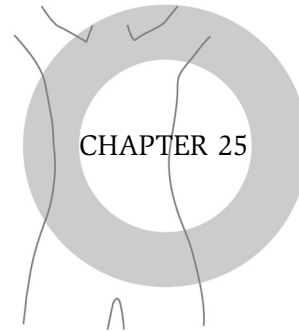


Urinary Incontinence



Helen A. Carcio

I. Bladder dysfunction explained.

A. Statistics.

1. Epidemiological studies suggest that 15% to 30% of all adults in the United States have some degree of incontinence.
2. The actual frequency is probably much higher considering the significant underreporting of the problem because of patients' reluctance (Box 25.1).
3. An estimated 75% of people affected are women.
4. Demographic trends are changing the nature of the country and the health care landscape.
 - a. The fastest growing segment of the population is the aging baby boomers; those between the ages of 45 and 65 have dramatically increased over the last 10 years.
 - b. As the number of elderly increases, so will the need for incontinence services.
5. Treatment of incontinence is not consumer driven. An astounding 50% of women affected never bring up the subject to their health care provider.

B. Some thoughts.

1. The most common form of incontinence is mixed incontinence, particularly among older women.

Common Reasons Why Women May Be Reluctant to Discuss Incontinence

**BOX
25.1**

- They believe incontinence is a normal part of aging.
- They are unaware there are conservative methods of treatment.
- They erroneously think that surgery is the only treatment option.
- They don't realize that they are not alone.
- They are afraid they will be put in a nursing home.
- They fear it is some form of cancer.
- They are able to rely on expensive incontinence products.
- They are not able to find resources to help with their problems.
- They are ashamed and embarrassed.
- They feel powerless and are resigned to their situation.

2. Aging itself does not cause incontinence, but the lower urinary tract does undergo some changes with age. These include:
 - a. Diminished muscle tone, bladder capacity, and voided volume.
 - b. The bladder is less compliant and less able to easily stretch with filling.
 - c. Uninhibited bladder contractions and post void residual volumes increase.
 - d. The function of the main pelvic floor muscle, the levator ani, deteriorates.
 - e. The above changes are thought to be related to loss of estrogen to the cells and vascular insufficiency.
 - (1) Symptoms include dysuria, incontinence, urinary frequency, and hematuria.
 - (2) There is an increased risk of urinary tract infections.
 - (3) These symptoms and signs of genitourinary atrophy may develop slowly, over many months or years, or may have a more rapid onset.
 - (4) Urogenital atrophy is the most likely consequence of menopause.
 - f. The lower urinary tract and pelvic musculature are under the influence of estrogen and share a common embryologic origin with the vagina.
 - (a) Squamous epithelium of the trigone and urethra thins and blood flow decreases.

II. Pathophysiology of the Lower Urinary Tract System (LUTS).

- A. The bladder and the urethra make up the lower urinary tract.

