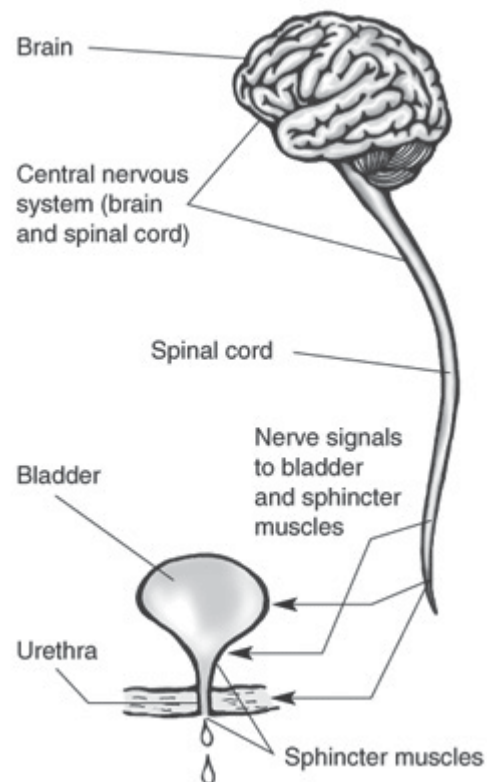


What is Neurogenic Bladder?

Millions of Americans have neurogenic bladder. Neurogenic bladder is the name given to a number of urinary conditions in people who lack bladder control due to a brain, spinal cord or nerve problem. This nerve damage can be the result of diseases such as multiple sclerosis (MS), Parkinson's disease or diabetes. It can also be caused by infection of the brain or spinal cord, heavy metal poisoning, stroke, spinal cord injury, or major pelvic surgery. People who are born with problems of the spinal cord, such as spina bifida, may also have this type of bladder problem.

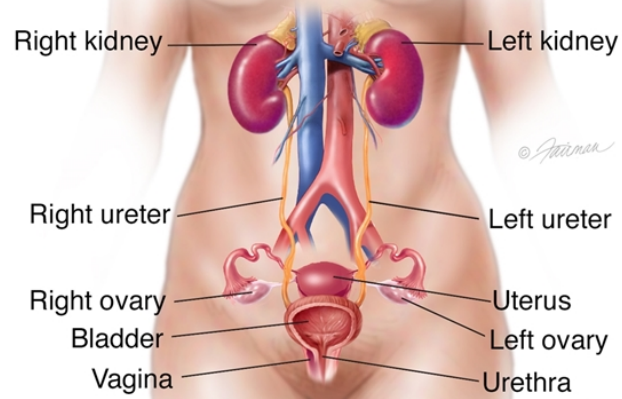
Nerves in the body control how the bladder stores or empties urine, and problems with these nerves cause overactive bladder (OAB), incontinence, and underactive bladder (UAB) or obstructive bladder, in which the flow of urine is blocked.



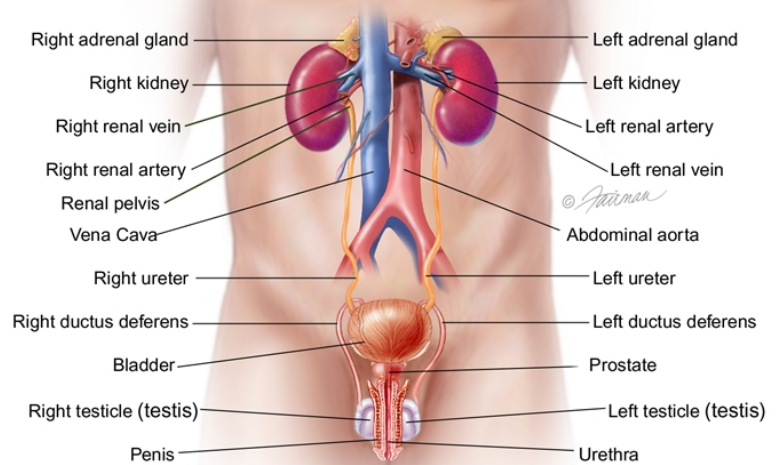
The Urinary System

The bladder and kidneys are part of the urinary system. These are the organs that make, store, and pass urine. When the urinary system is working well, the kidneys make urine and move it into the bladder. The bladder is a balloon-shaped organ that serves as a storage unit for urine. It is held in place by pelvic muscles in the lower part of your belly.

