

## Incontinence

### Goals and Objectives

#### Course Description

"Incontinence" is an asynchronous online continuing education course for physical therapists and physical therapist assistants. This course presents updated information about urinary and fecal incontinence; including information about societal impact, epidemiology, risk factors, classification, assessment, treatment, and complications.

#### Course Rationale

The purpose of this course is to present learners with current information about incontinence. A greater understanding of urinary and fecal incontinence will enable physical therapists and physical therapist assistants to provide more effective and efficient care to individuals with these conditions.

#### Course Goals and Objectives

Upon completion of this course, the participant will be able to:

1. identify the societal, economic, psychological and care-giving impact of incontinence
2. identify the factors which act as barriers to care
3. name risk factors for urinary incontinence
4. differentiate between the classifications of urinary incontinence
5. identify the key components of a urinary incontinence assessment
6. differentiate between all of the available treatment options for urinary incontinence
7. outline risk factors for fecal incontinence
8. identify anatomical and pathophysiological processes that cause fecal incontinences
9. identify tests and screening tools utilized to assess fecal incontinence
10. differentiate between all of the available treatment options for fecal incontinence.
11. identify neurological disorders that frequently result in incontinence
12. identify nursing home procedures that contribute to resident incontinence.
13. describe medical complications associated with incontinence

**Course Provider** – Innovative Educational Services

**Course Instructor** - Michael Niss, DPT

**Target Audience** – physical therapists and physical therapist assistants.

**Course Educational Level** – Introductory / intermediate

**Course Prerequisites** - None

**Method of Instruction/Availability** – online text-based course available continuously

**Criteria for issuance of CE Credits** – a score of 70% or greater on the course post-test.

**Continuing Education Credits** – 4 hours

**Determination of Credits** - Mergener Formula:  $.9 \times [-22.3 + (0.00209 \times 88,662) + (2.78 \times 20) + (15.5 \times 3)] = 240 \text{ minutes} = 4.0 \text{ hours}$

**Fees** - \$39.95

**Conflict of Interest** – No conflict of interest exists for the presenter or provider of this course.

**Refund Policy** - Unrestricted 100% refund upon request. The request for a refund by the learner shall be honored in full without penalty or other consideration of any kind. The request for a refund may be made by the learner at any time without limitations before, during, or after course participation.

## Incontinence

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#### Course Outline

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## **Overview**

Fecal incontinence and urinary incontinence will affect more than one fourth of all U.S. adults during their lives. Incontinence often has serious effects on the lives of the many individuals who have physical discomfort, embarrassment, stigma, and social isolation and on family members, caregivers, and society. Despite the prevalence of incontinence, the condition is widely underdiagnosed and underreported. Fewer than half of individuals with incontinence consult health care providers about the problem. Incontinence is often undetected and underreported by health care personnel, masking its true extent and clinical impact and reducing the opportunity for effective management.

## **Impact of Incontinence**

The impact of living as a person with urinary incontinence and/or fecal incontinence carries a significant burden. The nature of the condition presents unusual challenges. Incontinence is frequently chronic, with often unpredictable symptom episodes that can be disabling. A social stigma is attached to incontinence and by attribution to the sufferer. Effective therapies are often elusive. Symptoms impair function and place demands on families as well as patients.

Various factors influence whether or not a person will seek medical help and the individual's ability to adapt to their illness demands and benefit from treatment. Cultural, social, and psychological factors along with concepts of self-image and health expectations influence outcomes.

## **Costs of Incontinence**

Incontinence costs more than \$20 billion per year in the United States, more than the annual cost of all cancer care. More than 80 percent of this spending is associated with care for women, underscoring the treatment disparities between men and women with incontinence. Estimated annual per person costs for incontinence are \$600 for community-dwelling persons but \$3,500 for institutionalized persons. A majority of this money is spent on management and routine care (absorbent supplies, laundry, dry cleaning) and represents out-of-pocket costs paid by the patient. Costs of diagnostic evaluation, drug treatments, and surgery his also increasing.

Associated complications such as urinary tract infections and skin breakdown also account for a substantial proportion of associated costs; lastly, the burden of incontinence often is the impetus for institutionalization. Spending associated with incontinence represents 0.5 to 1.5 percent of median annual household income, similar to out-of-pocket spending on prescription drugs. Factors independently associated with increased costs include more frequent episodes,

type of incontinence, race (costs are higher for African American women), and having a lower quality of life score.

Effective treatment reduces costs associated with incontinence. As incontinence frequency decreases by approximately 50%, costs decrease by 37 percent at 6 months and by 60 percent at 18 months post treatment. Incontinence also is associated with psychological costs, causing a profound adverse effect on quality of life.

### **Illness Burden**

The person with incontinence is faced with a persistent challenge of overcoming social and cultural taboos. Loss of control over elimination and public humiliation represent major threats to self-esteem. Individuals will go to great lengths to keep their incontinence a secret. Revelation of this secret can have a profound effect on their well-being. Individuals with incontinence often plan their life around easy and rapid access to toilet facilities. To accomplish this, they may curtail activities other members of society take for granted: shopping, going to the cinema, dining out, or having sexual intercourse.

They suffer from embarrassment, shame, and sometimes depression. Not surprisingly, researchers have found that patients with incontinence, on average, suffer a quality of life far below than that of the U.S. population as a whole, especially in the domains of vitality, social functioning, emotional role, and mental health.

Incontinent patients have been reported to be less likely to marry and to hold a normal job. Stigmatization has been found to lead to social isolation, limited life chances, and delayed help seeking. Numerous studies report that incontinence has a strong, if not devastating, impact on quality of life. Yet 50%–70% of incontinent persons do not seek help for their condition.

### **Barriers to Care**

Barriers for seeking help include a lack of understanding of the condition, mistaken beliefs that symptoms are a normal part of aging or childbirth, and lack of knowledge about available treatments. Patients may not communicate their concerns to their physician or other healthcare providers because of embarrassment, fear of surgical interventions, or misconceptions of what constitutes a medical problem.

In a study that found that primary care physicians ask few of their patients about incontinence, up to 70% of incontinent patients did not voluntarily report the problem, but more than 75% did report the condition when asked about it by their physician. Health care professionals need to take the lead in talking about incontinence. They need to ask their patients about bowel and bladder function,

about the patient's ability to control it, and whether it is resulting in changes in daily routine.

Patients and practitioners often refer to things differently, attaching their own interpretations to the reported symptoms. A simple question or two may be all that is needed to reveal the presence of incontinence.

Many people who are incontinent begin a gradual process of adaptation and accommodation of symptoms; this gives the individual the illusion of coping. Severity of symptoms may be a driving factor that brings people to their physician because they are no longer able to cope with the symptoms. Incontinent people have a need to perceive the benefits of treatment in order to overcome the emotional costs they will expend in revealing their incontinence to a clinician.

### **Caregiving Burden**

Caregiver burden is the strain or load borne by an individual caring for an older, chronically ill, or disabled family member or other person. It is a multidimensional response to the physical, psychological, emotional, social, and financial stressors associated with caring for another person. An estimated 44.4 million Americans are informal caregivers (persons who provide unpaid assistance to a family member or friend who needs help with one or more activities of daily living. The majority of those they care for are 50 years of age or older. Thirty percent of caregivers provide assistance with an average of eight or more ADLs and provide an average of 33 or more hours of care per week. Many of these caregivers report providing incontinence-related care (29%–53%) and/or toileting assistance (47%–68%). Despite the high proportion of caregivers who report providing care related to managing or preventing incontinence, there is limited research examining the impact of incontinence on some aspect of caregiver burden (measuring burden, stress, fatigue, or hours of caregiving). In most of these studies, all or the majority of the care recipients had dementia.

Incontinence-related caregiving for frail elders, particularly those with dementia, generally involves multiple care-related activities. The decision to place a care recipient in a nursing home can be seen as a proxy measure of caregiver burden.

## **Urinary Incontinence**

### **Epidemiology**

Urinary Incontinence (UI) affects approximately 13 million Americans, with the highest prevalence in the elderly in both community and institutional settings. The high prevalence of UI and its significant adverse physical, psychological, and financial effects clearly justify more aggressive efforts to identify, evaluate, and treat UI in all settings.

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Reported prevalence rates of UI vary considerably, depending on the population studied, the definition of UI, and how the information is obtained. Among the population between 15 and 64 years of age, the prevalence of UI in men ranges from 1.5 to 5 percent and in women from 10 to 30 percent. Although UI is usually regarded as a condition affecting older multiparous women, it is also common in young, nulliparous women, particularly during physical activity.

Higher prevalences are also found in studies of pregnant women, in who estimates range from 32% to 64% for any UI. Prevalence tends to be low in the first trimester, greater in the second trimester, and even higher in the third trimester.

For noninstitutionalized persons older than 60 years of age, the prevalence of UI ranges from 15 to 35 percent, with women having twice the prevalence of men. Between 25 and 30 percent of those identified as incontinent have frequent incontinence episodes, usually daily or weekly.

Fewer studies have been published describing the prevalence of UI in men. In the general population of men, prevalence of UI ranges vary widely, from 1% to 39%. UI increases steadily with age and ranges from 11% to 34% in older men. As in women, prevalence of UI is higher among men in long-term-care settings. Men undergoing prostatectomy are at particular risk for UI. Incontinence tends to be most severe immediately after surgery and to improve over time.

Survey data from caregivers of the elderly show that approximately 53 percent of the homebound elderly are incontinent. A random sampling of hospitalized elderly patients identified 11 percent as having persistent UI at admission and 23 percent at discharge.

UI is generally recognized as one of the major causes of institutionalization of the elderly. Among the more than 1.5 million nursing facility residents, the prevalence of UI is 50 percent or greater, with the majority of nursing home residents having frequent UI. The annual incidence of UI in nursing home residents who are admitted continent was recently reported to be 27 percent and is higher in males; it is strongly associated with dementia, fecal incontinence, and inability to walk and transfer independently.

### **Risk Factors**

Established risk factors for UI include sex, age, genetics, obesity, medications, and cognitive and functional impairment. Other possible risk factors that have been investigated include race, fetal and obstetric factors, menopause, hormone therapy, hysterectomy, smoking, and family history.

### **Sex**

Urinary incontinence is far more common among women than men. Studies show that the female-to-male ratio is about 2:1.

### **Pregnancy and Childbirth**

Pregnancy and childbirth can increase the later risk for urinary incontinence. The risk is highest with the first child, and there is an increased risk in women who have their first child over age 30. Vaginal birth can cause pelvic prolapse, a condition in which pelvic muscles weaken and the pelvic organs (bladder, uterus) slip into the vaginal canal. Pelvic prolapse, and the surgery used to correct it, can cause incontinence. However, it is not clear if cesarean delivery helps prevent urinary incontinence. Similarly, evidence is inconclusive as to whether episiotomy prevents urinary incontinence.

### **Smoking**

Studies have reported a higher risk for incontinence, notably mixed incontinence, in women who are current or former heavy smokers (more than a pack a day).

### **Obesity**

Being overweight is a major risk factor for all types of incontinence. The more a person weighs, the greater their risk for UI.

### **Medical Factors**

Urge incontinence is more common among postmenopausal women who have a history of:

- Diabetes
- Hysterectomy
- Two or more urinary tract infections within the past year

### **Age**

The prevalence of UI increases with age. (However, UI should not be considered a normal part of the aging process.) Overall, the multifactorial elements of aging, including modified pharmacokinetics and associated physical comorbidities, may convert a continent patient to an incontinent one.

### **Genetics**

Abnormal connective tissues are found in those with female pelvic floor disorders, but determining whether this is a cause or an effect is complicated by the multifactorial origin of pelvic floor disorders, including but not limited to age, parity, vaginal delivery, menopause, obesity, and smoking. Despite the importance of environmental factors, they do not account for all individual differences in susceptibility to stress UI and other pelvic floor disorders; genetic differences also play a role.

Epidemiologic evidence, including racial differences in prevalence and evidence from twin studies, supports a genetic role in urinary incontinence. Case-control

studies show a higher prevalence of stress UI among first-degree relatives of women who also have the condition. These genetic associations may be due at least in part to connective tissue differences; women with genetic connective tissue disorders, such as Marfan syndrome and Ehlers-Danlos syndrome, have higher than-expected rates of stress UI.

Genetic differences therefore determine in part the variations in: (1) growth and development of the pelvic floor, (2) response to cyclic reproductive hormonal fluctuations throughout life, (3) response to aging, and (4) wound repair and tissue regeneration.

### **Childbirth Injury**

Vaginal childbirth—particularly with a long second stage of labor, a large infant, or increased parity—is a known risk factor for stress UI.

Both muscle injury and nerve injury occur during childbirth; this dual injury may contribute to the prolonged impairment of bladder function sometimes seen in postpartum women.

Pudendal nerve regeneration after vaginal delivery may be impeded by injury to the associated innervated muscles, such as external urethral sphincter, during vaginal delivery. Evidence from animal experiments, including both neurophysiological testing and neuroanatomical evidence, support the hypothesis that nerve regeneration or restoration of nerve function occurs more slowly after a dual injury to both the pudendal nerve and the external urethral sphincter than after either type of injury alone. Clinical evidence suggests that pudendal nerve function remains diminished years after vaginal delivery and that diminution of function is associated with the clinical development of stress UI. Insufficient regeneration after injury, in combination with other effects of aging, may be sufficient in the development of stress UI symptoms over time.

### **Prostate Surgery**

Transurethral resection of the prostate (TURP) is associated with a fairly low incidence of UI (approximately 1%). However, radical prostatectomy carries a much higher risk of UI, with prevalences based on patient self-report ranging from 8% to 56% at 1 year following surgery.