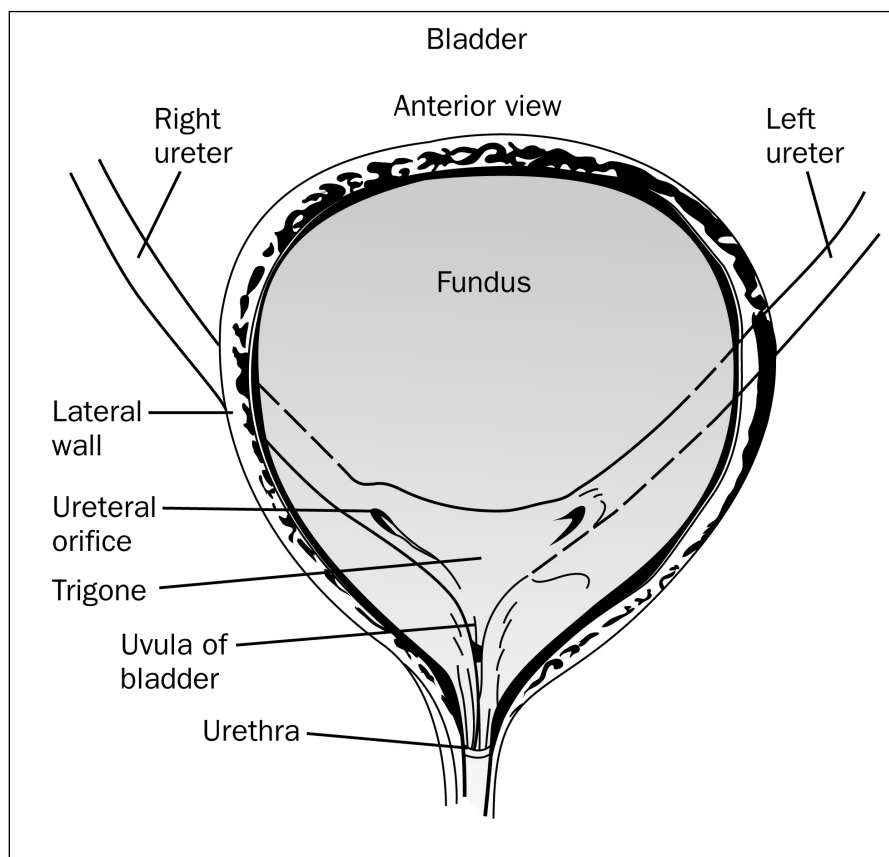


Figure 25.1 Anatomy of the bladder.

1. The bladder is both a holding tank and a pump.
 - a. Stores urine.
 - b. Empties when full.
2. Dome: The top of the bladder is the dome and is thin and collapsible.
 - a. Extends, as the bladder fills much like a hot air balloon.
 - b. Collapses when empty.
 - c. Figure 25.1 shows the anatomy of the bladder.
3. Base: The base of the bladder is the thicker and less distensible portion.

- a. The trigone is the lower portion where the ureters enter the bladder.
 - b. The bladder fills from the bottom and rises above the pubic bone when full.
 - c. Bladder fills in 1cc per minute.
 - d. Has an average capacity of 400–500 cc's.
- B.** The bladder wall consists of three layers.
1. Outer: Adventitial layer of connective tissue.
 2. Middle: Contains the main muscle of the detrusor.
 3. Inner: Mucous membrane.
- C.** Urethral sphincter.
1. Passes through the urogenital diaphragm and acts as a purse string to tighten the sphincter.
 2. Muscles provides passive compression to keep the urethra closed during filling.
- D.** Pelvic Floor Muscle. The levator ani is an internal diaphragm, which supports and stabilizes the pelvic organs.
1. Acts as a voluntary sphincter for the urethra.
 2. Forms an occlusive layer which closes the lower pelvic floor to resist the down thrust of an increase in intra-abdominal pressure.
 3. Consists of a strong striated long muscle.
- E.** Neurophysiology.
1. Distension of the bladder activates stretch receptors at approximately 200 cc's of urine.
 2. Sympathetic response facilitates urine storage by inhibiting the bladder contractions and stimulating the urethra to contract.
 3. Afferent impulses travel to the sacral spinal cord and the urge to urinate is felt.
 4. Efferent impulses return via the parasympathetic system.
 - a. Detrusor contracts and the bladder empties.
 - b. The urethral sphincter at the bladder neck simultaneously relaxes to allow the urine to escape.
 5. Pudendal nerve causes voluntary relaxation of the external sphincter and levator ani.
 6. Figure 25.2 provides a schematic diagram of the neurologic innervation of the bladder.

III. Urinary incontinence explained.

- A.** Functional classification.
1. Failure to store.