When it is not full of urine the bladder is relaxed. Nerve signals in your brain let you know that your bladder is getting full. Then you feel the need to urinate. The brain tells the bladder muscles to squeeze (or "contract"). This forces the urine out through your urethra, the tube that carries urine from your body. Your urethra has muscles called sphincters. They help keep the urethra closed so urine doesn't leak before you're ready to go to the bathroom. These sphincters open up when the bladder contracts.



Female urinary tract



Male urinary tract

Causes

Several muscles and nerves must work together for your bladder to hold urine until you are ready to empty it. Nerve messages go back and forth between the brain and the muscles that control bladder emptying. If these nerves are damaged by illness or injury, the muscles may not be able to

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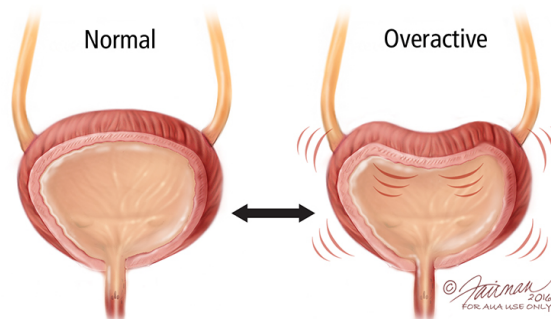
tighten or relax at the right time.

In people with neurogenic bladder, the nerves and muscles don't work together very well. As a result, the bladder may not fill or empty correctly. Bladder muscles may be **overactive** and squeeze more often than normal and before the bladder is full with urine.

Sometimes the muscles are too loose and let urine pass before you're ready to go to the bathroom (incontinence).

In other people the bladder muscle may be **underactive**. It will not squeeze when it is filled with urine and won't empty fully or at all. The sphincter muscles around the urethra also may not work the right way. They may remain tight when you are trying to empty your bladder. Some people experience both overactive and underactive bladder.

OVERACTIVE BLADDER



Normal vs. Overactive Bladder

Symptoms

The symptoms of neurogenic bladder differ from person to person. They also depend on the type of nerve damage the person has. Some people have symptoms of both overactive and underactive bladder. People with MS, stroke and herpes zoster are more likely to have both kinds of symptoms.

Urinary Tract Infection

People with overactive and underactive bladder can get repeated **urinary tract infections**. These are often the first symptom of neurogenic bladder. This repeated illness is caused by harmful bacteria, viruses or yeast growing in the urinary tract.

Leaking Urine (incontinence) with Overactive Bladder

In **overactive bladder** (often seen with strokes, brain disease and Parkinson's disease), the muscles squeeze more often than normal. Sometimes this squeezing causes urine to leak before you're ready to go to the bathroom (incontinence). With overactive bladder, you feel a sudden urge to go to the bathroom that you can't ignore. This "gotta go" feeling makes you afraid you will leak urine if you don't get to a bathroom right away. You may or may not leak urine after feeling this urge to go. You may leak just a few drops of urine. Sometimes you may gush a large amount of urine. Sometimes urine will leak while you sleep.

Frequency in OAB

Another OAB symptom is going to the bathroom many times during the day or night. (You may produce only small amounts of urine.) The number of times someone urinates differs from person to person. But many experts agree that going to the bathroom more than 8 times in 24 hours is "frequent urination."

Urinary Retention/Obstruction with Underactive Bladder

In people with an underactive bladder (often seen with diabetes, MS, polio, syphilis or major pelvic surgery), the bladder muscle may not squeeze when it needs to. The sphincter muscles around the urethra also may not work the right way. They may stay tight when you are trying to empty your bladder. With UAB symptoms, you may only produce a "dribble" of urine. You may not be able to empty your bladder fully (urinary retention). Sometimes you may not be able to empty your bladder at all (obstructive bladder).

How Can Neurogenic Bladder Affect Your Life?