### **Iatrogenic Causes**

Drugs can contribute to urinary incontinence. Any drug that depresses cognitive function and sensation can contribute to functional incontinence. Agents which depress bladder contractility or increase outlet resistance may cause or worsen urinary retention and consequent overflow incontinence. Agents which promote an increase in bladder tone or contractility can effectively decrease the volume threshold for detrusor overactivity, seemingly worsening urge incontinence. The functional bladder capacity at which detrusor overactivity occurs can also be reduced by increasing the residual urine volume. Rapidly acting diuretics may



aggravate urge incontinence by increasing the rate of bladder filling and the frequency and intensity of afferent stimulation. Finally, any therapy which decreases outlet resistance can cause or aggravate stress incontinence.

### **Agents Associated with Urinary Incontinence**

- Alpha-adrenergic antagonists
- Skeletal muscle relaxants
- ACE inhibitors
- Estrogen
- Antipsychotic agents
- Parasympathomimetic agents
- Cholinesterase antagonists
- Diuretics (short acting)
- Agents causing constipation
- Calcium channel blockers
- Antimuscarinic agents
- Alpha-adrenergic agonists
- Opioid analgesics
- Psychotropic drugs (sedatives, hypnotics)

### **Anatomy and Physiology**

Normal urination is a complex and dynamic process involving several anatomic structures and the coordination of numerous physiologic processes.

Maintaining continence depends on the normal physiologic function of the lower genitourinary tract, normal innervation and neurologic control over genitourinary function, mental awareness of the need to void, and the mental and physical capacities to reach a toilet or toilet substitute at the appropriate time. Thus, disorders of the genitourinary tract, neurologic disorders, psychological disturbances, and limitations in mobility or environmental factors (e. g., physical restraints or drugs) can all contribute to the development and persistence of incontinence.

The normal function of the lower genitourinary tract includes two basic processes: the storage of urine and its emptying.

In order to store urine, the bladder must accommodate increasing volumes of fluid under low pressure (i. e., it must be compliant). The sensation of bladder fullness must be perceived at an appropriate time, the bladder must have an adequate capacity (normally 300 to 600 ml, or about 1 pint), and the bladder must not contract involuntarily.

In order to empty urine, the bladder must have the capability to contract voluntarily. There must be a coordinated lowering of resistance in the bladder

outlet as the bladder contracts, and there can be no anatomic obstruction to urine flow.

Any condition that impairs these normal functions of the lower genitourinary tract can cause incontinence.

### **Classification of Urinary Incontinence**

#### **Urge Incontinence / Overactive Bladder (OAB)**

Urge incontinence describes incontinence associated with a sudden urge to void. This urge is not the typical sense that one has of a need to void but is a pathologic sense of an extreme need to void which is difficult to ignore. Typically, patients describe a sudden urge to urinate but before they can get to the toilet urine starts to leak out. Often the entire bladder may empty leading to a large volume of urine loss.

Overactivity of the bladder during filling or storage can be expressed as phasic involuntary contractions (known as detrusor overactivity), as low compliance, or as a combination. Detrusor overactivity (DO) is most commonly seen in association with neurologic disease or injury; however, it may be associated with increased afferent input due to inflammation or irritation of the bladder or urethral wall, bladder outlet obstruction, stress urinary incontinence (perhaps due to sudden entry of urine into the proximal urethra), aging (probably related to neural degeneration), or may be idiopathic.

Some hypothesize that decreased stimulation from the pelvic floor can contribute to phasic overactivity. Decreased compliance during filling or storage may be secondary to neurologic injury or disease, usually at a sacral or infrasacral level, but may result from any process that destroys the viscoelastic or elastic properties of the bladder wall.

Some patients with urge incontinence may have triggers that lead to it. Many will complain of urge incontinence after washing their hands or hearing running water (as when washing dishes or hearing someone else taking a shower), after feeling a chill, or when they get close to their home and are fumbling for the keys to get in the house.

Any condition that causes local irritation in the lower genitourinary tract, such as chronic inflammation of the bladder or urethra, stones, tumors, or diverticula of the bladder, can precipitate urge incontinence. Correcting the condition will often cure the incontinence.

Urge incontinence can also be caused by a variety of genitourinary and neurologic disorders. This type of incontinence is often (but not always) associated with an unstable bladder (in the past referred to by many names,

including uninhibited neurogenic bladder, detrusor hyperreflexia, and detrusor instability).

Neurologic disorders that impair central nervous system and spinal-cord control over bladder contraction can also cause urge incontinence. Involuntary bladder contractions can occur because of damage to the nerves of the bladder, to the nervous system, or to the muscles themselves. Multiple sclerosis, Parkinson's disease, Alzheimer's Disease, stroke, and injury--including injury that occurs during surgery--can all harm bladder nerves or muscles.

The pathophysiology of urge incontinence is multifactorial, involving a decreased capacity to handle afferent information, decreased suprapontine inhibition, increased afferent and myogenic activity, and increased sensitivity to contraction-mediating transmitters and mediators.

Afferent activity signals through two pathways: (1) the myogenic pathway, in which smooth muscle distension creates the signal, and (2) the mucosal pathway, which involves urothelial and suburothelial structures. The myogenic pathway signals through small contractions of the smooth muscle, which can generate a signal through the C5 fibers and perhaps also A-delta fibers. Initiation of the micturition reflex occurs when the bladder is distended and is mediated by A-delta fibers.

Distension also initiates events in the urothelium or mucosa, such as release of transmitters that act on interstitial cells and afferent nerves. The urothelium, suburothelium, interstitial cells, and afferent nerves constitute a signaling unit. The sympathetic storage reflex (pelvic to hypogastric reflex) is initiated as the bladder distends, and the afferent activity generated travels through the pelvic nerves to the spinal cord. The somatic storage reflex (pelvic-to-pudendal reflex or guarding reflex) is initiated by sudden increases in bladder pressure (e.g., cough, laugh, or sneeze), and the afferent activity travels through the pelvic nerves.

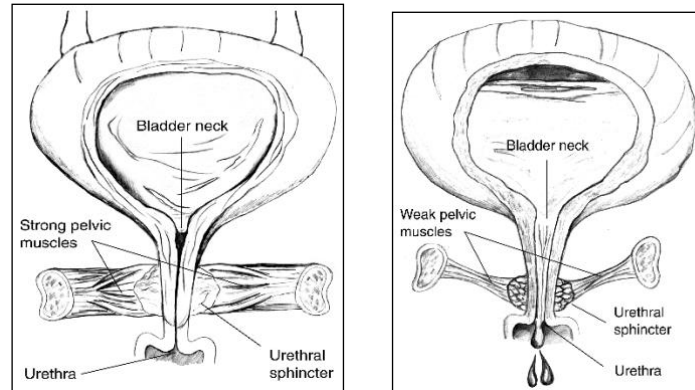
Information travels through the spinal cord to specific structures in the brain, including the periaqueductal gray (PAG), which receive afferents from the bladder; the insula, which maps sensation; the anterior cingulate gyrus (ACG), a site for emotional/autonomic motor controls; and the prefrontal cortex (PFC), which is involved in voluntary control. The pontine micturition center (PMC) connects with the PAG. The PMC has two components (micturition and storage) that can be functionally separated. Afferent signals from the bladder go first to the PAG, are processed in the ACG, go through the thalamus and hypothalamus, and then to the PMC. If PMC activity is uncontrolled, urge UI results.

### **Stress Incontinence / Outlet Underactivity**

Stress incontinence implies leakage of small, and sometimes large, amounts of urine with increases in intra-abdominal pressure, such as would occur with

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exercise, straining, coughing, laughing, or sneezing. This type of incontinence usually occurs in women, especially those who have had multiple vaginal deliveries or pelvic surgery. It is generally related to weakened musculature of the pelvic floor and subsequent loss of resistance in the bladder outlet.



Decreased outlet resistance may result from any process that damages the innervation or structural elements of the smooth and/or striated sphincter or support of the bladder outlet in the female. This may occur with neurologic disease or injury, surgical or other mechanical trauma, or aging. Classically, sphincteric incontinence in the female was categorized into relatively discrete entities: (1) so-called genuine stress incontinence (GSI) and (2) intrinsic sphincter deficiency (ISD), originally described as “type III stress incontinence.”

GSI in the female was described as associated with hypermobility of the bladder outlet because of poor pelvic support and with an outlet that was competent at rest but lost its competence only during increases in intra-abdominal pressure. ISD described a nonfunctional or very poorly functional bladder neck and proximal urethra at rest.

Stress or effort-related UI is a symptom that arises primarily from damage to muscles and/or nerves and/or connective tissue within the pelvic floor. The urethra is normally supported by the action of the levator ani muscles through their connection to the endopelvic fascia of the anterior vaginal wall. Damage to this connection, or to the nerve supply, or direct muscle damage can, therefore, influence continence. Bladder neck function is likewise important, and loss of normal bladder neck closure can result in UI despite normal urethral support.

The “hammock hypothesis” of John DeLancey proposes that for stress incontinence to occur with hypermobility there must be a lack of stability of the suburethral supportive layer: the effect of abdominal pressure increases on the normal bladder outlet, if the suburethral supportive layer is firm, is to compress the urethra rapidly and effectively. If the supportive suburethral layer is lax and/or movable, compression is not as effective. Intrinsic sphincter dysfunction denotes an intrinsic malfunction of the urethral sphincter mechanism itself. In its most

overt form, it is characterized by a bladder neck and proximal urethra which are open at rest and is usually the result of prior surgery, trauma with scarring, or a neurologic lesion.

### **Overflow Incontinence**

Sometimes people find that they cannot stop their bladders from constantly dribbling, or continuing to dribble for some time after they have passed urine. It is as if their bladders were like a constantly overflowing pan - hence the general name overflow incontinence. Overflow incontinence occurs when the patient's bladder is always full so that it frequently leaks urine.

Overflow incontinence is caused by anatomic obstruction to bladder emptying and/or inability of the bladder to contract, with subsequent leakage of small amounts of urine. Most common in older men when benign prostatic hyperplasia anatomically obstructs urine flow, it can also be related to diabetic neuropathic bladders (which contract poorly), spinal cord injuries (which impair the innervation that causes bladder contraction), and a variety of drugs that impair bladder contraction.

This type of incontinence usually requires either the surgical removal of the anatomic obstruction or chronic or intermittent catheter drainage to prevent recurrent urinary tract infections and renal failure, both of which can result from chronic urinary retention.

Overflow incontinence is rare in women, although sometimes it is caused by fibroid or ovarian tumors. Spinal cord injuries or nervous system disorders are additional causes of overflow incontinence. Also overflow incontinence in women can be from increased outlet resistance from advanced vaginal prolapse causing a "kink" in the urethra or after an anti-incontinence procedure which has overcorrected the problem.

### **Functional Incontinence**

Functional incontinence occurs when a person does not recognize the need to go to the toilet, recognize where the toilet is, or because of disability or other limiting factors is unable to get to the toilet in time. The urine loss may be large. Causes of functional incontinence include confusion, dementia, poor eyesight, poor mobility, poor dexterity, unwillingness to toilet because of depression, anxiety or anger, or being in a situation in which one is unable to reach a toilet.

Functional incontinence can also be related to a variety of iatrogenic factors such as environmental barriers, inaccessible toilets and caregivers, and psychotropic medication.

People with functional incontinence may have problems thinking, moving, or communicating that prevent them from reaching a toilet. A person with Alzheimer's Disease, for example, may not think well enough to plan a timely trip

to a restroom. A person in a wheelchair may be blocked from getting to a toilet in time. Conditions such as these are often associated with age and account for much of the incontinence of elderly women and men in nursing homes.

### **Other types of incontinence**

Stress and urge incontinence often occur together in women. Combinations of incontinence - and this combination in particular - are sometimes referred to as "mixed incontinence."

"Transient incontinence" is a temporary version of incontinence. It can be triggered by medications, urinary tract infections, mental impairment, restricted mobility, and stool impaction (severe constipation), which can push against the urinary tract and obstruct outflow. Incontinence can often occur while trying to concentrate on a task and avoiding using the toilet.

### **Assessment**

Clinical assessment of urinary incontinence should seek to identify relevant predisposing and precipitating factors and other diagnoses that may require referral for additional investigation and treatment.

A comprehensive continence assessment should consider all of the following:

- Prior history of urinary incontinence, including onset, duration and characteristics, precipitants of urinary incontinence, associated symptoms (e.g., dysuria, polyuria, hesitancy) and previous treatment and/or management, including the response to the interventions and the occurrence of persistent or recurrent UTI.
- Voiding Diary (see Appendix A). To document the frequency and severity of urinary incontinence and the circumstances under which urine leakage occurs, it is recommended that patients complete voiding diaries. Voiding diaries document the daily chronological record of fluid intake, incontinence episodes with associated activity and perceived level of urgency, severity of each incontinence episode (i.e., estimated volume of leakage), pad usage, and normal voiding episodes with measured volume.
- Medication review, particularly those that might affect continence, such as medications with anticholinergic properties (may cause urinary retention and possible overflow incontinence), sedative/hypnotics (may cause sedation leading to functional incontinence), diuretics (may cause urgency, frequency, overflow incontinence), narcotics, alpha-adrenergic agonists (may cause urinary retention in men) or antagonists (may cause stress incontinence in women) calcium channel blockers (may cause urinary retention).

