other waste products from the bladder. Water is the beverage of choice. Other beverages with sugar and caffeine are acceptable in moderation. Generally, it is recommended that you drink approximately 2000-2400cc daily which is equivalent to 8 - 10 (8 oz) glasses of liquid per day or about 2 quarts. For persons with a Foley catheter or supra pubic catheter, it is recommended you increase your fluid intake to about 3 quarts per day.
- **Routinely and completely empty your bladder on a regular basis.** It is very important that your bladder is emptied on a regular basis. When not emptied regularly, bacteria in the bladder may multiply and cause a urinary tract infection. Additionally, the bladder muscle may be damaged due to overstretching (overfilled bladder) and cause urine to backflow into the kidneys which, in turn, may lead to kidney infection and other health problems. Maintain your regular catheterization schedule as recommended by

your healthcare provider but keep in mind that adjustments may be necessary. Extra catheterizations may be needed if you drink more than usual in the heat of the summer, at a social gathering or for medical reasons. Remember, the ideal amount for each intermittent catheterization should be under 400-500cc. A sterile or clean catheter should be used each time you do an IC. For those using indwelling catheters, it is equally important to keep the tubing free of kinks and to drain the collection bag routinely.

- **Keep your skin clean.** Good hygiene helps prevent infection. Wash the genital area with soap and water every day. Change your clothes if they become soiled and wash the genital area immediately after any urine or bowel accident. This helps decrease the number of bacteria that remain on the skin. Always wash your hands before and after providing bladder care and instruct any caregivers to do the same. Hand washing is the number one way to prevent the spread of bacteria and infection.
- **Proper position of drainage bag.** If using a catheter (indwelling or external) that connects to a drainage bag, the bag should always remain below the bladder so urine will drain freely. Empty the drainage bag at least every four hours or when the bag is about half full. This helps prevent the backflow of urine and allows your bladder to continuously empty completely.
- **Maintain your urinary products or appliances by regular washing and inspection.** Clean your drainage bag every day as described above. Sediment in the urine can collect in tubing and connectors making it more difficult for urine to drain and easier for bacteria to spread. Always put a cap over the end of the tubing that connects directly to your catheter when the bag is not in use and use an alcohol wipe to clean this end before reattaching it to your catheter.
- **Have regular urology checkups.** It is highly recommended that you have a complete medical checkup at least yearly. Your rehab physician or primary care physician will perform necessary urologic exams and order any other tests needed. You may also be seen by a urologist who is a physician who specializes in bladder care. A urologist can also perform exams and procedures, make recommendations, or order tests to help better understand your bladder and how to manage it. Several tests are available. A renal scan or ultrasound may help identify whether the kidneys are functioning properly. An x-ray of the abdomen may be ordered to help detect any kidney or bladder stones. For those with indwelling catheters, cystoscopic evaluations may be ordered allowing the doctor to see inside the urethra and bladder. Recent research is showing a small increase in the risk of bladder cancer among individuals who have been using indwelling catheters for long periods of time.

Signs and Symptoms of Urinary Tract Infection. Unfortunately, UTI's do happen even when you and/or your caregivers do everything you can to prevent them. As such, you need to know the signs and symptoms of a UTI which usually include one or more of the following:

- Cloudy and/or foul smelling urine
- Increase in mucous strands or sediment
- Blood in urine
- Pain or burning with urination
- Increase in bladder spasms

- Increase in frequency of urination or urinary incontinence
- Increase in residual urine
- Low back or flank pain
- Elevated temperature/fever
- Chills, nausea and/or vomiting

Treatment of Urinary Tract Infection. If you suspect you have a UTI, you should call your doctor or healthcare provider as soon as possible. You may be asked to obtain a sample of your urine in a sterile specimen cup so it can be analyzed in a laboratory to determine if you have an infection and the specific bacteria causing the infection. The test that may be ordered is called a urinalysis with culture and the sensitivity (UA C&S). Knowing the specific bacteria, your doctor can order the most appropriate antibiotic. If an antibiotic is prescribed, it is important to take it exactly how the doctor recommended in order to kill the bacteria completely.