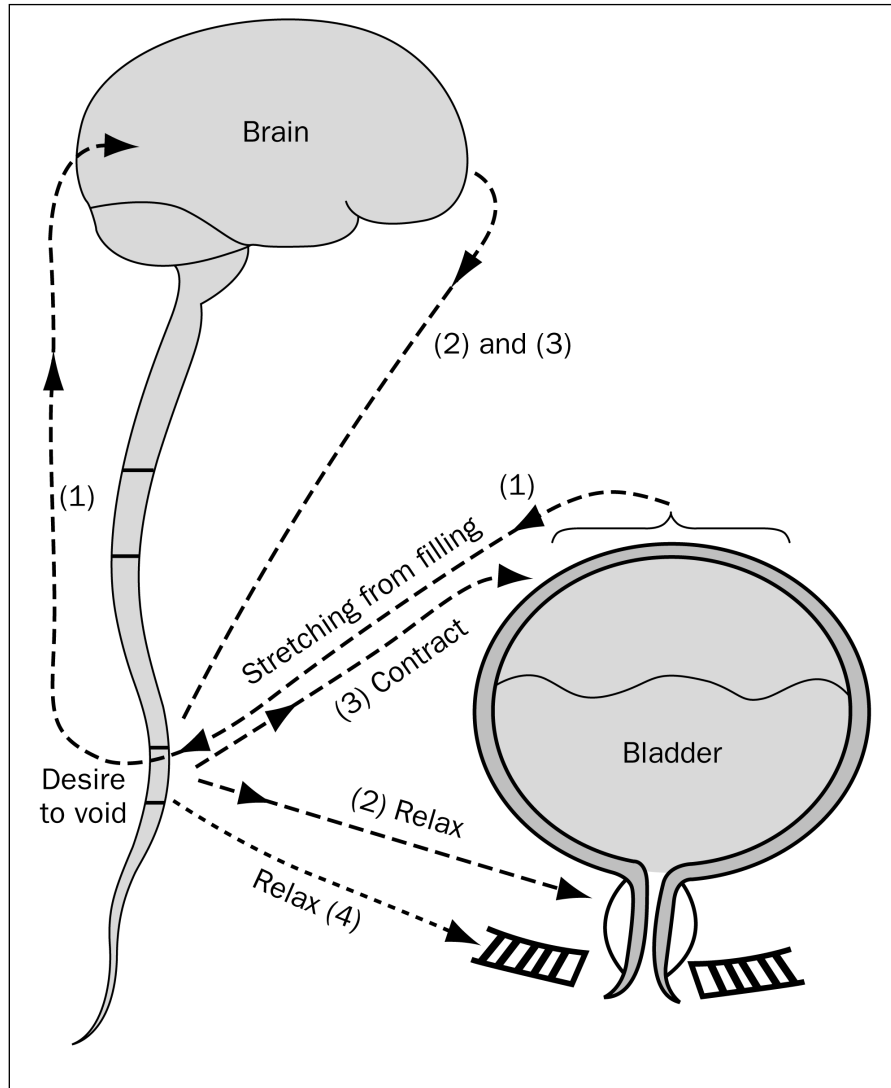


Figure 25.2 Schematic of neurologic innervation of the bladder.

- a. Bladder.
 - (1) Involuntary muscle contractions.
 - (2) Low compliance or stretchability.
 - (3) Hypersensitivity to filling pressures.
 2. Failure to empty.
 - a. Bladder does not contract efficiently.
 - b. Outlet obstruction due to a stricture or kink in the urethra (cystocele) or the pressure of an enlarged prostate.
 3. Incontinence is the ultimate sign of storage failure.
- B. Requirements for urinary continence.**
1. Intact intrinsic urethral sphincteric mechanism.
 2. Well supported bladder neck and urethra.
 3. Normal bladder storage capacity at low pressure.
 4. Good compliance.
 5. Competent pelvic floor muscle.

IV. Types of urinary incontinence.

- A. Stress urinary incontinence (SUI).**
1. Involuntary loss of urine due to increased abdominal pressure on the bladder which exceeds maximal urethral pressure (the ability of the urethra to hold the urine in).
 2. Symptoms.
 - a. Urine loss, usually occurring at unexpected or inappropriate times.
 - b. Volume varies and is often described as occurring in spurts or drops.
 - c. Precipitated by cough, sneeze, change in position, or other types of exertional activities often related to sports.
 - d. Rare nighttime occurrence.
 3. Cause.
 - a. Pelvic muscles act as a backboard or spring to absorb any increases in abdominal pressure and prevent overwhelming the urethral sphincter.
 - b. When backboard becomes weakened or damaged, the bladder neck becomes displaced and opens the urethra to allow leaking.
 - c. Abdominal forces generated to the bladder overcome the closing ability of the urethra and leaking occurs.
- B. Overactive bladder.**
1. Symptom.
 - a. Symptom complex consisting of urgency, frequency, and urge incontinence. May not always be incontinent.