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- Patterns of fluid intake, such as amounts, time of day, alterations and potential complications, such as decreased or increased urine output.
- Use of urinary tract stimulants or irritants (e.g., frequent caffeine intake).
- Pelvic and rectal examination to identify physical features that may directly affect urinary incontinence, such as prolapsed uterus or bladder, prostate enlargement, significant constipation or fecal impaction, use of a urinary catheter, atrophic vaginitis, distended bladder, or bladder spasms.
- Functional and cognitive capabilities that could enhance urinary continence and limitations that could adversely affect continence, such as impaired cognitive function or dementia, impaired immobility, decreased manual dexterity, the need for task segmentation, decreased upper and lower extremity muscle strength, decreased vision, pain with movement.
- Type and frequency of physical assistance necessary for the individual to access the toilet, commode, urinal, etc. and the types of prompting needed to encourage urination.
- Pertinent diagnoses such as congestive heart failure, stroke, diabetes mellitus, obesity, and neurological disorders (e.g., Multiple Sclerosis, Parkinson's Disease or tumors that could affect the urinary tract or its function).
- Identification of and/or potential of developing complications such as skin irritation or breakdown.
- Tests or studies indicated to identify the type(s) of urinary incontinence (e.g., post-void residual(s) for patients who have, or are at risk of, urinary retention, results of any urine culture if the resident has clinically significant systemic or urinary symptoms), or evaluations assessing the resident's readiness for bladder rehabilitation programs.
- Environmental factors and assistive devices that may restrict or facilitate an individual's ability to access the toilet (e.g., grab bars, raised or low toilet seats, inadequate lighting, distance to toilet or bedside commodes, availability of urinals, use of bed rails or restraints, or fear of falling).

### Assessment Tools

The following incontinence-specific scales may be useful when therapies are being evaluated:

### **The Cleveland Clinic Incontinence Score**

The Cleveland Clinic Incontinence Score is widely used because it is practical and easy to use and interpret. The score takes into account the frequency of incontinence and the use of pads and lifestyle alteration.

### **International Consultation on Incontinence Questionnaire (ICIQ)**

The ICIQ provides a robust measure to assess the impact of symptoms of incontinence on quality of life and outcome of treatment. This questionnaire is also of use to general practitioners and clinicians in both primary and secondary care institutions to screen for incontinence, to obtain a brief yet comprehensive summary of the level, impact and perceived cause of symptoms of incontinence and to facilitate patient-clinician discussions.

### **Bristol Female Lower Urinary Tract Symptoms Questionnaire (BFLUTS)**

A questionnaire that is sensitive to changes in the symptomatology of the female lower urinary tract, particularly urinary incontinence. It is an instrument that can characterize symptom severity, impact on quality of life and evaluate treatment outcome.

### **I-QOL**

The I-QOL is a 22-item quality of life instrument specific to persons with stress and mixed types of urinary incontinence. The I-QOL is an appropriate tool for assessing the effects of treatment, treatment decision-making among providers and patients, and for conducting cross-cultural comparisons measuring the impacts of urinary incontinence.

### **Urogenital Distress Inventory (UDI)**

This questionnaire was developed in the U.S. with women to assess the degree to which symptoms associated with incontinence are troubling. It contains 19 lower urinary tract symptoms and has been shown to have high levels of validity, reliability, and responsiveness.

### **Incontinence Impact Questionnaire (IIQ)**

This questionnaire was developed to assess the psychosocial impact of urinary incontinence in women and consists of 30 items.

## **Treatment**

The treatment of urinary incontinence includes many different strategies that can be separated into the following categories:

- Surgical Therapies
- Lifestyle Interventions
- Physical Therapies
- Behavioral Therapies
- Drug Therapies

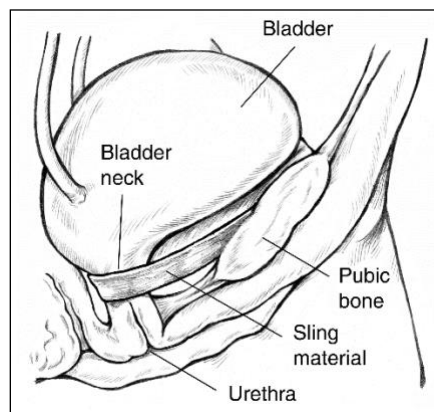


- Neuromodulations
- Non-Therapeutic Interventions

## Surgical Therapies for Women

### Slings

The procedure of choice for stress urinary incontinence in females is what is called a sling procedure. A sling in the shape of a narrow ribbon (made of a synthetic mesh material, a biomaterial, or the patients' own tissue) is placed under the urethra through one vaginal incision and two small abdominal incisions. The idea is to replace the deficient pelvic floor muscles and provide a "backboard" or "hammock" of support under the urethra.



According to published peer-reviewed studies, these slings are approximately 85% effective. There is a great variety of slings that have been marketed in the U.S. Three of the most common are the Tension-free Transvaginal Tape, The Trans-Obturator Tape, and the Minislings. Currently there is minimal long term data to show better success with one variety of sling over the others. The decision in regards to what brand or type of sling to utilize is based primarily with an individual surgeon's experience, patient preference and comorbidities such as prior abdominal surgery or previous anti-incontinence surgery.

#### ***Tension-free transvaginal (TVT) sling***

The tension-free transvaginal (TVT) sling procedure treats urinary stress incontinence by positioning a polypropylene mesh tape underneath the urethra. The 20-minute outpatient procedure involves two miniature incisions and has an 86–95% cure rate. Complications, such as bladder perforation, can occur in the retropubic space if the procedure is not done correctly. However, recent advancements have proven that the minimally invasive tvt sling procedure is regarded as a common treatment for SUI. There are many other complications associated with the Tension Free Transvaginal (TVT) Sling including mesh erosion from day 1 up to 7 years later.

#### ***Transobturator tape (TOT) sling***

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First developed in Europe and later introduced to the U.S. by Dr. John R. Miklos, the transobturator tape (TOT) sling procedure is meant to eliminate stress urinary incontinence by providing support under the urethra. The minimally-invasive procedure eliminates retropubic needle passage and involves inserting a mesh tape under the urethra through three small incisions in the groin area.

### ***Mini-sling procedure***

The mini-sling procedure was released in the United States in late 2006 by Gynecare/Johnson and Johnson under the name of TVT-Secure. AMS have released a similar version called MiniArc. The TVT-SECUR was designed to overcome two of the perioperative complications reported with use of TVT-Obturator: thigh pain and bladder outlet obstruction. The TVT-SECUR was designed to minimize the operative procedure as much as possible in order to reduce those undesired complications. This new device is composed of an 8 cm long laser cut polypropylene mesh and is introduced to the internal obturator muscle (Hammock position) by a metallic inserter, while no exit skin cuts are needed. The MiniArc is also quite simple and again eliminates the need for skin incisions other than the vaginal incision.

### ***Autologous Pubovaginal Slings***

The primary procedure performed using autologous tissue is the pubovaginal sling (PVS).

Compared with synthetic implants, use of autologous tissue generally results in fewer complications. Initial PVS procedures resulted in high rates of obstruction, erosion, infection, and retention. However, in the late 1970s and early 1980s, the procedure was improved and simplified, and surgeons realized the importance of ensuring low tension on the sling to avoid complications. PVS became the “gold standard” treatment for complex incontinence, particularly for patients for whom previous procedures had failed. It also became apparent that PVS was preferable to other procedures for incontinence, including the Burch procedure and various types of needle suspension. By the late 1990s, PVS also was used for patients with simpler forms of incontinence. One study of 251 patients found that stress UI resolved in 73 percent of patients; unexpected urinary retention occurred in only four patients. Stress UI did not recur in any of the patients in which it initially resolved. This procedure has been refined further to use smaller lengths of fascia (“sling on a string”), avoiding long, painful incisions in the leg to harvest the fascia.

The primary complications arising from the PVS procedure are obstruction, urinary retention, *de novo* urge UI, presumptively due to excess sling tension. Other complications are associated with the harvesting site, which increases operative time and may be associated with incisional hernias, wound infections, hematomas, and increased post-operative discomfort.

Muscle relaxants, intra-operative positioning of the patient and autologous fascia contraction over time affect sling tension, such that the determination of sling tension can be difficult to ascertain. However, unique advantages of autologous PVS include low rates of both early and late failures, the virtual absence of erosions, and extrusions making it ideally suited for the complex patient requiring adjunctive tissue for urethral reconstruction.

### **Bladder Repositioning**

Most stress incontinence in women results from the urethra dropping down toward the vagina. Therefore, common surgery for stress incontinence involves pulling the urethra up to a more normal position. Working through an incision in the vagina or abdomen, the surgeon raises the urethra and secures it with a string attached to muscle, ligament, or bone. For severe cases of stress incontinence, the surgeon may secure the urethra with a wide sling. This not only holds up the bladder but also compresses the bottom of the bladder and the top of the urethra, further preventing leakage.

### **Peri/Trans Urethral Bulking Injections**

Urethral bulking agents are substances that are injected by the periurethral or transurethral route as a treatment for stress urinary incontinence. Improvement in stress urinary incontinence is achieved by increasing the tissue bulk around the urethra and thereby increasing resistance to the outflow of urine. This is most effective in patients with a relatively fixed urethra.

There are several types of periurethral and transurethral bulking agents. Types include: cross-linked collagen (e.g., Contigen®, Bard®), carbon-coated spheres (e.g., Durasphere™), and periurethral polytetrafluoroethylene (e.g., Teflon®), and copolymer (e.g., Uryx®, Tegress™). Blood and fat have been used with limited success. The main downfall is the need to repeat the procedure over time.

### **Surgical Therapies for Men**

#### **Overflow Incontinence**

The most common cause of incontinence in men is benign prostatic hypertrophy (BPH). The growing prostate effectively compresses the urethra and causes overflow incontinence.

Several surgical procedures have been developed to address this common problem:

**Transurethral surgery.** In this type of surgery, no external incision is needed. After giving anesthesia, the surgeon reaches the prostate by inserting an instrument through the urethra.

A procedure called transurethral resection of the prostate (TURP) is used for 90 percent of all prostate surgeries done for BPH. With TURP, a resectoscope is inserted through the penis. The resectoscope, which is about 12 inches long and 1/2 inch in diameter, contains a light, valves for controlling irrigating fluid, and an electrical loop that cuts tissue and seals blood vessels. During the 90-minute operation, the surgeon uses the resectoscope's wire loop to remove the obstructing tissue one piece at a time. The pieces of tissue are carried by the fluid into the bladder and then flushed out at the end of the operation.

Most doctors suggest using TURP whenever possible. Transurethral procedures are less traumatic than open forms of surgery and require a shorter recovery period. One possible side effect of TURP is retrograde, or backward, ejaculation.

Another surgical procedure is called transurethral incision of the prostate (TUIP). Instead of removing tissue, as with TURP, this procedure widens the urethra by making a few small cuts in the bladder neck, where the urethra joins the bladder, and in the prostate gland itself. Although some people believe that TUIP gives the same relief as TURP with less risk of side effects such as retrograde ejaculation, its advantages and long-term side effects have not been clearly established.

**Open surgery.** In the few cases when a transurethral procedure cannot be used, open surgery, which requires an external incision, may be used. Open surgery is often done when the gland is greatly enlarged, when there are complicating factors, or when the bladder has been damaged and needs to be repaired. The location of the enlargement within the gland and the patient's general health help the surgeon decide which of the three open procedures to use. With all the open procedures, anesthesia is given and an incision is made. Once the surgeon reaches the prostate capsule, he or she scoops out the enlarged tissue from inside the gland.

**Laser surgery.** The FDA has approved a surgical procedure that employs side-firing laser fibers and Nd: YAG lasers to vaporize obstructing prostate tissue. The doctor passes the laser fiber through the urethra into the prostate using a cystoscope and then delivers several bursts of energy lasting 30 to 60 seconds. The laser energy destroys prostate tissue and causes shrinkage. As with TURP, laser surgery requires anesthesia and a hospital stay. One advantage of laser surgery over TURP is that laser surgery causes little blood loss. Laser surgery also allows for a quicker recovery time. But laser surgery may not be effective on larger prostates. The long-term effectiveness of laser surgery is not known.

**Photoselective vaporization of the prostate (PVP).** PVP uses a high-energy laser to destroy prostate tissue and seal the treated area.

**Interstitial laser coagulation.** Unlike other laser procedures, interstitial laser coagulation places the tip of the fiberoptic probe directly into the prostate tissue to destroy it.

**Transurethral microwave.** This procedure uses a device that delivers microwaves to heat and destroy excess prostate tissue. In the procedure called transurethral microwave thermotherapy (TUMT), the device sends computer-regulated microwaves through a catheter to heat selected portions of the prostate to at least 111 degrees Fahrenheit. A cooling system protects the urinary tract during the procedure.

The procedure takes about 1 hour and can be performed on an outpatient basis without general anesthesia. TUMT has not been reported to lead to erectile dysfunction or incontinence.

Although microwave therapy does not cure BPH, it reduces urinary frequency, urgency, straining, and intermittent flow. It does not correct the problem of incomplete emptying of the bladder. Ongoing research will determine any long-term effects of microwave therapy and who might benefit most from this therapy.

**Transurethral needle ablation (TUNA).** This is a minimally invasive system for the treatment of BPH. The TUNA system delivers low-level radiofrequency energy through twin needles to burn away a well-defined region of the enlarged prostate. Shields protect the urethra from heat damage. The TUNA system improves urine flow and relieves symptoms with fewer side effects when compared with transurethral resection of the prostate (TURP). No incontinence or impotence has been observed.

**Water-induced thermotherapy.** This therapy uses heated water to destroy excess tissue in the prostate. A catheter containing multiple shafts is positioned in the urethra so that a treatment balloon rests in the middle of the prostate. A computer controls the temperature of the water, which flows into the balloon and heats the surrounding prostate tissue. The system focuses the heat in a precise region of the prostate. Surrounding tissues in the urethra and bladder are protected. Destroyed tissue either escapes with urine through the urethra or is reabsorbed by the body.