The symptoms of neurogenic bladder can seriously affect your quality of life. They may make it difficult for you to get through your day without interruptions. You may feel afraid to go out with friends, take vacations or do everyday things. You may be afraid you may not be able to find a bathroom when you need one. Some people begin to cancel activities and withdraw from their lives. Neurogenic bladder may affect your work and your relationships. You may feel tired, depressed, anxious and lonely. If you are experiencing incontinence, the leaking urine can sometimes cause skin problems or infections.

What Should You Do If You Are Having Symptoms?

It is important to talk with your health care provider and find out what is causing your symptoms. The symptoms of neurogenic bladder may seem like the symptoms of other illnesses and medical problems. Your health care provider can help rule out other issues.

Sometimes neurogenic bladder symptoms can lead to more serious bladder problems. But there are a number of treatments available. You and your health care provider can decide which treatment is best for you.

Diagnosis

Neurogenic bladder involves the nervous system and the bladder. Your health care provider will conduct different tests to determine the health of both.

Medical History

Your health care provider will ask you a number of questions to understand your medical history. This should include information about the symptoms you are having, how long you have had them, and how they are changing your life. A medical history will also include information about your past and current health problems. You should have a list of the over-the-counter and prescription drugs you usually take. Your health care provider should also ask you about your diet, and about how much and what kinds of liquids you drink during the day.

Physical Exam

Your health care provider will examine you to look for something that may be causing your symptoms. In women, the physical exam will likely include your abdomen, the organs in your pelvis and your rectum. In men, the physical exam will include your abdomen, prostate and rectum.

Bladder Diary

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You may be asked to keep a **bladder diary**, where you will note how often you go to the bathroom and any time you leak urine. This will help your health care provider learn more about your day-to-day symptoms.

Pad Test

During this test, you will wear a pad that had been treated with a special dye. The pad changes color when you leak urine.

Other Tests

- **Urine culture:** Your health care provider may ask you to leave a sample of your urine to test for infection or blood.
- **Bladder scan:** This type of ultrasound shows how much urine is still in the bladder after you go to the bathroom.
- **Cystoscopy:** During this test, the doctor inserts a narrow tube with a tiny lens into the bladder. This allows them to rule out other causes of your symptoms.
- **Urodynamic testing:** These tests check how well your lower urinary tract stores and releases urine. There are several urodynamic tests you may be asked to take. You may be asked to urinate into a special funnel to see how much urine you produce and how long it takes. You may have a catheter inserted in your bladder to drain your bladder or to add water to it and check the resulting pressure.

Imaging: Your health care provider may need to do additional imaging tests such as **x-rays** and **CT scans** to diagnose your condition. You may also be referred to a specialist for an exam that may include imaging of the spine and brain.

Treatment

Neurogenic bladder is a serious condition, but when it is watched closely and treated the best way, patients can see large improvements in their quality of life.

Specific treatment for neurogenic bladder will be decided by your health care provider based on:

- your age, overall health and medical history
- the cause of the nerve damage
- the type of symptoms
- the severity of symptoms
- your tolerance for certain drugs, procedures or therapies
- their expectations for the course of the condition

There is some overlap in the treatment of **overactive** and **underactive bladder**, as shown below in bold.

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Overactive Bladder

Lifestyle:

Delayed voiding
Scheduled voiding
 Pelvic floor exercises
Bladder diary
Dietary changes

Drugs

Neuromodulation:

Sacral neuromodulation
 Percutaneous tibial nerve

Underactive Bladder

Lifestyle:

Scheduled voiding
 Double voiding
Bladder diary
Dietary changes

Drugs

Catheters:

Clean intermittent
 Continuous

Surgery:

Artificial sphincter
 Urinary diversion
 Bladder augmentation
 Sphincter resection/sphincterotomy

The Bottom Line: What Can I Do?

Neurogenic bladder can be a lot to handle. Talk to your health care provider about any symptoms you have. Find out what can be done to manage your symptoms. When given treatment choices, think about what will work best for you and your lifestyle.