Table 25.1 Comparison of Presenting Symptoms

	OAB	Stress Incontinence	IC
Urgency	X		X
Frequency	X		X
Leaking with physical activity		X	
Leakage volume	Large	Drops to small amounts	Variable
Nighttime urination	X	Rare	X
Inability to reach toilet in time with urgency	X		X
Pelvic pain			X

Mixed is a combination of the symptoms of urge and stress incontinence.
OAB = overactive bladder; IC = interstitial cystitis.

- b. Characterized by sudden, strong feeling of urgency caused by uncontrolled (overactive) contractions of the detrusor during filling.
 - c. The urgency may be very strong or very subtle.
 - d. The urge a woman experiences is actually a bladder contraction that creates a false need to empty the bladder before it is full.
 - e. If the force of the contractions is too strong or the seal of the urethra is weak, uncontrollable urine leakage can occur.
- C. Urge incontinence.**
1. The involuntary leakage of urine that is often immediately preceded by an urge to urinate in the absence of physical activity.
 2. Frequency associated with “triggers” such as running water, or placing the house key in the front door.
 3. Urine loss may be substantial since contractions may continue until the bladder is empty.
 4. Must distinguish from a normal strong urge to void which can be controlled.
- D. Mixed incontinence.**
1. A combination of stress and urge incontinence (see Table 25.1, which compares the symptoms of both).
 2. Probability increases with age.
 3. Usually described as being “stress dominant” or “urge domi-

Table 25.2 Comparison of the Causes of Incontinence

Causes of Stress Incontinence	Causes of Urge Incontinence/OAB
Pregnancy	Urinary tract infection
Genetic factors	Bladder stones or tumor
Vaginal delivery, particularly if multiple	Lack of vaginal estrogen
Mild to moderate cystocele	Urethritis/urethral diverticulum
Inadequate estrogen levels	Cystocele
Previous pelvic surgeries/radiation	Neurological problems associated with stroke, Parkinson's disease, multiple sclerosis, or spinal cord problems
Obesity, particularly a high waist-to-hip ratio	Habitual frequent voiding
High impact sports	Diabetes
Medications (ACE inhibitors, Alpha-adrenergic blockers)	Incomplete emptying of the bladder
Long-term heavy lifting	Smoking
Chronic constipation	
Elevated body mass index (BMI)	
Chronic cough, often related to smoking	
Vascular changes associated with aging	

nant” depending on which type of symptoms is more prevalent.

4. It is a combination of symptoms in which each requires special consideration.
 5. Table 25.2 compares the causes of stress and urge incontinence.
- E.** Transient incontinence. Causes of incontinence that are usually caused by outside forces, which can be controlled or reversed (see list in Box 25.2).
- F.** Interstitial cystitis.
1. Symptoms.
 - a. Complex of symptoms characterized by urinary urgency and frequency, pelvic pain, dysuria, dyspareunia, and nocturia.
 - b. Bladder is tender and pain increases with filling and is relieved with emptying.
 - c. Is often misdiagnosed in the early phases of the condition as overactive bladder or urge incontinence.

Causes of Transient Incontinence

**BOX
25.2**

- Delirium/dementia
- Bladder infection
- Atrophic vaginitis/urethritis
- Medications
- Endocrine causes
- Restricted mobility
- Stool impaction/constipation
- Polyuria

- d. Pelvic pain increases over the years and is often diagnosed as endometriosis.
- e. Symptoms worsen with intercourse (12–24 hours), menstrual cycle changes, seasonal allergies, and stress.
- f. No underlying cause has been identified.
- g. Diagnosis is difficult and may take up to seven years of seeing various providers. It is usually made by exclusion.

V. Diagnostic testing and differential diagnosis.

A. The health history.

1. Begin by reassuring the woman that incontinence is a relatively common problem and that effective treatment is available.
2. History includes the patient's perception of her symptoms, which helps determine the type and extent of urinary incontinence.
3. Urinary symptoms of frequency, urgency, and incontinence mimic other bladder disorders and require special evaluation.
4. Assess bowel function and type.
5. Address the impact that incontinence has on the patient's life, self-esteem, and activities of daily living.
6. Inquire about prior pelvic surgeries, number of vaginal deliveries, patient motility, medications, and history of urinary tract infection.
7. Review use and extent of "self help" measures such as pad use and fluid reduction.