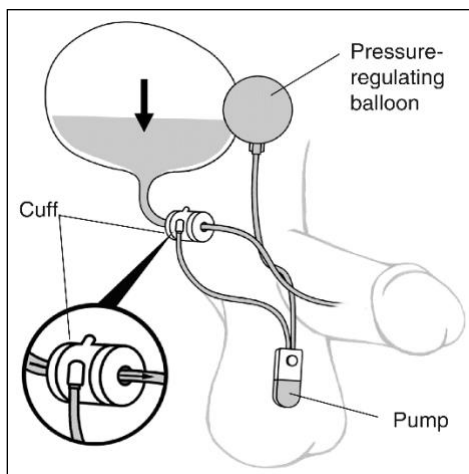
**High-intensity focused ultrasound.** The use of ultrasound waves to destroy prostate tissue is still undergoing clinical trials in the United States. The FDA has not yet approved high-intensity focused ultrasound.

### **Stress Incontinence**

Because bulking agents are no longer recommended for male stress UI, Artificial Urinary Sphincters (AUS) and slings are the predominant treatments for this condition. Significant intra-operative complications are rare and not significant if recognized and treated appropriately. Early postoperative complications include

urinary retention if the cuff is placed too tightly, swelling and hematoma, pain and paresthesia (most common in bone-anchored slings), infection, and early erosion. Of note, infection is unusual, occurring more commonly in immune-compromised or diabetic patients and early erosions usually occur because of an unrecognized urethral injury. Secondary urethral injury from atrophy or erosion is somewhat more common. The incidence of urethral atrophy will increase over time, and mechanical failure of the AUS, while rare, may occur.

**Artificial Urinary Sphincter (AUS).** Artificial genitor-urinary sphincters (AUS) traditionally were placed using perineal and suprapubic incisions, but a transscrotal approach was popularized in 2003. This greatly simplified surgery, although cuff placement may not be as accurate.



Although there is a significant amount of research on AUS outcomes, many studies rely on patient-reported outcomes; thus, definitions of success vary widely. Most studies did find significant reductions in pad use by men who were treated with an AUS. QOL scores also improved for most patients. Risks associated with AUS include device malfunction (6 - 25%), erosion (4 - 7%), infection (1 - 5.5%), and atrophy (0 - 10%). Between 19 and 30 percent of men required a repeat procedure. The rates of these complications varied due to different definitions and outcome parameters, variations in surgeons and surgical technique, and the length of follow-up.

Good candidates for AUS include men with PPI both with and without radiation, men who have undergone salvage prostatectomy, and men who have undergone a transurethral resection of the prostate. Incontinence in appropriate candidates for AUS can range from mild to severe, although the procedure typically is reserved for men with moderate to severe incontinence. Previous AUS failure or complications are not contraindications for a subsequent AUS; tandem or alternative cuff placement can be used in these patients. Poor candidates for AUS include men with poor bladder storage parameters, poor dexterity, poor mental aptitude, nonstable bladder neck contracture, or unrealistic expectations

Although the AUS is the “gold standard” of treatment for men with stress UI, not all men are interested in mechanical devices and an AUS may not be appropriate for a man with minimal but bothersome incontinence.

**Slings.** Sling procedures for men have become popular for a number of reasons, despite a lack of clinical trial data. They are comparable in efficacy to AUS and the surgery is easier to perform. Many patients also wish to avoid a mechanical device. Slings are most useful for treatment of men with mild to moderate stress UI, or for men with uncontrolled stricture disease. Slings also are useful for men who are unwilling or unable to operate an AUS.

A sling procedure offers appropriately selected men an effective treatment with acceptable complications in the short to intermediate term, although long-term safety and efficacy are not known.

The two primary types of male slings used currently are the bone-anchored perineal sling and the transobturator sling. The bone-anchored perineal sling provides direct compression of the urethra against the pubic bone using synthetic materials. Determining the success of sling procedures, again, is difficult because no definition of success has been established; “cure” or “dry” rates are too high an expectation. Thus, reported success rates range from 40 to 92 percent depending on the definition of success, length of followup, and patient selection.

The transobturator sling avoids bone anchor and thus should be less painful, but outcome data are minimal.

## **Therapeutic Exercise**

### **Pelvic Floor Muscle Training**

Pelvic floor muscle training (PFMT), also known as Kegel exercises, can improve the muscle control, timing of superficial and deep layer contractions, and the pelvic floor strength. Further, strengthening the pelvic floor muscles improves quality of life by improving incontinence, increasing support of pelvic viscera and sexual functioning.

The pelvic floor muscles are comprised of two layers of muscles. The deep layer of the pelvic floor is known as the levator ani muscle group. The superficial layer is known as the urogenital diaphragm muscles (consisting not only of the deep transverse and superficial transverse perineal muscles but also the bulbocavernosus and ischiocavernosus muscles, and the anal sphincter muscle).

The functions of the pelvic floor muscles are to squeeze around the pelvic openings and to provide an inward lift. When these two muscle group layers are not contracting simultaneously, or if the contraction is preceded by an increase in abdominal pressure, stress urinary incontinence can occur.

The focus of Pelvic Floor Muscle Training is the lifting of the levator plate, hypertrophy and increased rigidity of muscles, and closing of the levator hiatus, all leading to permanent changes and better functioning of the pelvic floor musculature.

There is good evidence to support the use of pelvic floor muscle training to treat stress urinary incontinence. Pelvic floor muscle training can improve the muscle control, timing of superficial and deep layer contractions, and the pelvic floor strength. Further, strengthening the pelvic floor muscles improves quality of life by improving incontinence, increasing support of pelvic viscera and sexual functioning.

Randomized trials have shown that Pelvic Floor Muscle Training (PFMT) can effectively treat incontinence. Exercise dose, inclusive of exercise type and intensity, repetitions, sets, frequency, volume, and duration, determines the effectiveness of PFMT. Adherence is also a key factor. Muscle training includes motor learning (search, find, learn, control)—which usually involves teaching by rehabilitation professionals—and training, which can be done by the patient alone or in groups with other patients.

**PFMT for Women** - A trial of supervised PFMT of at least 3 months' duration should be offered as first-line treatment to women with stress or mixed UI.

Recommendations for effective pelvic floor muscle strength training include specificity of contractions, performing 8 to 12 slow velocity maximum contractions (fewer repetitions better optimize strength and power), three sets performed daily, and more than 5 months of training.

Without proper instruction, many women are unable to volitionally contract these muscle groups on demand as the pelvic floor muscles are located at the floor of the pelvis and seldom used consciously. One common error is the substitutions of gluteal, hip adductor and/or abdominal muscles rather than contraction the pelvic floor muscles.

The following are a few suggested patient instructions that many therapists have found effective for facilitating proper PFMT technique in women:

- “Try to stop the flow of urine when you are sitting on the toilet. If you can do it, you are using the right muscles.”
- “Imagine that you are trying to stop passing gas. Squeeze the muscles you would use. If you sense a pulling feeling, those are the right muscles for pelvic exercises.”



## Incontinence

- “Lie down and put your finger inside your vagina. Squeeze as if you were trying to stop urine from coming out. If you feel tightness on your finger, you are squeezing the right pelvic muscle.”
- “Don’t squeeze other muscles at the same time. Be careful not to tighten your stomach, legs, or other muscles. Squeezing the wrong muscles can put more pressure on your bladder control muscles. Just squeeze the pelvic muscle.”
- “Don’t hold your breath.”

Analysis of PFMT for stress UI is complicated by the significant variation in exercise dose and training programs used in PFMT studies. Studies vary in the intensity of contractions, number of repetitions, and duration of training, and few studies assess adherence to an exercise regimen.

A randomized trial of women to either home training alone or home training plus intensive training reported significant differences in muscle strength and in outcomes with respect to curing incontinence. The home training program was fairly intense and included individual education in anatomy and physiology; vaginal palpation, observation, and strength measurement; 8 to 12 contractions three times per day, held for 6 to 8 seconds; and seven visits with a physical therapist. The intensive training program included these same activities and also a 45-minute pelvic floor muscle exercise class once per week. This study and numerous others have shown that more training results in increased effectiveness of PFMT for stress UI.

**PFMT for Men** - Although four randomized controlled trials have demonstrated that perioperative pelvic floor muscle exercises and bladder control training reduce post-prostatectomy incontinence (PPI), there are few data assessing the value of these treatments for persistent PPI.

In a study of 300 men who underwent radical prostatectomy, one group was taught pelvic floor muscle exercises during their hospital stay and provided with a home exercise program and two postoperative reinforcement visits. The other group received no formal exercise training. At 3 months, continence rates were 74 percent in the group that received treatment compared to 30 percent in the no-treatment group. By 1 year, the treatment group had a continence rate of 99 percent versus 88 percent for the untreated group (continence was defined as daily use of one “precautionary” pad or no pads). A second trial similarly randomized 102 men to perioperative pelvic floor exercise or to the control group, which received “placebo” treatment, i.e., weekly false transdermal electrical stimulation of abdominal and thigh adductor muscles. Continence rates were 88 percent in the treatment group versus 56 percent in the control group after 3 months, and 95 percent and 81 percent, respectively, after 1 year.

These results show that perioperative behavioral training can aid in recovery of bladder control and reduce the severity of incontinence following radical prostatectomy. Implementation studies are needed to determine the optimal components and timing of visits for perioperative PFMT and to develop selection criteria for patients needing more intensive programs. Efforts also are needed to encourage urologists to refer radical prostatectomy patients for perioperative training or develop the expertise in their own practices.

### **Behavioral Intervention**

Behavioral techniques include the use of bladder training, biofeedback, dietary changes, and multi-component approaches that combine bladder training with PME and/or biofeedback. Behavioral training can be administered with written materials, verbal feedback, coaching in person or on the phone, in groups, or using other strategies, such as cognitive approaches or biofeedback for increasing the potential for success. Behavioral approaches can also be combined with medications such as antimuscarinics.

Interventions involving the use of behavioral programs are among the least invasive approaches to address urinary incontinence and have no known adverse complications. Behavior programs involve efforts to modify the resident's behavior and/or environment. Critical aspects of a successful behavioral program include education of the caregiver and the resident, availability of the staff and the consistent implementation of the interventions.

It is important for the comprehensive assessment to identify the essential skills the individual must possess to be successful with specific interventions being attempted. These skills include the individual's ability to: comprehend and follow through on education and instructions; identify urinary urge sensation; learn to inhibit or control the urge to void until reaching a toilet; contract the pelvic floor muscle (Kegel exercises) to lessen urgency and/or urinary leakage; and/or respond to prompts to void.

### **Bladder Training**

Bladder training is a behavioral technique that requires the individual to resist or inhibit the sensation of urgency (the strong desire to urinate), to postpone or delay voiding, and to urinate according to a timetable rather than to the urge to void.

Bladder training was introduced in the 1960s by Jeffcoate and Francis, and modified by Frewen in the 1970s. It involves education, a strict schedule of daytime voiding with progressive increases in time between voids, urgency suppression techniques, and positive reinforcement. Frewen recommended that women be treated initially on an inpatient basis, and the training was often combined with antimuscarinic medication or sedatives to manage extreme

urgency. Inpatient bladder training is no longer standard practice, and the technique has been modified to be administered on an outpatient basis.

Bladder training incorporates patient education regarding bladder function, causes of incontinence and urge control strategies. Patients are also provided with a voiding regimen and asked to self-monitor and keep diaries to help set voiding intervals.

Reinforcement in the form of clinician support and encouragement to adhere to the training regimen is critical. Urge control strategies involve a variety of relaxation or distraction techniques, including breathing exercises and self-affirmation, by which the patient distracts themselves from the sense of urgency, permitting longer intervals between voiding. Relaxation activities help the detrusor to relax.

More recently, patients have been instructed to perform five quick, strong muscle contractions as part of urge control; there is some evidence that this aids detrusor muscle relaxation.

Bladder training is believed to work by improving the brain's ability to inhibit bladder contractions and facilitate urethral closure during bladder filling. Bladder training also improves central modulation of afferent sensory impulses, increases individual awareness, and changes behavior related to the circumstances that trigger LUT symptoms.

This program is difficult to implement in cognitively impaired individuals and may not be successful in patients who are frail, elderly, or dependent. The patient who is most appropriate for a bladder rehabilitation (retraining) program is usually fairly independent in activities of daily living, has occasional incontinence, is aware of the need to urinate (void), may wear incontinence products for episodic urine leakage, and has a goal to maintain his/her highest level of continence and decrease urine leakage.

Successful bladder retraining usually takes at least several weeks.

Some studies of bladder training found that this approach was effective for reducing UI in women older than 55 years of age. In a definitive randomized trial, older women achieved an average 57 percent reduction of incontinence episodes, with 75 percent realizing a 50 percent or greater improvement. This study included women diagnosed as having stress UI or DO (with or without stress UI); no significant differences were found in outcomes for these two groups. Bladder training also resulted in significant improvements in Quality of Life scores for these women.

Bladder training has been compared to PFMT and to a combination of bladder training plus PFMT for treatment of stress UI. Initially, the group receiving

combination therapy had better outcomes, but by 6 months after treatment there were no significant differences in outcomes among the groups. Relapse was observed at 12 weeks for the PFMT group and at 6 weeks for the bladder training groups, which might provide information on when booster interventions would be needed.

### **Prompted Voiding**

Prompted Voiding is a behavioral technique appropriate for use with dependent or more cognitively impaired individuals. Prompted voiding techniques have been shown to reduce urinary incontinence episodes up to 40% for elderly incontinent nursing home residents, regardless of their type of urinary incontinence or cognitive deficit—provided that they at least are able to say their name or reliably point to one of two objects.