OAB is a very common problem for men and women. It is also the most common type of bladder problem in people who have multiple sclerosis. The most common symptom of OAB is the sudden and unexpected urge to urinate that you can't control. To manage your OAB symptoms you may be offered the treatment options listed below.

Lifestyle Changes

For many patients with less serious nerve damage, the first treatments used are often lifestyle changes. These are changes you can make in your daily life to control your symptoms.

Delayed voiding: You start by delaying urination a few minutes. You slowly increase the time to a few hours. This helps you learn how to put off voiding, even when you feel an urge.

Scheduled voiding: With this method, you follow a daily schedule of going to the bathroom. Instead of going when you feel the urge, you go to the bathroom at set times during the day. Depending on how often you go to the bathroom now, your health care provider may ask you to urinate every 2 to 4 hours, whether you feel you have to go or not.

"Quick flicks": These can help decrease that "gotta go" feeling when it hits. Some call these exercises "quick flicks" because you quickly squeeze and release the muscles in your pelvis several times. When you get that "gotta go" feeling, squeeze and then relax your pelvic floor muscles as quickly as you can. Do "quick flicks" several times in a row when you feel the urge to go. This sends a message to your nervous system and back to your bladder to stop squeezing. As your bladder stops squeezing and starts relaxing, your "gotta go" feeling should lessen. When you do this exercise, it helps to be still, relax and concentrate just on the "quick flicks." Your health care provider can explain this exercise in more detail.

Bladder diary: Writing down when you make trips to the bathroom for a few days can help you and your health care provider understand your symptoms better. A **bladder diary** may help show you some things that make your symptoms worse. For example, are your symptoms worse after eating or drinking a certain kind of food? Are they worse when you don't drink enough liquids?

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Dietary changes: Weight loss and limiting your intake of "bladder irritating" foods and drinks may be helpful. You may be asked to try avoiding coffee, tea, alcohol, soda, other fizzy drinks, citrus fruit and spicy foods. Some patients may see an improvement in their condition while using lifestyle treatment options. However, many may need additional treatments before seeing relief.

Drugs

Drugs may be used if lifestyle changes don't help enough. Some drugs for OAB symptoms relax overactive bladder muscles. Other drugs can help stop your bladder from contracting.

Some drugs are delivered through the skin with a gel or a patch. Your health care provider should follow you closely to look for changes and any side effects of these drugs. To get the best results, your health care provider may ask you to take different doses of the drug, or you may be given a different drug to try. Sometimes behavioral therapy will be used along with drugs.

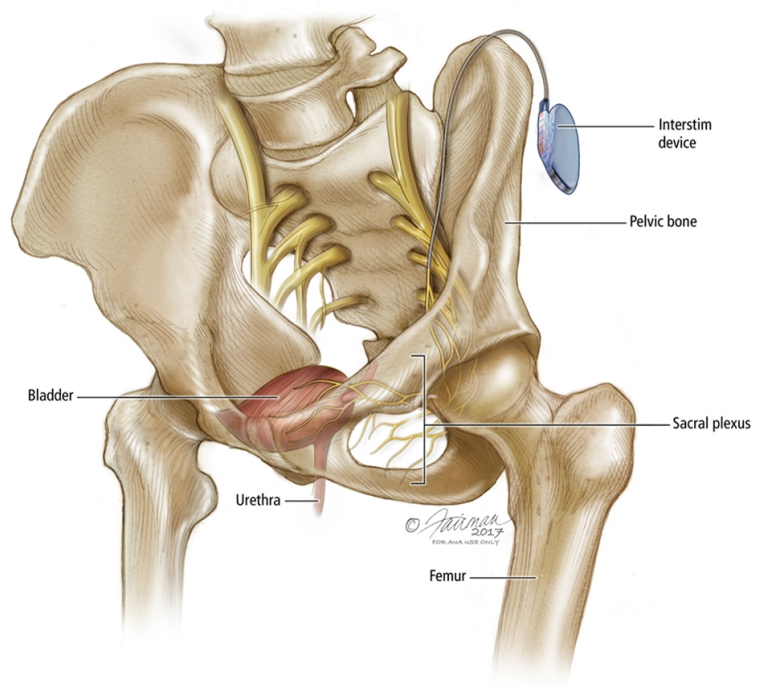
Injections with botulinum toxin (Botox®) are used to help patients who have overactive bladder because of a brain or spinal cord disease or injury. You and your health care provider will decide if this is right for you. When injected into the bladder muscle, this drug may help keep it from contracting too often. Over time, this treatment wears off in some people. It may need to be repeated in 6 months or a year.

