

URINARY INCONTINENCE



No Need to Suffer in Silence

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Voiding Dysfunction • Pelvic Reconstructive Surgery

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Introduction

If you are reading this booklet because you or someone you know is affected by the loss of bladder control, a condition called **urinary incontinence**, you are not alone. Millions of Americans have such a condition, which causes them to involuntarily leak urine. Urinary incontinence affects both sexes, all ages, and people of all socioeconomic levels. It is estimated that 15% to 30% of people older than 60 have incontinence, with women twice as likely as men to suffer from it. Despite its prevalence, many people with this condition are reluctant to seek medical help because of embarrassment or because they are unaware that help **IS** available. Many, instead, turn to diapers and pads, unnecessarily resigning themselves to living unhappily and uncomfortably with this debilitating yet very treatable problem. Reading this booklet will provide you with basic knowledge about urinary incontinence including the different types of urinary incontinence, the means of evaluation of the condition, and the treatments available.

Urinary incontinence may have many different underlying causes. In some cases, it is a temporary problem due, perhaps, to a urinary infection or to the effects of medication. Often, however, urinary incontinence is a long-standing and progressive problem that can last indefinitely. Therefore, it is imperative that anyone suffering from incontinence seek proper diagnosis and treatment.

Today, more than ever before, help is available. It is important to know that there are urologists, such as myself, who specialize in the treatment of incontinence and have at their disposal the newest diagnostic techniques and medical therapies to do so. Incontinence usually can be cured or significantly improved so that bladder control problems need not interfere with a healthy, productive, and active lifestyle.

After a thorough evaluation including a history and physical examination, a urinalysis, and possibly other specialized tests, the exact cause of the incontinence can be pinpointed and the course of treatment can be determined. This may be as simple as prescribing an antibiotic, or it may involve one or more of the following treatments: behavior modification, pelvic muscle-conditioning exercises, biofeedback, medication, or surgery.

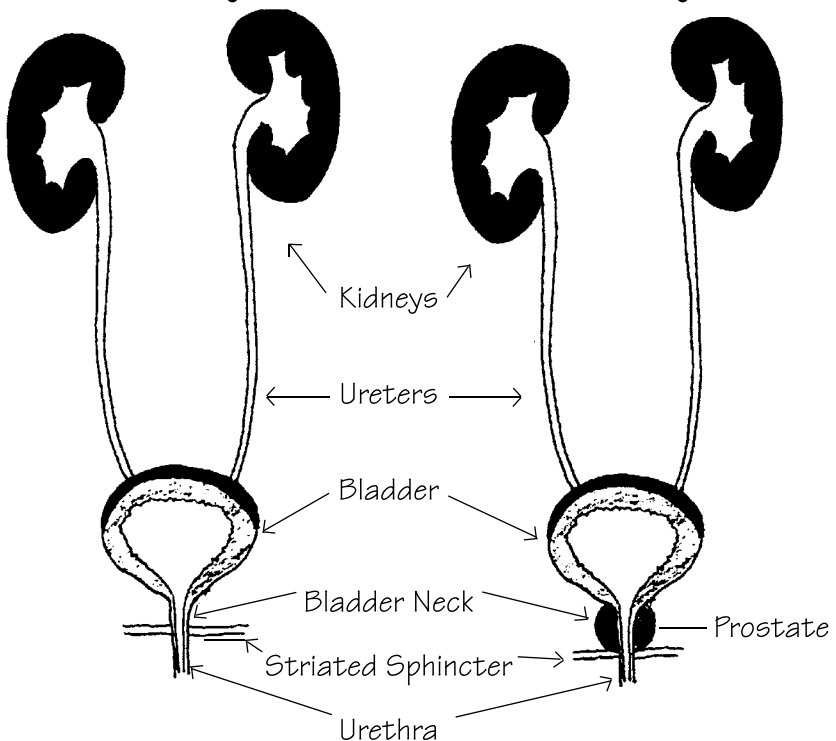
Urinary incontinence is far more than just a medical problem, often affecting the emotional, psychological, and social well-being of patients as well. Many people fear participating in daily activities that take them out of the range of a toilet. So it is particularly important to know that the vast majority of people suffering from incontinence can be successfully treated.