Prompted voiding has three components: regular monitoring with encouragement to report continence status; prompting to toilet on a scheduled basis; and praise and positive feedback when the resident is continent and attempts to toilet.

These methods require training, motivation and continued effort by the patient and caregivers to ensure continued success. Prompted voiding focuses on teaching the person, who is incontinent, to recognize bladder fullness or the need to void, to ask for help, or to respond when prompted to toilet.

Individuals who are assessed with urge or mixed incontinence and are cognitively impaired may be candidates for prompted voiding. As the resident's cognition changes, the facility should consider other factors, such as mobility, when deciding to conduct a voiding trial to determine feasibility of an ongoing toileting program.

### **Habit Training / Scheduled Voiding**

Habit Training/Scheduled Voiding is a behavioral technique that calls for scheduled toileting at regular intervals on a planned basis to match the resident's voiding habits. Unlike bladder retraining, there is no systematic effort to encourage the patient to delay voiding and resist urges. Habit training includes timed voiding with the interval based on the resident's usual voiding schedule or pattern. Scheduled voiding is timed voiding, usually every three to four hours while awake. Residents who cannot self-toilet because of decreased cognition are candidates for habit training or scheduled voiding programs.

### **Biofeedback**

Biofeedback is a learning technique to exert better voluntary control over urine storage. Biofeedback uses visual or auditory instrumentation to give patients moment-to-moment information on how well they are controlling the sphincter, detrusor, and abdominal muscles. Biofeedback in conjunction with PFMT targets skeletal muscles that are under voluntary control. Some patients have difficulty identifying, controlling, and coordinating the function of pelvic floor muscle group

## Incontinence

through verbal instructions or are uncomfortable with digital palpation. With biofeedback, these exercises are performed with simultaneous electromyographic feedback given to the patient to help facilitate awareness of the state of muscle contraction.

After such training, successful patients typically learn to perform the correct responses relatively automatically. Patients with urinary incontinence are trained to relax the detrusor and abdominal muscles and/or contract the sphincter, depending upon the form of incontinence.

When used in patients with stress and/or urge incontinence, biofeedback has been shown to result in complete control of incontinence in approximately 20-25 percent of patients and to provide important improvement in another 30 percent. There are two caveats: the degree of improvement is variable, and long-term followup data are not available. It is important to recognize that biofeedback requires sophisticated equipment and training.

### **Pessaries**

A pessary is a small plastic or silicone medical device which is inserted into the vagina or rectum and held in place by the pelvic floor musculature. The device pushes up against the wall of the vagina and the urethra. This helps reposition the urethra to reduce stress leakage.

Pessaries have long been used to manage female Pelvic Organ Prolapse (POP), and are currently used for long-term and interim management, and may be useful for predicting surgical results. For example, a pessary can be placed temporarily to determine if it can resolve pelvic floor symptoms purportedly caused by prolapse. A survey of American Urogynecologic Society members found that 77 percent use pessaries as first-line therapy for prolapse whereas 12 percent reserve pessaries only for nonsurgical candidates.

Two different kinds of pessaries, space-occupying and support are used to treat POP, and the devices can vary in shape, size, and stiffness. Women with good levator ani muscle tone are candidates for support pessaries, while those with poor muscle tone are better suited to space-occupying pessaries.

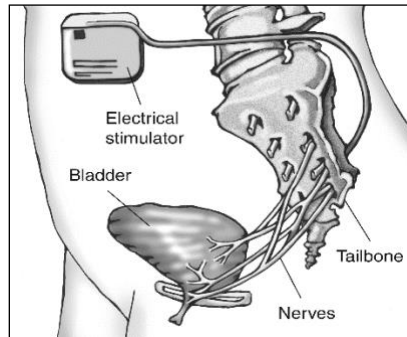
Of women successfully fitted with a pessary for POP, 34 percent to 73 percent were still using it 12 months later. Symptoms of urge incontinence and voiding difficulty improved in one-quarter to one-half of women, and prolapse and urinary scales also improved. Improvement in anatomy also was observed. Adverse events, primarily erosion, were observed in only a small number of women.

Contraindications for pessary use include an inability to care for or receive help with care for the pessary, vaginal ulcerations or lesions, severe atrophy, or recurrent vaginitis.

## Neuromodulation

### Sacral nerve stimulation (SNS)

Stimulation of the sacral nerve roots is a technique in which an electrical stimulus directly stimulates the S3 sacral nerve root.



The mechanism by which neuromodulation acts to improve symptoms is not completely understood.

The technique has evolved over time, but typically it is performed as a staged procedure. The first stage involves a “test” stimulation using a percutaneous needle to stimulate the S3 nerve root. If there is a favorable response during the trial period, then long-term stimulation can be provided by implanting an implantable pulse generator surgically. The implantable pulse generator is usually placed in the fatty tissues overlying the buttocks, although abdominal placement was used with some of the earlier studies.

Sacral nerve stimulation (SNS) has been approved for treatment of urinary urgency and frequency, urge incontinence, and nonobstructive urinary retention. Improvements in surgical techniques have simplified placement of these devices. Placing a permanent lead is now relatively simple, and the settings on the device can be manipulated by the patient. Long-term, multicenter studies of sacral neuromodulator implants have found a greater than 50 percent improvement in symptoms of urgency, frequency, and incomplete bladder emptying that is maintained for at least 5 years. SNS also may be useful for treatment of FI, pelvic pain, vulvodynia, and interstitial cystitis.

### Pudendal Nerve stimulation (PNS)

Pudendal nerve stimulation (PNS) represents an alternative approach that may help relieve symptoms in those not helped by SNS. The pudendal nerve is a distal branch of sacral nerves S2, S3, and S4. PNS potentially may increase afferent stimulation through the sacral nerve roots. Animal studies show that PNS can inhibit bladder contraction in SCI cats and dogs. PNS also has been tested in humans with urgency, frequency, or urge incontinence.

First sensation of fullness increased 98 percent in these patients and maximal cystometric capacity increased 66 percent. In another trial, patients were randomized to PNS or SNS. Overall improvement in symptoms was 44 percent for SNS and 59 percent for PNS. PNS was superior to SNS for relieving pelvic pain, urgency, frequency, and improving bowel function. Stimulating at different frequencies had different effects on symptoms, which may allow targeting of PNS treatment to specific symptoms. Patients also preferred PNS to SNS.

### **Percutaneous Tibial Nerve Stimulation**

Tibial nerve stimulation also may be a way to alleviate UI symptoms and voiding dysfunctions. Percutaneous tibial nerve stimulation (PTNS) showed some success in treating OAB, but daily stimulation was needed and maintenance therapy may be necessary for sustained symptom reduction. Urodynamic studies of 90 patients with OAB found that PTNS increased bladder capacity and also increased the volume at which the first unstable detrusor contraction occurred. PTNS has been approved by the FDA, but reimbursement issues exist.

### **Neurotoxins**

Two neurotoxins are resiniferatoxin and botulinum toxin. Botulinum toxin is a neuromuscular blocking agent which prevents nerve conduction. Typically, botulinum toxin-A is used and can be injected directly into the wall of the bladder under cystoscopic guidance as a treatment for refractory OAB. It is not currently FDA approved for this indication. Concerns with this approach are the risk of urinary tract infections and urinary retention and that the ideal dosing has not yet been determined. Additionally, the effects of botulinum toxin are temporary and multiple courses of treatment would be anticipated.

Resiniferatoxin is a neurotoxin in the same category as capsaicin; these do not have FDA approval for the treatment of OAB. These agents block transmission along the C-fibers, nerve fibers involved in transmitting noxious stimuli. It has been hypothesized that inhibition of these fibers may be a treatment for overactive bladder.

## **Pharmacologic Treatments**

### **Urge Incontinence**

Pharmacologic treatments for overactive bladder include antimuscarinic agents which have differing affinities for multiple subtypes of muscarinic receptors found both in the bladder as well as throughout the body. These agents generally bind to muscarinic receptors on the bladder muscle blocking the input required for contraction of the muscle. In short, such drugs prevent or decrease the intensity of involuntary bladder contractions.

Because muscarinic receptors are present throughout the body, nonselective agents affect other processes explaining the occurrence of side effects such as dry mouth (reduced action on salivation), constipation (slowing gut contractions),

## Incontinence

dry eyes (affecting tear ducts), and altered cognition (affecting central nervous system). In an attempt to decrease the effect on other organs and improve tolerability, the development of agents purported to be more specific in targeting subtypes of muscarinic receptors found in the bladder has been undertaken.

Medication is often initiated with the lowest dose of an agent and adjusted to the desired clinical effect while minimizing adverse effects. The two most frequently prescribed pharmacologic treatments for OAB in the United States are oxybutynin and tolterodine.

List of medications used for urge incontinence:

Medication	Brand name	Dosage
Oxybutynin	Ditropan®	2.5 - 5 mg 2 - 4 times per day
Oxybutynin extended-release	DitropanXL®	5 - 30 mg once daily
Oxybutynin extended-release, transdermal patch	OXYTROL®	3.9 mg/day system applied twice weekly (every 3-4 days)
Tolterodine	Detrol®	1 - 2 mg 2 times daily
Tolterodine extended-release	Detrol LA®	2 - 4 mg once daily
Darifenacin	ENABLEX®	7.5-15mg once daily
Solifenacin	VESicare®	5-10mg once daily
Trospium chloride	Sanctura®	20mg twice daily
Trospium chloride extended-release	Sanctura XR®	60mg once daily
Fesoterodine fumarate	Toviaz™	4mg or 8mg once daily
Oxybutynin chloride, topical gel	Gelnique™	1-gram dose of 100mg applied once daily to thigh, abdomen, upper arm, or shoulder

### Stress Incontinence

Medications to treat stress incontinence are aimed at improving the action of the muscles that are holding urine in the bladder.

Stress incontinence may be treated with drugs such as:

- Pseudoephedrine
- Imipramine
- Duloxetine

Side effects of these drugs may include agitation, insomnia, or anxiety.



### **Overflow Incontinence**

The FDA has approved six drugs to relieve overflow incontinence associated with an enlarged prostate.

Finasteride (Proscar) and dutasteride (Avodart), inhibit production of the hormone DHT, which is involved with prostate enlargement. The use of either of these drugs can either prevent progression of growth of the prostate or actually shrink the prostate in some men.

The FDA also approved the drugs terazosin (Hytrin), doxazosin (Cardura), tamsulosin (Flomax), and alfuzosin (Uroxatral) for the treatment of BPH. All four drugs act by relaxing the smooth muscle of the prostate and bladder neck to improve urine flow and to reduce bladder outlet obstruction. The four drugs belong to the class known as alpha blockers. Terazosin and doxazosin were developed first to treat high blood pressure. Tamsulosin and alfuzosin were developed specifically to treat BPH.

The Medical Therapy of Prostatic Symptoms (MTOPS) Trial, supported by the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), recently found that using finasteride and doxazosin together is more effective than using either drug alone to relieve symptoms and prevent BPH progression. The two-drug regimen reduced the risk of BPH progression by 67 percent, compared with 39 percent for doxazosin alone and 34 percent for finasteride alone.

### **Non-Therapeutic Interventions**

#### **Absorbent Products**

Absorbent incontinence products include perineal pads or panty liners for slight leakage, undergarments and protective underwear for moderate to heavy leakage, guards and drip collection pouches for men, and products (called adult briefs) for moderate or heavy loss.

Absorbent products can be a useful, rational way to manage incontinence; however, every absorbent product has a saturation point. Factors contributing to the selection of the type of product to be used should include the severity of incontinence, gender, fit, and ease of use.

Advantages of using absorbent products to manage urinary incontinence include the ability to contain urine (some may wick the urine away from the skin), provide protection for clothing, and preserve the resident's dignity and comfort.

The potential disadvantages of absorbent products are the impact on the patient's dignity, cost, the association with skin breakdown and irritation, and the amount of time needed to check and change them.

## **Catheterization**

**Intermittent Catheterization** - Intermittent catheterization can often manage overflow incontinence effectively. Individuals who have new onset incontinence from a transient, hypotonic/atonic bladder (usually seen following indwelling catheterization in the hospital) may benefit from intermittent bladder catheterization until the bladder tone returns (e.g., up to approximately 7 days). A voiding trial and post void residual can help identify when bladder tone has returned.

**Indwelling Catheter** - An indwelling urinary catheter is a drainage tube that is inserted into the urinary bladder through the urethra, is left in place, and is connected to a closed collection system.

Appropriate indications for continuing use of an indwelling catheter beyond 14 days may include:

- Urinary retention that cannot be treated or corrected medically or surgically, for which alternative therapy is not feasible.
- Contamination of Stage III or IV pressure ulcer with urine which has impeded healing, despite appropriate personal care for the incontinence; and
- Terminal illness or severe impairment, which makes positioning or clothing changes uncomfortable, or which is associated with intractable pain.

An indwelling catheter may be associated with significant complications, including bacteremia, febrile episodes, bladder stones, fistula formation, erosion of the urethra, epididymitis, chronic renal inflammation and pyelonephritis. In addition, indwelling catheters are prone to blockage.

Risk factors for catheter blockage include alkaline urine, poor urine flow, proteinuria, and preexisting bladder stones. In the absence of evidence indicating blockage, catheters need not be changed routinely as long as monitoring is adequate. Based on the patient's individualized assessment, the catheter may need to be changed more or less often than every 30 days.

Some individuals with indwelling catheters experience persistent leakage around the catheter. Examples of factors that may contribute to leakage include irritation by a large balloon or by catheter materials, excessive catheter diameter, fecal impaction, and improper catheter positioning. Because leakage around the catheter is frequently caused by bladder spasm, leakage should generally not be treated by using increasingly larger catheter sizes, unless medically justified.