A urologist should follow you closely to watch for side effects, including urinary retention (not emptying your bladder completely). If you do have problems emptying your bladder completely after injections, you may be required to use a catheter (thin, hollow tube) to empty your bladder, at least for a short time.

Neuromodulation Therapy

This therapy is the name given to a group of treatments that deliver electricity or drugs to nerves.

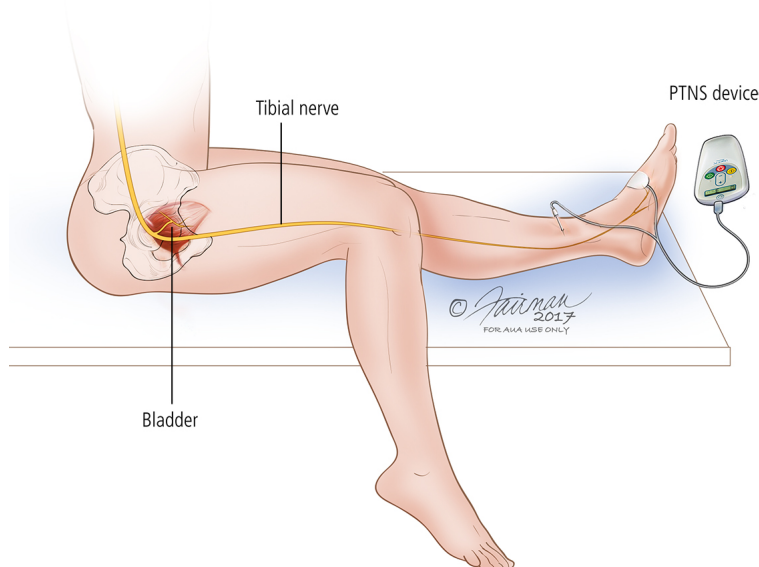
- **Sacral Neuromodulation:**
This is used for patients with overactive bladder when drugs or lifestyle changes don't help. The sacral nerves carry signals between your spinal cord and the bladder. Changing these signals can improve overactive bladder symptoms. The surgeon places a thin wire close to the sacral nerves. Then the wire is connected to a small, battery operated device placed under your skin. It delivers harmless electrical impulses to the bladder to stop the "bad" signals that can cause overactive bladder.



Sacral Neuromodulation Stimulation (SNS)

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- **Percutaneous Tibial Nerve Stimulation:** In this type of neuromodulation a needle is inserted into a nerve in your leg called the tibial nerve. The needle is connected to a device that sends electrical impulses. The impulses travel to the tibial nerve, and then to the sacral nerve. This is done in your health care provider's office. Most patients receive 12 treatments for the best results.



Percutaneous Tibial Nerve Stimulation (PTNS)

Underactive bladder is a condition in which you aren't able to empty your bladder completely – or at all. You may hesitate before urine flows, or you may have to push urine out. Your urine may only come out in dribbles. Treatment options for underactive bladder symptoms are listed below.

Lifestyle Changes

Some of these therapies are the same as for overactive bladder, and again, are often the first therapies used to treat neurogenic bladder. They consist of changes in the way you live day-to-day to help control symptoms.

Scheduled voiding: With this method, you follow a daily schedule of going to the bathroom. Instead of going when you feel the urge, you go to the bathroom at set times during the day. Depending on how often you go to the bathroom now, your health care provider may ask you to urinate every 2 to 4 hours, whether you feel you have to go or not.

Double voiding: After urinating, wait a few minutes and then try again to empty your bladder.

Bladder diary: Writing down when you make trips to the bathroom for a few days can help you and your health care provider understand your symptoms better. A **bladder diary** may help show you some things that make your symptoms worse. For example, are your symptoms worse after eating or drinking a certain kind of food? Are they worse when you don't drink enough liquids?