B. Bladder Voiding Diary.

1. Obtain a 3-day recorded history of the woman's day-to-day bladder habits and patterns.

2. Objectively document intake and output and extent of the problem.
 3. Diary allows the woman to focus on her behavior and how it relates to symptoms.
 4. The mere keeping of the diary can be therapeutic and continence may improve once a causal relationship is established and documented.
 5. See Box 25.3 for a sample recording of the bladder diary.
 6. Review the use of any bladder irritants.
 - a. The lining of the bladder is sensitive to certain types of foods and fluids, particularly those with high caffeine and acid content.
 - b. It can cause “irritative symptoms” such as urgency and frequency.
 - c. Box 25.4 lists the worse offenders in the Carcio “C” List.
- C. The physical examination is outlined in Table 25.3.
1. Urinalysis (see chapter 11).
 - a. Rule out infection. Elderly women may not have the characteristic symptoms of a urinary tract infection (UTI), such as burning urination, and may only have frequency and incontinence.
 - b. The presence of leukocytes and nitrates on a Multistix Reagent strip is a sensitive and inexpensive indicator.
 - c. The presence of glucosuria or proteinuria require further investigation.
 - d. Hematuria may be indicative of bladder cancer and may require referral for cystoscopy.
 2. Postvoid residual.
 - a. It is the integral result of bladder contractility and urethral resistance.
 - b. A high residual may indicate an inability of the bladder to contract against an increase in urethral pressure or a hypotonic bladder.
 - c. A measurement of a residual that is 25% or less of the voided volume is acceptable.
 3. Vaginal cultures should be obtained (see chapter 10).
 - a. Urinary frequency may be a symptom of genital herpes.
 - (1) Rule out genital herpes with herpes select serology type 2 testing. HSV 2 may be latent and/or asymptomatic for decades, activating in perimenopause or menopause. Presentations are atypical, further evading easy diagnosis.

*Common Bladder Irritants***BOX
25.4**

Coffee and tea (sometimes even decaffeinated)
Chocolate
Carbonation
Coke and colas (Pepsi)
Citrus (whether juice or fresh)
Cranberry juice or pills
C vitamin
Cocktails
Crystal light
Candy and other sugars
Chili and other tomato-based products
Chinese food (spicy or with MSG)
Cigarette smoking
Condiments such as honey and artificial
sweeteners—Aspartame (NutraSweet, Equal)
Cold remedies

4. Assess for atrophic vaginitis (see chapter 23).
 - a. The “Maturation Index” should be assessed in order to determine the presence and extent of atrophic vaginitis.
 - b. The presence of any parabasal cells on a wet mount may be considered documentation of atrophic vaginitis.
 - c. Observe for the presence of a urinary caruncle which can cause symptoms of urgency, frequency, and bleeding.
- D. Assess pelvic muscle tone (see chapter 24).
 1. Ask patient to squeeze around your two examining fingers while palpating the levator ani muscle.
 2. Note the patient’s ability to sustain constriction and deflection of finger or fingers upward with a good squeeze. No deflection indicates weaker muscles.
 3. Constriction lasting a few seconds indicates weakening.

Table 25.3 The Focused Physical Examination in the Evaluation of Incontinence

Abdominal	Abdominal skin condition Bowel sounds Masses Suprapubic tenderness Bladder distention
Pelvic examination	Perineal skin condition Urethral characteristics Atrophism Vaginal infection Pelvic floor deficits such as cystocele or rectocele Palpation of the strength and symmetry of the levator ani muscle Bladder base tenderness in the anterior vagina Pelvic muscle laxity Pelvic mass Provocative stress test with direct observation of urine loss
Rectal examination	Skin irritation Perineal sensation Sphincter tone Presence and consistency of stool Masses or fecal impaction
Neurological examination	Gait Mental status Knee and ankle reflexes Perineal sensation of S2–S4 dermatomes Anal reflex or “wink” (S2–S5) Bulbocavernosus reflex (S2–S4)
Laboratory assessment	Urinalysis for infection, blood, glucose, protein Urine culture for infection Cytology for atypical or malignant cells

4. A weakness may be indicative as the cause of SUI.

E. Provocative stress test.

1. Stress testing has a sensitivity and specificity of > 90%.
2. Ask the patient to stand and cough with a moderately full bladder (150 cc's).