Current standards indicate that catheterization should be accomplished with the narrowest, softest tube that will serve the purpose of draining the bladder.

Additional care practices related to catheterization include:

## Incontinence

- Educating the person or responsible party on the risks and benefits of catheter use;
- Recognizing and assessing for complications and their causes, and maintaining a record of any catheter-related problems;
- Attempts to remove the catheter as soon as possible when no indications exist for its continuing use;
- Monitoring for excessive post void residual, after removing a catheter that was inserted for obstruction or overflow incontinence;
- Keeping the catheter anchored to prevent excessive tension on the catheter, which can lead to urethral tears or dislodging the catheter; and
- Securing the catheter to facilitate flow of urine.

Research has shown that catheterization is an important, potentially modifiable, risk factor for UTI. By day 30 of catheterization, bacteriuria is nearly universal.

The potential for complications can be reduced by:

- Identifying specific clinical indications for the use of an indwelling catheter;
- Assessing whether other treatments and services would appropriately address those conditions; and
- Assessing whether patients are at risk for other possible complications resulting from the continuing use of the catheter, such as obstruction resulting from catheter encrustation, urethral erosion, bladder spasms, hematuria, and leakage around the catheter.

**External Catheter** - External catheters (“condom” or “Texas” catheter) are most frequently used in elderly men with dementia. There is no tube placed inside the penis. Instead, a condom-like device is placed over the penis. A tube leads from this device to a drainage bag. The condom catheter must be changed every day.

## Fecal Incontinence

### Epidemiology

Fecal incontinence (FI) is usually defined as the involuntary loss of solid or liquid stool. Anal incontinence is a broader concept that includes loss of solid or liquid stool, flatus, or mucus. The two terms are sometimes used interchangeably, and some surveys have included the loss of flatus in the definition of FI.

Estimates of the prevalence of FI in community-based populations range from 0.4% to 18%. Considering those studies that used the most unbiased methods, such as anonymous, self-administered questionnaires, estimates range from 11% to 15%. Most surveys report increased prevalence of FI with age. Population-based studies of older adults report prevalences of FI ranging from

3.0% to 32%. Several studies have reported the FI is more common among women compared to men, but the literature is mixed on the issue of gender.

In nursing homes, prevalences range from 45% to 55%. This range may be explained partly by FI being one of the most common reasons for nursing home admission. FI in nursing homes has been associated with functional impairment, dementia, and sensory impairments — all factors that place a person at risk for institutionalization.

Studies of the incidence of FI in the general population are rare. One study reported a cumulative 5-year incidence of 8.5% among older adults. Most other incidence studies have been conducted in special populations, such as patients undergoing medical or surgical procedures and postpartum women. Studies of FI in the postpartum period have identified anal sphincter injury during childbirth as a major cause of FI in young healthy women.

### **Anatomy & Physiology**

Fecal continence is normally maintained by anatomical factors (i.e., pelvic barrier, rectal curvatures, and transverse rectal folds), recto-anal sensation, and rectal compliance.

The rectal segment above the middle fold is derived from the embryological hindgut, may contain feces, and is free to distend towards the peritoneal cavity.

The lower rectum situated below the middle rectal fold is derived from the cloaca, surrounded by condensed extraperitoneal tissue, and is empty except during defecation. Rectal distention by stool induces rectal contraction, the sensation of urgency, and reflex relaxation of the internal anal sphincter, prompting defecation if socially convenient. If not, rectal contractions and the sensation of urgency generally subside as the rectum accommodates to continued distention. This, together with voluntary contraction of the external anal sphincter, permits defecation to be postponed when necessary. The factors that determine whether rectal distention is interpreted as a desire to defecate or to pass flatus are unclear.

### **Pathophysiology of Fecal Incontinence**

Fecal incontinence (FI) is caused by anorectal dysfunctions and/or disordered bowel habits, resulting from a variety of conditions. FI is a multifactorial disorder. The pathophysiological mechanisms reflect the etiology of FI, and more than one pathophysiological mechanism may contribute to FI in the same patient.

### **Pelvic Barrier**

The anal sphincters and pelvic floor muscles (i.e., levator ani) comprise the pelvic barrier. The internal anal sphincter generates approximately 70% of anal resting

tone; the external anal sphincter, which is a tonically active striated muscle, provides the balance. The puborectalis is a U-shaped component of the levator ani which blends with the upper aspect of the external sphincter and maintains a relatively acute anorectal angle at rest. When continence is threatened, the external sphincter and pelvic floor can be contracted voluntarily to preserve continence. A majority of women with FI have reduced anal resting and/or squeeze pressures, reflecting weakness of the internal and/or external anal sphincters respectively.

Anal sphincter damage due to obstetric or iatrogenic injury and pudendal neuropathy are common causes of anal sphincter weakness. Endoanal ultrasound and magnetic resonance imaging (MRI) reveal anal sphincter injury, which manifests as defects, scarring, or thinning (i.e., atrophy).

External sphincter injury is associated with lower anal squeeze pressures, reflecting external sphincter dysfunction.

Pudendal neuropathy can also cause anal sphincter weakness. Neurogenic injury may result not only from a pudendal neuropathy but also from damage to nerves within the sphincter.

FI is also associated with atrophy, denervation, and impaired function of the puborectalis muscle, which is correlated with symptoms.

A subset of patients with FI have more generalized pelvic floor weakness (i.e., descending perineum syndrome), which is often associated with pelvic organ prolapse affecting the anterior and/or middle compartments. Excessive perineal descent may stretch, and thereby damage the pudendal nerve. Excessive descent may also make the anorectal angle more obtuse. This impairs the flap valve normally responsible for maintaining fecal continence during increased intra-abdominal pressure. Sphincter pressures are lower in incontinent than in continent patients with the descending perineum syndrome.

### **Rectal Perception**

Patients with FI may have normal, reduced, or increased rectal sensation. Reduced rectal sensation allows stool to enter the anal canal, and perhaps leak before the external sphincter contracts. Conversely, other patients with FI have exaggerated rectal sensation (i.e., rectal hypersensitivity). Compared to patients with normal rectal sensation, patients with urge FI and rectal hypersensitivity have more frequent stools.

The mechanisms of rectal hypersensitivity are being studied. Because rectal perception is attributable not to rectal distention per se, but to the contractile response to distention, rectal hypersensitivity in FI may be not primary, but perhaps partly secondary to an exaggerated contractile response to distention. Indeed, rectal capacity is reduced in some women with FI. Reduced capacity is

associated with rectal hypersensitivity and with the symptom of urgency. Thus, it is conceivable that either increased tone (i.e., reduced capacity or compliance), and/or an exaggerated contractile response to distention, and/or an alteration in passive properties (e.g., fibrosis) may amplify the increase in rectal tension during distention, thereby contributing to rectal hypersensitivity in FI.

### **Impaired Rectal Evacuation**

Impaired rectal evacuation with retention of feces may contribute to FI in women, in elderly patients, and in men with a hypertonic sphincter (i.e., a long, high-pressured anal sphincter entraps small particles of feces during defecation and subsequently expels them, causing perianal soiling and discomfort).

### **Iatrogenic Causes**

There are many drugs that can contribute to fecal incontinence.

#### Drugs causing diarrhea

- Antibiotics
- 5HT<sub>4</sub> agonists
- Serotonin reuptake inhibitors (SRIs)
- Protein pump inhibitors
- Magnesium-containing antacids
- Digoxin
- Laxatives
- Dietary ingredients or supplements causing diarrhea
- Excess fiber
- Lactose (in lactose intolerance)

#### Drugs causing constipation

- Anticholinergic agents
- Opiates
- Iron supplements
- Calcium channel antagonists

### **Other Factors**

In addition to normal anorectal functions and stool consistency, mental faculties and mobility are necessary to preserve continence. Clinical observations and epidemiological studies suggest that irritable bowel syndrome (IBS) is a risk factor for FI. IBS may be associated with accelerated small intestinal and/or colonic transit. Conceivably, rapid delivery of colonic contents to the rectum may predispose to FI, particularly in patients with a dysfunctional rectal reservoir. Rectal urgency was found to be the most important risk factor for FI among women in the community, being associated on average with an eightfold increased risk for FI. Taken together, these data are consistent with the concept that in FI, rectal urgency is a distinct symptom which reflects rectal overactivity

and/or rectal hypersensitivity rather than loose stools. Indeed, rectal urgency is associated not only with liquid but also with formed stools in healthy subjects.

## Diagnosis

The pathway to detect persons at risk and patients with fecal incontinence includes self-reported symptoms using questionnaires and scales, clinical history of patients seeking help, anal manometry, sensory testing, anal endosonography, magnetic resonance imaging, and colonoscopy to detect baseline causes for FI. Treatment decisions are made based on instrumental methods including ultrasound and anal manometry, but no consensus exists about which test is a “gold standard,” essential to estimate the diagnostic values of other tests.

- Anal manometry checks the tightness of the anal sphincter and its ability to respond to signals, as well as the sensitivity and function of the rectum. Magnetic resonance imaging (MRI) is sometimes used to evaluate the sphincter.
- Anorectal ultrasonography evaluates the structure of the anal sphincters.
- Proctography, also known as defecography, shows how much stool the rectum can hold, how well the rectum holds it, and how well the rectum can evacuate it.
- Proctosigmoidoscopy allows doctors to look inside the rectum and lower colon for signs of disease or other problems that can cause fecal incontinence, such as inflammation, tumors, or scar tissue.
- Anal electromyography tests for nerve damage, which is often associated with injury during childbirth.

## Assessment

The following fecal incontinence-specific scales may be useful when therapies are being evaluated:

### **Fecal Incontinence Severity Index**

The Fecal Incontinence Severity Index is based on a type-by-frequency matrix with four types of leakage (gas, mucus, liquid stool, solid stool) and five frequencies (one to three times per month, once per week, twice per week, once per day, twice or more per day).

### **Fecal Incontinence Quality of Life Scale**

This tool measures the impact of anal incontinence over 4 scales of quality of life: Lifestyle, Coping/Behavior, Depression/Self-perception, and Embarrassment. The instrument does not measure physical symptom severity.

### **Manchester Health Questionnaire**

It assesses the quality of life in 8 different domains as well as quantifies symptom severity.

### **St. Mark's Score**

This scale provides a scoring system to assess the severity of fecal incontinence. Specific areas reviewed include fecal leakage, bowel urgency, use of pads, medication, and interference with activities.

### **Treatment**

Fecal incontinence management should be implemented in a conservative graduated fashion. Dietary modification and medication should be the initial approach. Pelvic floor muscle training and biofeedback are typically the next progression; and finally, if required, surgical intervention. Treatment is dependent on a number of factors, such as symptom severity, availability of modality options, and the affected individual's ability to adhere to treatment.

### **Dietary Changes**

Food affects the consistency of stool and how quickly it passes through the digestive system. One way to help control fecal incontinence in some persons is to eat foods that add bulk to stool, decreasing the water content of the feces and making it firmer. Also, avoidance of foods and drinks such as those containing caffeine, which relax the internal anal sphincter muscle. Another approach is to eat foods low in fiber to decrease the work of the anal sphincters. Fruit can act as a natural laxative and should be eaten sparingly. Foods to be avoided also include those that typically cause diarrhea, such as cured or smoked meat; spicy foods; alcohol; dairy products; fatty and greasy foods; and artificial sweeteners.

Patients should be encouraged to keep a daily food diary to assist them in managing the quantity and quality of food intake.

### **Medications**

For people with bowel incontinence due to diarrhea, medications such as loperamide (Imodium) may be used to control the diarrhea and improve bowel incontinence.

Other antidiarrheal medications include anti-cholinergic medications (belladonna or atropine), which reduce intestinal secretions and movement of the bowel. Opium derivatives (paregoric or codeine) or diphenoxylate (lomotil), as well as loperamide (Imodium) increase intestinal tone and decrease movement of the bowel.

Other medications used to control bowel incontinence include drugs that reduce water content in the stools (activated charcoal or Kaopectate) or that absorb fluid and add bulk to the stools (Metamucil).



### **Therapeutic Exercise**

A progressive Pelvic Floor Muscle Training program focusing on the pelvic floor and sphincter muscles has been proven to significantly reduce, and sometimes even eliminate, anal incontinence. The exercises are the same as those previously discussed for the treatment of urinary incontinence. (see Urinary Incontinence - Therapeutic Exercise)

### **Biofeedback**

In treating fecal incontinence, biofeedback techniques convert the physiologic measures from an intra-anal EMG sensor, anal manometric probe (measuring intra-anal pressure) or perianal surface EMG electrodes to either visual or audio display for feedback. Recently, investigators have also used ultrasound to show patients contraction of the anal sphincter on a screen. The technique requires good clinician rapport, skill in biofeedback techniques, and knowledge of rectal and pelvic floor anatomy and physiology.

Biofeedback training for fecal incontinence focuses on improving the ability to voluntarily contract the external anal sphincter and puborectalis muscles in response to rectal filling. Specifically, biofeedback attempts to improve rectal sensory perception, strength, coordination, or some combination of these three components. Sensory training involves inducing intrarectal pressure using a balloon feedback device. A manometric balloon probe is inserted into the rectum. The balloon is filled with air to produce a sensation of rectal filling. The patient is trained to perceive the stimulation of rectal distention and to respond without delay with an immediate and forceful external anal sphincter contraction to counteract reflex inhibition (relaxation) of the internal anal sphincter.

The purpose of sensory training is to increase an awareness of the presence of fecal material in the rectum and to decrease delay in response to sensation of distention. By retraining the sensory threshold, the patient becomes able to discriminate and respond to smaller rectal volumes, thus lowering the threshold for sensing rectal distention.