Dietary changes: Weight loss and limiting intake of "bladder irritating" foods and drinks may be helpful. You may be asked to try avoiding coffee, tea, alcohol, soda, other fizzy drinks, citrus fruit and spicy foods. Some patients with underactive bladder may see an improvement in their condition while using lifestyle treatment options. However, many may need additional treatments before their symptoms are relieved.

Drugs

Drugs may be used if lifestyle changes don't help enough. There are several prescription drugs that can be used to help improve bladder emptying with urinary retention. Your health care provider should follow you closely to look for changes and any side effects of these drugs. To get the best

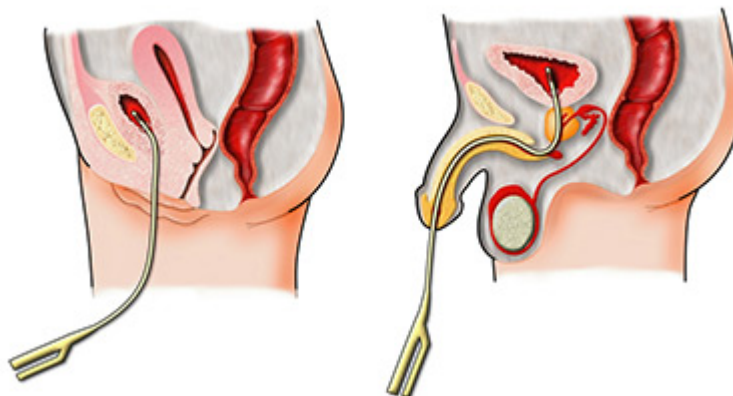
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results, your health care provider may ask you to take different doses of the drug, or you may be given a different drug to try. Sometimes behavioral therapy will be used along with drugs.

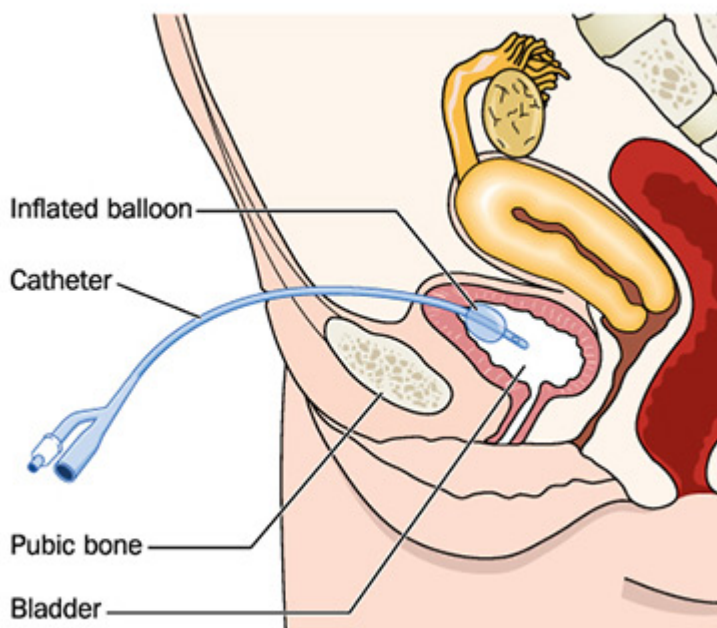
Catheters

Using a catheter can help you empty your bladder. A catheter is a thin, straw-like tube that is inserted into the urethra when you need to drain urine.

- **Clean intermittent catheterization (CIC):** This is something you can learn to do yourself. Depending on your symptoms, your health care provider may ask you to do this 3 to 4 times a day, leaving it in only long enough to empty your bladder. Sometimes clean intermittent catheterization can help improve how your bladder works after several weeks or months. However, CIC can be hard for some people whose nerve damage or other health issues cause hand coordination problems.
- **Continuous catheterization:** Some patients may have a different kind of catheter inserted to drain urine at all times.



Catheters emptying the bladders of a female and a male



Suprapubic catheter

Surgery

Surgery is used to help some patients with more serious types of underactive bladder.