3. Observe for small spurts of urine that escape simultaneously with each cough. (May place pad between legs to catch and observe any urine released.)
 4. Delayed or persistent leakage suggest detrusor overactivity (triggered by coughing) rather than outlet incompetence.
 5. If urine escapes, place one finger on either side of the urethra to compress it.
 6. Ask the patient to cough again.
 7. If there is no loss of urine during the cough, the test is considered positive for stress urinary incontinence.
- F.** Assess the neuronal support to the sacral dermatome, S2, S3, and S4. These dermatomes innervate the micturition reflex (Figure 25.3).
1. Lightly stroke the skin area innervated by the dermatomes in the inner thighs (Figure 25.3).
Note response to light touch. Compare contralateral sides.
 2. Bulbocavernosus reflex.
 - a. Stroke or gently squeeze the clitoris.
 - b. Note contraction of the bulbocavernosus muscle around the clitoris.
 3. Anal reflex (so-called anal wink).
 - a. Lightly stroke the skin lateral to the anus.
 - b. Note contraction of the anal sphincter.
- G.** The cotton-tipped swab (Q-tip) test.
1. Determines the degree of the detachment of the proximal urethra (Figure 25.4).
 2. Place cotton-tipped swab through the urethra to the midurethral area.
 3. Ask patient to perform a Valsalva maneuver (hold breath while bearing down).
 4. Note change in the angle of the cotton-tipped swab.
 - a. Normally, 10 to 15 degrees from the horizontal position.
 - b. If there is significant urethral detachment and loss of urethral sphincter muscle, the angle will exceed 30 degrees (Figure 25.4).
- H.** Perform a simple CMG (see chapter 37).
- VI. Follow-up.**
- A.** Follow-up visits may range from 2 weeks to 3 months based on the patient's problems, response to therapy, and clinician/patient preference.
- B.** Once the diagnosis is established an individualized plan of care is developed with the patient. Options include:
1. Pelvic floor muscle strengthening.
 - a. Kegel exercises, which include a rectal tightening and