CONCLUSION

In conclusion, successful bladder management can be achieved in persons with spinal cord injury. The keys to a healthy urinary system are: taking all the proper steps to care for your skin, bladder and kidneys; performing your bladder program routinely; taking steps to prevent UTI; and getting necessary treatment if a UTI develops.

REFERENCES AND RESOURCES

http://www.harborhospital.org/body.cfm?xyzpdqabc=0&id=555628&action=detail&AEProductIDSRCA=Adam2004_1&AEArticleID=003981 - Bladder Care

<http://www.nlm.nih.gov/medlineplus/ency/article/003981.htm> - Bladder Care

<http://www.spinalcordcenter.org/manual/index.html> - Bladder care

<http://www.spinalcord.uab.edu/show.asp?durki=21484> - Bladder care

<http://www.urologyhealth.org> - Bladder Care

GLOSSARY

AUTONOMIC DYSREFLEXIA - An emergent, potentially dangerous condition associated with a spinal cord injury patient whose level of injury is T6 or above. This condition is usually related to a noxious stimulus that is not sensed or felt by the individual due to the neural impulses blocked in the spinal cord due to the injury. During an episode of autonomic dysreflexia, the blood pressure can become very high and can cause stroke if not treated appropriately.

BLADDER - As urine flows from the kidneys, it is collected in the bladder prior to urine leaving the body.

CREDE' MANEUVER - Gently pressing on the lower abdomen just above the pubic bone to either initiate a bladder contraction, thereby emptying the bladder of urine, or to help the bladder completely empty once a bladder contraction has started.

DETRUSOR MUSCLES – Bladder muscles that contract (squeeze) when time to urinate and then relax to allow your bladder to fill with urine.

DYSSYNERGIA - A condition when the bladder muscles contract to push urine out but the sphincter muscles do not relax and inhibit the normal flow of urine from the bladder.

FOLEY CATHETER - Sometimes called an indwelling catheter, remains in the bladder for extended periods of time allowing the bladder to drain continuously.

KIDNEYS - As blood circulates through a pair of kidneys, it screens out waste products from the blood and creates urine.

LOWER MOTOR NEURON BLADDER – See Non-reflex Bladder.

INTERMITTENT CATHETERIZATION - A procedure used to empty the bladder of urine using a catheter at scheduled times. Once the bladder is empty, the catheter is removed.

MEATUS – See Urinary Meatus

NEUROGENIC BLADDER - Impaired bladder function and control due to injury to the central or peripheral nervous system, as in persons with spinal cord injury.

NON-REFLEX BLADDER - Absence or limited reflex of the bladder muscles that usually contract when the bladder starts to fill with urine.

PERINEUM - For males the space between the scrotum and anus; for females the space between the vulva and the anus.

REFLEX BLADDER - As the bladder fills with urine, a reflex is triggered to cause the bladder muscles to relax and push urine from the bladder.

SPHINCTERS - A round, donut shaped muscle that constricts an opening. For example, the sphincter when closed, keeps stool in the rectum; when the sphincter is relaxed, stool is passed.

SUPRA PUBIC CATHETER - During surgery, a catheter is inserted through the abdominal wall into the bladder which allows continuous drainage of the bladder.

UPPER MOTOR NEURON BLADDER - See Reflex Bladder.

URETERS - Urine draining from the kidneys is passed through two small tubes called ureters into the bladder.

URETHRA - A tube that allows urine to pass from the bladder to outside the body. For males, semen is ejaculated through the urethra.

URINARY MEATUS - Opening of the urethra on the body surface where urine is excreted. It is located at the tip of the penis on males and above the vaginal opening on females.

URINARY TRACT INFECTION - A bacterial or fungal infection occurring in the kidneys, ureters or urinary bladder.