In order for biofeedback to be effective, individuals must be cooperative and motivated, have some ability to sense rectal distention and be able to voluntarily contract the external anal sphincter.

### **Surgery**

Several surgical approaches are currently utilized to address fecal incontinence. They include sphincteroplasty utilizing an artificial anal sphincter, radio-frequency ablation of the anal canal tissue, implantation of a sacral nerve stimulator, and ileostomy/colostomy for intractable cases of FI.

**Artificial Anal Sphincter** – The device is intended to mimic the function of the anal sphincter. It consists of three components linked together by kink-resistant

tubing: an inflatable cuff, a manual control pump, and a pressure-regulating balloon.

During a surgical procedure, the inflatable cuff is placed around the anus. When filled with fluid, the cuff applies pressure to the anus and keeps it closed, thereby preventing passage of stool. The cuff is connected by tubing to the control pump, which is placed under the skin of the scrotum in males or labia in females. The pump in turn is connected to the balloon, which is implanted in the abdominal cavity. When a patient wishes to have a bowel movement, the bulb on the control pump is manually squeezed and released several times. This transfers fluid from the cuff to the balloon by way of the tubing, thereby deflating the cuff and allowing stool to pass. Pressure from the balloon slowly forces the fluid back into the cuff over several minutes, again closing off the anus and preventing the accidental passage of stool.

**Transanal Radiofrequency Ablation (Secca<sup>®</sup> procedure)** – This procedure is an alternative therapy for the treatment of fecal incontinence for patients who have not responded to medical therapy or have failed other surgical intervention. This radiofrequency therapy is based on Parisien and Corman's theory that "collagen deposition and subsequent scarring may increase one's ability to recognize and retain stool and permit improved continence"

The Secca procedure delivers controlled radiofrequency energy to the sphincter muscles surrounding the anal canal. The energy creates precise, submucosal burn lesions, triggering collagen contraction. The lesions are subsequently resorbed, remodeling the tissue. Takahashi proposes that "the remodeled tissue improves barrier function of the anal sphincter".

This outpatient procedure is performed in an endoscopy suite with the patient sedated; and takes approximately 60 minutes.

**Sacral Nerve Stimulation** - A neurostimulator is surgically implanted in patients who have failed or could not tolerate more conservative treatments. The system has several components: a neurostimulator which delivers an electrical pulse to the sacral nerve; an electrical lead that is implanted on a sacral nerve, and a programmer that is used to control the electrical pulse delivered by the neurostimulator. The neurostimulator and the lead are permanent implants. The programmer is a handheld device that is not implanted. The device is identical to the one used to treat urinary incontinence.

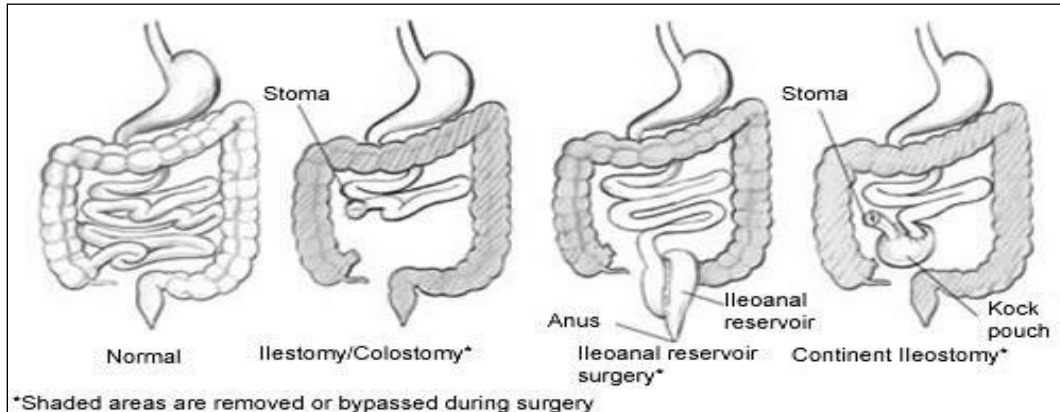
The appliance sends a small electrical stimulation to the sacral nerve that controls the anal sphincter. In order to see if the device will work, a patient first undergoes test stimulation. The lead is implanted on the sacral nerve and an external test stimulator (that is not implanted) is used to deliver the electrical pulse. Patients who may benefit from long-term implantation are first identified by a two-week trial period. The patient records the number of bowel accidents

they have. If their bowel accidents decline by at least half the number in a week, the patient may benefit from the treatment. The patient is then eligible to undergo surgical implantation of the neurostimulation system for long-term therapy.

**Bowel Diversion (Ostomy)** – Surgery is performed to divert the bowels to an opening in the abdomen where a stoma is created. A surgeon forms a stoma by rolling the bowel's end back on itself, like a shirt cuff, and stitching it to the abdominal wall. An ostomy pouch is attached to the stoma and worn outside the body to collect stool.

Several surgical options exist for bowel diversion:

- **Ileostomy** diverts the ileum to a stoma. Semisolid waste flows out of the stoma and collects in an ostomy pouch, which must be emptied several times a day. An ileostomy bypasses the colon, rectum, and anus and has the fewest complications.
- **Colostomy** is similar to an ileostomy, but the colon—not the ileum—is diverted to a stoma. As with an ileostomy, stool collects in an ostomy pouch.
- **Ileoanal reservoir surgery** is an option when the large intestine is removed but the anus remains intact and disease-free. The surgeon creates a colonlike pouch, called an ileoanal reservoir, from the last several inches of the ileum. The ileoanal reservoir is also called a pelvic pouch or J-pouch. Stool collects in the ileoanal reservoir and then exits the body through the anus during a bowel movement. People who have undergone ileoanal reservoir surgery initially have about six to 10 bowel movements a day. Two or more surgeries are usually required, including a temporary ileostomy, and an adjustment period lasting several months is needed for the newly formed ileoanal reservoir to stretch and adjust to its new function. After the adjustment period, bowel movements decrease to as few as 4 to 6 a day.
- **Continent ileostomy** is an option for people who are not good candidates for ileoanal reservoir surgery because of damage to the rectum or anus but do not want to wear an ostomy pouch. As with ileoanal reservoir surgery, the large intestine is removed and a colon-like pouch, called a Kock pouch, is made from the end of the ileum. The surgeon connects the Kock pouch to a stoma. A Kock pouch must be drained each day by inserting a tube through the stoma. An ostomy pouch is not needed and the stoma is covered by a patch when it is not in use.



### Neurologic Disorders and Incontinence

Loss of voluntary control over bowel and bladder function frequently occurs in central nervous system (CNS) disorders. CNS disorders affect bowel function in a variety of ways, depending on the location and severity of damage, often resulting in variable loss of sensory and voluntary motor functions of the anorectum and urinary bladder. Whereas the enteric nervous system usually remains intact, lack of CNS modulation of the gastrointestinal tract may result in dysmotility, delayed colonic transit time, constipation, and anorectal dysfunction including fecal incontinence.

The prevalence of bowel dysfunction in persons with CNS diseases is much higher than in the general population. It has been reported in as many as 70% of people with multiple sclerosis (MS), up to 75% of individuals with spinal cord injury (SCI), up to 68% of people with spina bifida, and up to 23% of persons after stroke. These dysfunctions include both incontinence and constipation. Despite the high prevalence and impact of fecal incontinence and constipation in CNS disorders, evidence to support neurogenic bowel management is scanty, and programs for this patient group continue to rely on ritual, anecdote, and trial and error.

### Stroke

#### Urinary Dysfunction in Stroke

Prevalence estimates for urinary incontinence in stroke survivors range from 32% to 79% upon hospital admission, decreasing to 25% to 28% at discharge and from 12% to 19% 6 months after the stroke. Many stroke survivors have double incontinence, which is 4 times as high as in the population without stroke. UI falls into two categories: Urge incontinence and urge incontinence with reduced or no awareness of bladder filling before indication. The latter may be the strongest

predictor of mortality and the need for institutional care at 3 months post-stroke, in contrast to urge incontinence.

Post-stroke UI is associated with decreased attentiveness. Individuals with reduced bladder filling awareness perform the poorest. In stroke survivors who recognize UI, one hypothesis is that primary treatment should aim to improve attentiveness, and improving processing speed as well as incorporating prompted voiding or perhaps pelvic floor muscle training.

### **Bowel Dysfunction in Stroke**

Prevalence estimates of fecal incontinence in stroke survivors are somewhat lower than for urinary incontinence but remain significant. Between 31% and 40% experience FI on hospital admission, 18% have FI upon discharge and between 7% and 9 % continue to have FI 6 months after their stroke. Studies suggest that functional limitations are an important factor. FI is often more severe in stroke survivors than FI in age- and gender-matched populations without stroke. FI is often associated with increased morbidity and more social isolation for stroke survivors and their caregivers.

### **Spinal Cord Injuries (SCI)**

#### **Urinary Dysfunction in SCI**

Bladder dysfunction is common in patients with SCI as it is with suprapontine and subsacral disorders. Genitourinary issues account for 30 percent of rehospitalizations in the first year after SCI and continue to account for approximately one-third of rehospitalizations throughout the patient's life. Approximately 10 percent of male SCI patients are discharged with an indwelling or suprapubic catheter; by 20 years postinjury, approximately 30 percent have a suprapubic catheter. More than one-quarter of female SCI patients are discharged with an indwelling catheter.

Not only do these patients suffer from embarrassment, inconvenience, increased costs and burden of care, but persistently elevated detrusor pressure is associated with increased risk of upper urinary tract damage and complications. Patients with SCI are at comparatively high risk for this, in contrast to its rarity in other populations. Thus, a primary clinical objective of treatment of neurogenic lower urinary dysfunction is protection of the upper urinary tract by minimizing risk of pyelonephritis and stone disease, because renal failure continues to be a leading cause of mortality in patients with SCI who survive their initial injury.

Urinary incontinence is often regarded as having a low priority in SCI management programs, but this is shortsighted and overlooks the devastating effects that UI can have on patients in terms of confidence, physical and mental well-being, and overall quality of life.

### **Bowel Dysfunction in SCI**

More than one-third of surveyed individuals with SCI rate bowel and bladder dysfunction as having the most important effect on their lives after injury, and many rank neurogenic bowel dysfunction as one of their major life-limiting problems.

Recent studies have defined three different neuropathophysiologic patterns associated with bowel dysfunction:

1. Present in >T7 injuries, is characterized by very high prevalence of constipation, substantial defecatory difficulty, and mild FI
2. Present in <T7, with preserved spinal reflexes, is characterized by some constipation, very substantial defecation difficulty, and mild FI
3. Present in <T7, with absent sacral reflexes, is characterized by modest constipation, less defecatory difficulty, and greater severity of FI

Identification of these patterns may be of help when designing therapeutic strategies.

### **Multiple Sclerosis (MS)**

MS is a relatively common neurological disease affecting approximately 250,000 Americans. Onset of disease is often in the third or fourth decades, and 60% of patients are women.

#### **Urinary Dysfunction in Multiple Sclerosis**

Lower urinary tract (LUT) symptoms eventually occur in up to 90 percent of multiple sclerosis (MS) patients over the course of their disease. LUT symptoms occur in most men and women with MS at a fairly young age (mean 32.9 years). The presence of LUT symptoms increases risk of upper tract infections, but predicting the long-term risk of upper tract infection is difficult and is not influenced by patient demographics, including MS subtype. Bladder storage problems often coexist with inadequate bladder emptying. The most common urodynamic finding is neurogenic detrusor overactivity, often with detrusor dyssynergia. Bladder dysfunction, however, does not necessarily correlate with urodynamic patterns or disease stages.

#### **Bowel Dysfunction in Multiple Sclerosis**

Both constipation and fecal incontinence are common, and incontinence correlates strongly with the presence of genitourinary symptoms. Anorectal sensory and motor abnormalities are common in patients with MS and FI. These include elevated thresholds of rectal sensory perception and impaired striated muscle contraction (external anal sphincter and puborectalis muscle), with preserved internal anal sphincter tone and function. Constipation may be protective of impaired continence mechanisms in this population and should not be treated aggressively.

## **Incontinence in Nursing Homes**

Most published treatments for urinary and fecal incontinence in nursing home (NH) residents have been directed to the risk factors of immobility and dementia. The logic is that immobility prevents people from getting to the bathroom and dementia reduces the motivation of both the resident to request assistance and of the caregiver to provide it. Furthermore, it is unlikely that any intervention directed to the medical risk factors for UI and FI (e.g., hyperactive bladder or poor rectal sensation) could be effective if residents are unaware of the need to toilet (dementia) or are unable to move to the toilet (mobility).

Treatments using prompted voiding have been evaluated most frequently in controlled trials and include three components relevant to immobility and dementia.

1. Residents are approached every 2 hours and asked if they are wet or dry.
2. Residents are prompted up to three times to request assistance.
3. When residents ask for assistance, they are reinforced and provided assistance to the toilet.

This simple intervention is labor intensive, does not involve treating abnormalities of the lower urinary tract, and is effective. In various clinical trials, 33%–60% of residents reduced the frequency of their incontinence to less than one episode per day or became continent after participating in a prompted-voiding program.

Supplementing prompted voiding with pharmacologic treatment for urge incontinence did not result in further significant clinical improvement.

In regard to prevention, it is important to note that residents who improved with prompted voiding did so within the first several days of the trial. This quick response suggests that prompted voiding was not effective because it taught residents new behaviors associated with continence. The more plausible explanation is that residents were primarily incontinent because of the failure of caregivers to provide care (prompting and assistance) that would have prevented incontinence or at least would have reduced its severity. If NH residents who could be responsive to toileting assistance were identified soon after admission and treated with prompted voiding, it is likely that most of the urinary and fecal incontinence in nursing home residents could be prevented. Unfortunately, there are several reasons why such prevention programs are not implemented in NHs.

