

Spontaneous Voiding

The bladder muscles contract to start the bladder-emptying process. This may be under your control (voluntary) or not (involuntary):

- A. **Normal Voiding.** This is done under your control. When the bladder gets full, messages are sent to the sacral level of the spinal cord and carried to the brain. The brain sends messages back to the bladder to contract, and to the sphincter muscle to open, so you can void.
- B. **Sphincterotomy.** This surgical process weakens the bladder neck and sphincter muscle to allow urine to flow out more easily. After this surgery, you will urinate involuntarily, and must wear a collection device.
- C. **Condom Catheter.** These collection devices are worn by men for incontinence problems or after sphincterotomy (see above). They are made of latex rubber or silicone that covers the penis and attaches to a tube that drains into a collection bag.

Stimulated Voiding

Voiding is encouraged in one of several ways, such as:

- A. **Anal or Rectal Stretch.** This method for relaxing the urinary sphincter is usually used along with an abdominal corset and valsalva (see below).
- B. **Credé.** This method involves manually pressing down on the bladder.
- C. **Tapping.** The area over the bladder is tapped with the fingertips or the side of the hand, lightly and repeatedly, to stimulate detrusor muscle contractions and voiding.
- D. **Valsalva.** This method involves increasing pressure inside the abdomen by bearing down as if you were going to have a bowel movement.

Surgical Alternatives

- A. **Mitrofanoff.** A passageway is constructed using the appendix so that catheterization can be done through the abdomen to the bladder.
- B. **Bladder Augmentation.** Surgical enlargement of the bladder.
- C. **Sphincterotomy.** See the description of this procedure in the "Spontaneous Voiding" section.

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Staying Healthy After a Spinal Cord Injury

BLADDER MANAGEMENT

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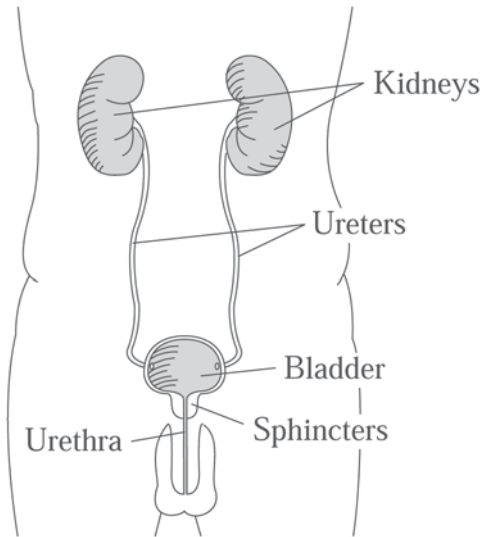
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THE URINARY SYSTEM

The Urinary System is made up of five major parts:

The Kidneys



The two kidneys filter waste and excess water from the blood and produce urine. Urine is being produced every minute of the day.

The Ureters

Each kidney has a thin, hollow tube that connects to the bladder. Urine flows down the ureters from the kidneys and empties into the bladder. The ureters have one-way valves in them, so even if you were to stand on your head urine could not flow back to the kidneys from the bladder.

The Bladder

The bladder is a collapsible sac lying in the pelvis. It is able to stretch to hold urine until you are ready to urinate. The bladder walls are made up of a series of muscles known collectively as the *detrusor muscles*. When you are ready to urinate, the detrusor muscles contract (squeeze) to help push the urine from the

bladder. The lower portion of the bladder, which funnels urine into the urethra, is called the *bladder neck* or *bladder outlet*.

The Sphincter Muscles

The internal and external sphincter muscles form a ring around the urethra to keep urine in the bladder. When you are ready to urinate, these muscles relax to allow urine to flow out of the bladder.

The Urethra

The urethra is a small tube that allows urine to flow from the bladder to outside the body. The male urethra is 8-10 inches long and the female urethra is 1-2 inches long. The external urethral opening from the body is called the *meatus* for both men and women.

VOIDING (URINATION)

Normally, when the bladder becomes full (about 1-2 cups for most people), nerve endings in the bladder wall send a message to the brain via the spinal cord. The brain sends a message back to the bladder to *contract the detrusor muscles* and *relax the sphincter muscles* so you can void. If you can't get to a toilet, the brain delays the messages until you are ready to void.

After spinal cord injury

The bladder, along with the rest of the body, undergoes dramatic changes. Since messages between the bladder and the brain cannot travel up and down the spinal cord, the voiding pattern described above is not possible.

Depending on your type of spinal cord injury, your bladder may become either "floppy" (*flaccid*) or "hyperactive" (*spastic* or *reflex*).

The Flaccid Bladder

A floppy bladder loses detrusor muscle tone (strength) and does not contract for emptying. This type of bladder can be easily overstretched with too much urine, which can damage the bladder wall and increase the risk of infection.

Emptying the flaccid bladder can be done with techniques such as Credé, Valsalva, or intermittent catheterization. It is very important that you do not let your bladder get overfull, even if it means waking up at night to catheterize yourself more frequently.

The Reflex Bladder

The detrusor muscles in a hyperactive bladder may have increased tone, and may contract automatically, causing incontinence (accidental voiding). Sometimes the bladder sphincters do not coordinate properly with the detrusor muscles, and medication or surgery may be helpful.

BLADDER MANAGEMENT

Foley or Suprapubic Catheter

A tube is inserted through the urethra or abdomen and into the bladder, where a balloon on the end holds it in place. It remains in the bladder and drains constantly, so the bladder is never full.

Intermittent Catheterization

You drain your bladder several times a day by inserting a small rubber or plastic tube. The tube does not stay in the bladder between catheterizations.

CONTINUED OTHER SIDE