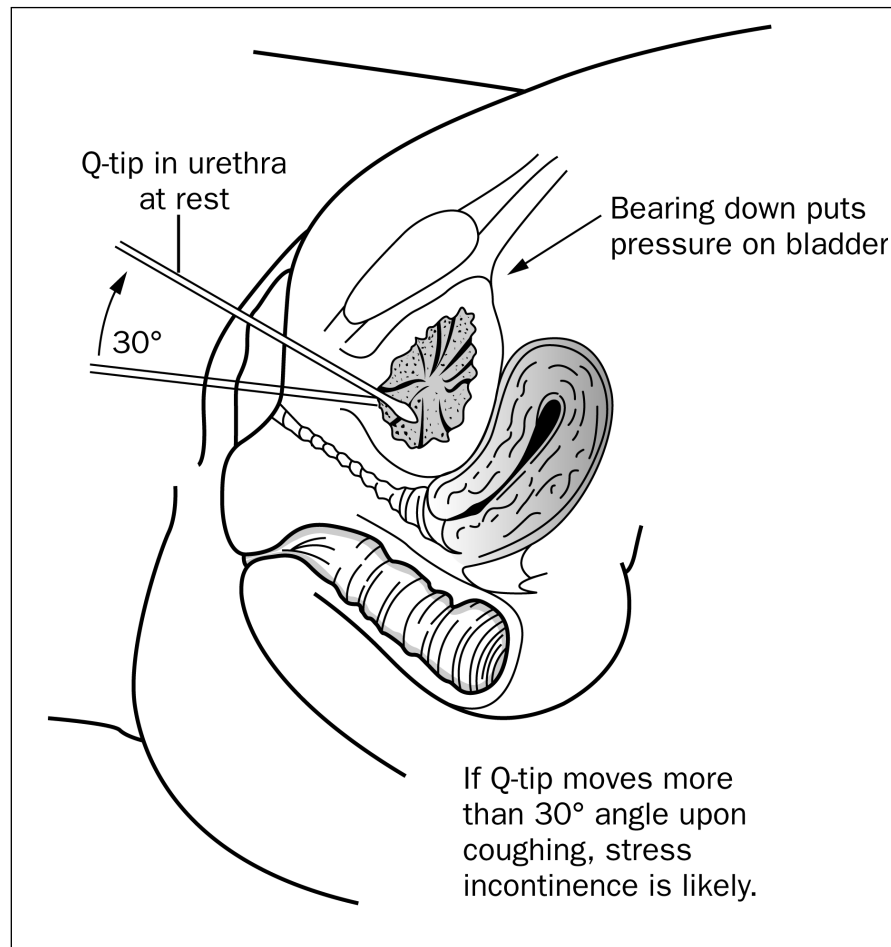


Figure 25.4 Cotton-tipped (Q-tip) swab test is used to determine the degree of detachment of the proximal urethra.

- a. Vaginal device that elevates and stabilizes the bladder neck and increases urethral resistance.
- b. Takes up redundant vaginal tissue, forming a sling that will support and elevate the uterus, and flatten and support a cystocele.
4. Electrical stimulation.
 - a. Delivers a weak, painless electrical current to the pelvic floor muscles.

*Urge Suppression***BOX
25.5****PATIENT EDUCATION: Urge Suppression**

In the following exercises you will learn to decrease frequency and urgency by calming the bladder.

The urgency curve is similar to a labor contraction, you simply have to mentally and physically suppress the urge and ride through the contraction. It is a matter of “mind over bladder.” Follow these simple steps: (You may leak a little during this training period.)

The urge strikes!

- Avoid rushing to the toilet. It will make matters worse.
- Sit down and try to relax.
- Do 5 “quick flicks.” This is done by tightening your rectal sphincter for a couple seconds, and releasing for another few seconds. Quickly repeat this sequence 5 times in a row.
- Next, relax your body totally—try imagery—think of something pleasant and unrelated. (Preferably not the running water of a peaceful waterfall!) The urge should be decreasing by now.
- Do another set of 5 “quick flicks.”
- This may completely make the urge go away, or at least suppress the urge long enough to allow you to squeeze and calmly walk to the bathroom.

- b. Inhibits bladder spasm by affecting the neural pathways between the pudendal nerve and the bladder.
 5. Urge suppression.
 - a. Contracting the muscle of the pelvic floor reflexively causes the muscles of the bladder to relax.
 - b. Box 25.5 lists the steps to use when teaching urge suppression.
 6. Table 25.4 summarizes the treatment options in the treatment of urinary incontinence.
 - C. Certain clinical conditions should be referred to a specialist.
 1. Uncertain diagnosis.
 2. Hematuria without urinary tract infection.
 3. Urinary retention with persistent symptoms of inadequate bladder emptying.
 4. History of previous incontinence surgery, radical pelvic surgery, or pelvic irradiation.
 5. Neurological conditions such as MS (muscular sclerosis), spinal cord injury, or neuropathy.
 6. Suspicion of fistula or suburethral diverticula.
- VII. There are valuable resources for information on urinary incontinence.**

Table 25.4 Options in the Treatment of Incontinence

Continence Treatment Options	Stress	Urge	Mixed	IC
Pelvic muscle exercises	X	X	X	X
Biofeedback/EMG	X	X	X	X
Reduction in use of bladder irritants	X	X	X	
Treatment of vaginal atrophism	X	X	X	X
Pessary use	X	X	X	
Anticholinergics sometimes	X	X	X	
Bladder retraining sometimes	X	X	X	
Urge suppression		X	X	
Weight reduction	X		X	
Vaginal weights	X	X		
Smoking cessation	X	X	X	X

Note how mixed incontinence requires a combination of treatment options for stress and urge incontinence.

A. National Association for Continence (NAFC) Web site:

www.nafc.org

B. Society for Urologic Nurses and Associates (SUNA).