Artificial sphincter: This device helps treat severe urinary incontinence when the real sphincter muscle isn't working correctly. Surgery is required to place the sphincter cuff around the urethra while a pump is placed under the skin in the scrotum or labia. The pump is used to open the sphincter and allow you to pass urine.

Urinary diversion surgery: In this procedure the surgeon creates an opening called a stoma. Urine moves through the stoma to a collection pouch.

Bladder augmentation (augmentation cystoplasty): Part of the large intestine is removed and attached to the walls of the bladder. This increases the size of the bladder and helps it store more urine.

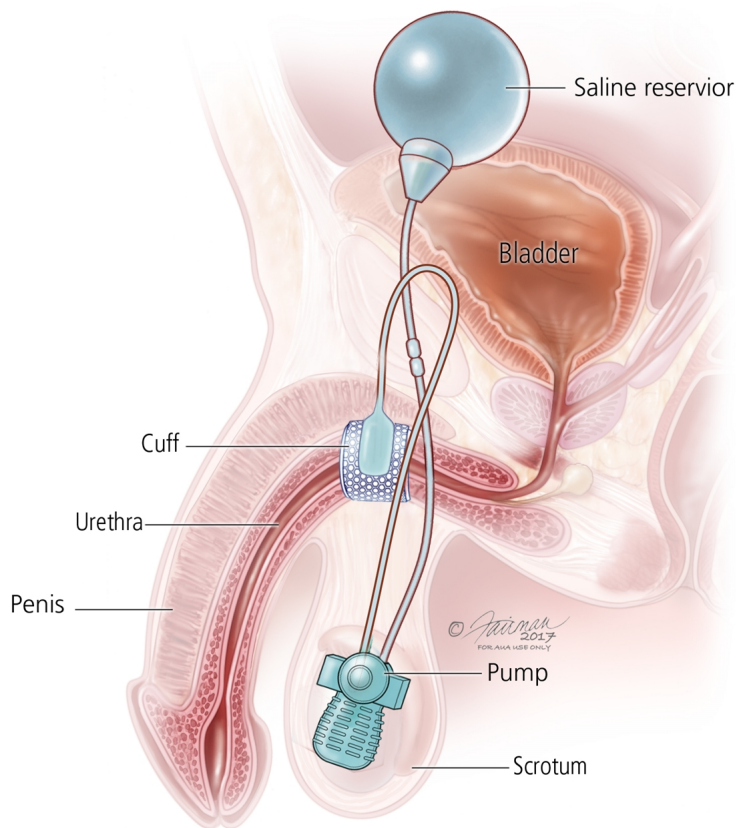
Sphincter resection: The weak portion of the urethral sphincter muscle is removed. In some cases sphincterotomy is performed, in which the entire muscle may be cut.

Other Treatments

If these treatments don't help, your health care provider should send you to a specialist, such as a urologist, who may specialize in neurogenic bladder or incontinence. A specialist may be able to offer other tests and treatments. The treatment choices offered to you will depend on the cause of your nerve damage and the symptoms you have.

The goals of treatment are to control your symptoms and prevent damage to your kidneys. Patients who have neurogenic bladder and have more overactive

bladder symptoms will have different treatment options than those with underactive bladder symptoms. No matter what the cause, treatments are focused on improving your quality of life.



Artificial sphincter

More Information

Find-a-Urologist Tool

You may be referred to a urologist specializing in neurogenic conditions of the bladder. Use the Find-a-Urologist tool to find a specialist near you. Choose "incontinence" as a "special interest area" to find urologists who specialize in helping patients who leak urine.

Questions To Ask Your Health Care Provider

- What causes neurogenic bladder?
- Can neurogenic bladder be prevented?
- Can you help me or do I need to see a specialist in neurourology? If so, how can I find the right one for me?
- Will I need to have tests to find out what is causing my neurogenic bladder?
- Would you explain each test and why you are recommending them?
- What types of treatment are available for neurogenic bladder?
- Are there side effects of treatment?
- What are the pros and cons of each type of treatment?

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- What treatment do you recommend for me and why?
- What happens if the first treatment doesn't help?
- Are there any lifestyle changes I can make that could help my symptoms?