Healthcare professionals frequently ignore practice guidelines to identify reversible causes of incontinence. More importantly, physicians often do not write orders to evaluate a resident's potential preferences for and responsiveness to toileting assistance. This is a particularly egregious error, since there is good evidence that a resident's responsiveness to toileting assistance can be predicted accurately with a brief trial of toileting assistance.

As for other nursing home care providers, residents with good memory have reported that toileting assistance occurs at an average rate of 0–2 episodes per day, with many residents reporting long waits for assistance and that they are reluctant to ask for toileting assistance because of staff reactions. Direct care staff report that they do not change or toilet people consistently because of lack of time. Furthermore, there is evidence that medical record documentation of incontinence care provision by nursing aides is erroneous. In short, the labor and staff management dynamics of preventing urinary and fecal incontinence do not offer providers an incentive to implement programs known to prevent or at least improve UI and FI.

### **Complications of Incontinence**

Two potentially serious physical complications are often directly associated with incontinence; perineal dermatitis and urinary tract infection.

#### **Dermatological Complications**

Skin problems associated with incontinence and moisture can range from irritation to increased risk of skin breakdown. Moisture may make the skin more susceptible to damage from friction and shear during repositioning.

One form of early skin breakdown is maceration or the softening of tissue by soaking. Macerated skin has a white appearance and a very soft, sometimes “soggy” texture.

The persistent exposure of perineal skin to urine and/or feces can irritate the epidermis and can cause severe dermatitis or skin erosion. Skin erosion is the loss of some or all of the epidermis (comparable to a deep chemical peel) leaving a slightly depressed area of skin.

One key to preventing skin breakdown is to keep the perineal skin clean and dry. Research has shown that a soap and water regimen alone may be less effective in preventing skin breakdown compared with moisture barriers and no-rinse incontinence cleansers. Because frequent washing with soap and water can dry the skin, the use of a perineal rinse may be indicated. Moisturizers help preserve the moisture in the skin by either sealing in existing moisture or adding moisture to the skin. Moisturizers include creams, lotions or pastes. However, moisturizers should be used sparingly—if at all—on already macerated or excessively moist skin.

#### **Urinary Tract Infections**

It is estimated that up to seventy-five percent of elderly, long-term care residents are predisposed to urinary tract infections due to some type of incontinence. E.



## Incontinence

coli is the most common bacteria; however, many other pathogens are present in the long term care setting.

Pain is most often the primary symptom of cystitis, prostatitis, acute pyelonephritis, and chronic pyelonephritis. Onset is usually sudden with cystitis and produces frequency, urgency, and burning or painful voiding of small amounts. Prostatitis is characterized by chills, fever, urinary frequency, urgency, and perineal and low-back pain. Acute pyelonephritis typically has a rapid onset with chills, fever, flank pain, nausea, and vomiting. In chronic pyelonephritis, symptoms are the same but vague.

### **Conclusion**

There is a need to raise the comfort level in our society to discuss bowel and bladder problems in the context of more visible health concerns and to meet the challenge of removing the stigma. Primary prevention needs to be a goal of all healthcare professionals, requiring a high level of community awareness and public education as well as health professionals' education. How this will translate into behavioral change and what triggers health-seeking behavior are not yet fully understood. Behavioral change needs to occur within the provider community as well as on the public side.

Prevention may lie in developing new and different standards of care for patients, including awareness of how surgical interventions may cause or create injury resulting in FI. Risk factors must be better understood. In nursing homes, continence could be improved with more toileting opportunities for residents. More can be done on all fronts, not only to aid in preventing incontinence but to also improve the awareness around it, to make it easier for people to seek help, and to find solutions to managing the condition if not resolving it.

**Appendix A: Sample Voiding Diary**

**Your Daily Bladder Diary**

This diary will help you and your health care team figure out the causes of your bladder control trouble. The “sample” line shows you how to use the diary.

Your name: \_\_\_\_\_

Date: \_\_\_\_\_

Time	Drinks		Trips to the Bathroom			Accidental Leaks			Did you feel a strong urge to go? <i>Circle one</i>	What were you doing at the time? <i>Sneezing, exercising, having sex, lifting, etc.</i>	
	<i>What kind?</i>	<i>How much?</i>	<i>How many times?</i>	<i>How much urine? (circle one)</i>		<i>How much? (circle one)</i>					
<b>Sample</b>	<b>Coffee</b>	<b>2 cups</b>	✓✓	<input checked="" type="radio"/> sm	<input type="radio"/> med	<input type="radio"/> lg	<input type="radio"/> sm	<input checked="" type="radio"/> med	<input type="radio"/> lg	Yes <input checked="" type="radio"/> No	<b>Running</b>
6-7 a.m.				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Yes No	
7-8 a.m.				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Yes No	
8-9 a.m.				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Yes No	
9-10 a.m.				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Yes No	
10-11 a.m.				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Yes No	
11-12 noon				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Yes No	
12-1 p.m.				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Yes No	
1-2 p.m.				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Yes No	
2-3 p.m.				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Yes No	
3-4 p.m.				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Yes No	
4-5 p.m.				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Yes No	
5-6 p.m.				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Yes No	
6-7 p.m.				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Yes No	

Use this sheet as a master for making copies that you can use as a bladder diary for as many days as you need.

Incontinence

Time	Drinks		Trips to the Bathroom			Accidental Leaks			Did you feel a strong urge to go? <i>Circle one</i>	What were you doing at the time? <i>Sneezing, exercising, having sex, lifting, etc.</i>	
	<i>What kind?</i>	<i>How much?</i>	<i>How many times?</i>	<i>How much urine? (circle one)</i>		<i>How much? (circle one)</i>					
<b>Sample</b>	<b>Soda</b>	<b>2 cans</b>	<b>✓✓</b>	<input checked="" type="radio"/> sm	<input type="radio"/> med	<input type="radio"/> lg	<input checked="" type="radio"/> sm	<input type="radio"/> med	<input type="radio"/> lg	Yes <input checked="" type="radio"/> No	<b>Running</b>
7-8 p.m.				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Yes No	
8-9 p.m.				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Yes No	
9-10 p.m.				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Yes No	
10-11 p.m.				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Yes No	
11-12 midnight				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Yes No	
12-1 a.m.				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Yes No	
1-2 a.m.				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Yes No	
2-3 a.m.				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Yes No	
3-4 a.m.				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Yes No	
4-5 a.m.				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Yes No	
5-6 a.m.				<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Yes No	

I used \_\_\_\_\_ pads today. I used \_\_\_\_\_ diapers today (write number).

Questions to ask my health care team: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

National Institute of Health, NIDDK, <https://www.niddk.nih.gov/health-information/health-topics/urologic-disease/daily-bladder-diary/pages/facts.aspx>

## Supplemental Information

### [The Role of Altered Connective Tissue in the Causation of Pelvic Floor Symptoms](#)

Liedl, B., Markovsky, O., Wagenlehner, F., & Gunnemann, A. (2012). The Role of Altered Connective Tissue in the Causation of Pelvic Floor Symptoms. In A. Alhasso (Ed.), *Urinary Incontinence: InTech*. CC BY 3.0

### [Epidemiology of Urinary Incontinence in Pregnancy and Postpartum](#)

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### [A Multi-Disciplinary Perspective on the Diagnosis and Treatment of Urinary Incontinence in Young Women](#)

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### [Incontinence: Physical Activity as a Supporting Preventive Approach](#)

Caetano, A. (2012). Incontinence: Physical Activity as a Supporting Preventive Approach. In A. Alhasso (Ed.), *Urinary Incontinence: InTech*. CC BY 3.0

### [Geriatric Urinary Incontinence - Special Concerns on the Frail Elderly](#)

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Santos, C. R. d. S., Lima, T. d. G. d. S., Schmidt, F. M. Q., de, V. L. C., & Santos, G. (2014). Pelvic Floor Rehabilitation in Anal Incontinence. In A. Catto-Smith (Ed.), *Fecal Incontinence - Causes, Management and Outcome: InTech*. CC BY 3.0

### [Effect of Kegel Exercises on the Management of Female Stress Urinary Incontinence: A Systematic Review of Randomized Controlled Trials](#)

Park, S. H., & Kang, C. B. (2014). Effect of Kegel Exercises on the Management of Female Stress Urinary Incontinence: A Systematic Review of Randomized Controlled Trials. *Advances in Nursing, 2014*. CC BY 3.0

### [Male Stress Urinary Incontinence: A Review of Surgical Treatment Options and Outcomes](#)

Trost, L., & Elliott, D. S. (2012). Male stress urinary incontinence: a review of surgical treatment options and outcomes. *Advances in urology, 2012*. CC BY 3.0

### [Nonsurgical Outpatient Therapies for the Management of Female Stress Urinary Incontinence: Long-Term Effectiveness and Durability](#)

Davila, G. W. (2011). Nonsurgical outpatient therapies for the management of female stress urinary incontinence: long-term effectiveness and durability. *Advances in urology, 2011*. CC BY 3.0

### [Health Care-Seeking Behaviors among Women Suffering from Urinary Incontinence](#)

Ahmed, A. S., & Zaky, N. H. (2016). Health Care-Seeking Behaviors among Women Suffering from Urinary Incontinence. *J Nurs Care, 5*(319), 2167-1168. CC BY 3.0

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## Incontinence

### Post-Test

1. What percentage of individuals with incontinence consults a health care provider about their problem? (p. 3)
  - A. 90%
  - B. 75%
  - C. 60%
  - D. less than 50%
2. Which of the following presents as a barrier for individuals seeking help for incontinence? (p.4)
  - A. Lack of understanding about the condition
  - B. Mistaken beliefs that symptoms are a normal part of aging or childbirth
  - C. lack of knowledge about available treatments.
  - D. All of the above
3. Urinary incontinence is generally recognized as one of the major causes of institutionalization of the elderly. (p. 6) A. True B. False
4. Which of the following is NOT an identified risk factor for urinary incontinence? (p. 6-7)
  - A. A woman who has had 2 or more cesarean births
  - B. Smoking
  - C. Obesity
  - D. Diabetes
5. Transurethral resection of the prostate is associated with a high incidence of UI. (p. 8)
  - A. True B. False
6. Phasic involuntary contractions of the urinary bladder are known as \_\_\_\_\_. (p. 10)
  - A. Somatic storage reflex
  - B. Detrusor overactivity
  - C. Intrinsic sphincter deficiency
  - D. Outlet underactivity
7. A 42-year-old woman with two children complains that she experiences urine leakage whenever she laughs or coughs. She is most likely experiencing \_\_\_\_\_ incontinence. (p. 11-12)
  - A. urge
  - B. stress
  - C. overflow
  - D. functional
8. Overflow incontinence is most common in older men with benign prostatic hyperplasia. (p. 13)
  - A. True B. False
9. People with functional incontinence may have problems thinking, moving, or communicating that prevent them from reaching a toilet. (p. 13) A. True B. False
10. The I-QOL is a 19 item questionnaire that assesses the psychosocial impact of male incontinence. (p. 16) A. True B. False

## Incontinence

11. Which of the following statements concerning incontinence surgery is correct? (p. 17-23)
  - A. A transobturator tape sling procedure is typically performed on men with urge incontinence.
  - B. Urethral bulking injections are most appropriate for women with overflow incontinence.
  - C. Transurethral surgery is most often performed on men with overflow incontinence.
  - D. Artificial urinary sphincters are primarily implanted in women with stress incontinence.
12. Pelvic floor muscle training (PFMT), also known as \_\_\_\_\_ exercises, can improve the muscle control, timing of superficial and deep layer contractions, and the pelvic floor strength. (p. 23)
  - A. Kashdin
  - B. Hubschman
  - C. Kegel
  - D. Kagan
13. Bladder training is a behavioral technique that requires the individual to resist the sensation of urgency, to postpone voiding, and to urinate according to a timetable. (p. 26) A. True B. False
14. Which of the following is NOT one of three components of prompted voiding? (p. 28)
  - A. Regular monitoring
  - B. Prompting to toilet on a regular basis
  - C. Patient self-initiative training
  - D. Praise and positive feedback
15. A \_\_\_\_\_ is a small plastic or silicone medical device which is inserted into the vagina or rectum and held in place by the pelvic floor musculature. (p. 29)
  - A. sternutate
  - B. bulee
  - C. pessary
  - D. podagra
16. Which one of the following treatment combinations would be appropriate? (p. 30-33)
  - A. Sacral nerve stimulation and oxybutynin for stress incontinence
  - B. Pessary and Proscar for urge incontinence
  - C. Percutaneous tibial nerve stimulation and tolterodine for urge incontinence
  - D. Biofeedback and Avodart for overflow incontinence
17. Which of the following is NOT one of the identified causes of fecal incontinence? (p. 36-38)
  - A. Congenital hypertrophy of the sigmoid colon
  - B. Anal sphincter damage due to obstetric injury
  - C. Pudendal neuropathy
  - D. Descending perineum syndrome
18. Which of the following would be an appropriate progression for treatment of fecal incontinence? (p. 40)
  - A. Dietary changes > biofeedback > PFMT > medication
  - B. Dietary changes > medication > PFMT > surgery
  - C. PFMT > dietary changes > surgery > medication
  - D. Biofeedback > PFMT > dietary changes > surgery
19. Which level of spinal cord injury would experience the greatest severity of fecal incontinence? (p. 46)
  - A. C6
  - B. T6
  - C. T11 with preserved spinal reflexes
  - D. L2 with absent sacral reflexes

## Incontinence

20. A regimen of soap and water alone is the most effective way to prevent incontinence related skin breakdown. (p. 48) A. True B. False

C3517G6513r61316T31317