Normal Urinary Function

To better understand incontinence, it is helpful to understand urinary tract anatomy and function. The **kidneys** are paired, fist-sized, bean-shaped organs that remove waste from the blood in the form of urine. Urine flows down the **ureters**, thin tubes that carry urine downward from the kidneys to the **bladder**. The bladder is a balloon-like muscular organ that functions to store and empty urine. The **urethra** is a thin tube that conveys urine from the bladder out of the body. The **sphincters** are muscles that surround the urethra and function to pinch the urethra closed to prevent urinary leakage. The **bladder neck sphincter** is located at the junction of the bladder and urethra and is an involuntary muscle. The **striated sphincter** is located at the base of the **prostate gland** in men and in the mid urethra in women and is a muscle under voluntary control. The prostate is a gland of the male reproductive system that surrounds the urethra and is located between the bladder neck sphincter and striated sphincter. The **pelvic floor muscles** are hammock-like muscles that provide support for the bladder, urethra, and other pelvic organs.

Female Urinary Tract

Male Urinary Tract



The bladder is able to store urine by virtue of the fact that during filling the bladder muscle remains in a state of *relaxation* at the same time as the sphincter muscles are *contracted* (squeezed). When the desire to urinate arises as the bladder fills to capacity (approximately 12 ounces), the coordinated squeezing of the bladder muscle and relaxation of the sphincter muscles will effectively empty the bladder.

Essentially, urinary incontinence will occur whenever the pressure in the bladder becomes greater than the urethral resistance caused by the squeezing of the sphincters. This can result because of involuntary bladder contractions (**overactive bladder**), lack of elasticity in the wall of the bladder (**poor compliance**), or because of an underactive bladder muscle that becomes over-distended with urine (**impaired contractility**). Other causes are weakened support of the urethra (**urethral hypermobility**) or a weak, defective bladder neck and urethral sphincter (**intrinsic sphincteric deficiency**).

Types Of Urinary Incontinence

Stress urinary incontinence (exertional incontinence) is most often due to poor urethral support (urethral hypermobility). A spurt-like leakage of urine occurs as a result of activities that increase abdominal pressure such as sneezing, coughing, lifting, laughing, walking, running, jumping, exercising, or changing position. This is a very common type of leakage in young and middle-aged females. The main risk factors are multiple vaginal deliveries, aging, menopause, hysterectomy, obesity, chronic coughing, and chronic constipation. Vaginal delivery of large babies is a particularly significant risk factor. Elective Caesarian section is protective against the occurrence of stress incontinence.

Stress incontinence may also be due to a weak or damaged bladder neck (**intrinsic sphincteric deficiency**). The main risk factors are prior anti-incontinence surgery or radical pelvic surgery, damage to the nerve supply to the bladder neck, radiation, and pelvic trauma. This typically causes severe urinary leakage with minimal activity and also causes **“gravitational” incontinence**, a profound urinary leakage resulting from positional changes.

Urgency incontinence results when an overactive bladder squeezes without its “owner’s permission.” A sudden and urgent need to urinate occurs and involuntary leakage happens before arrival to the bathroom. This type of incontinence can be triggered by putting the key in the door, running faucets, and cold weather. A bladder can become overactive as a result of an irritating factor (such as infection), obstruction of the bladder neck (due, for example, to an enlarged prostate in men or a dropped bladder in women), neurological diseases (including stroke, Parkinson’s disease, multiple sclerosis, etc.), or may occur without any underlying cause.

Reflex incontinence occurs when urinary leakage occurs without awareness. There is no sensation of urgency and no knowledge of the incontinence occurring.

Overflow incontinence occurs when the bladder becomes so overfilled that it overflows. This happens when a weak bladder muscle or a blocked bladder neck prevents normal emptying. This is common in men with prostate enlargement and in men and women with diseases affecting the nerve supply to the bladder including diabetes and herniated disks.

Functional incontinence occurs when, because of infirmity or injury, a person cannot get to the toilet when needed. The urinary tract under these circumstances is usually intrinsically normal, but physical or mental disabilities prevent normal toilet usage.

Mixed urinary incontinence is a relatively common occurrence in which more than one type of incontinence is present.

How Is Urinary Incontinence Properly Evaluated?

The starting point of the evaluation of urinary incontinence is a thorough history and physical examination. The history will attempt to determine the type, the duration, as well as the severity of the incontinence. Factors that may precipitate urinary incontinence such as running water, sneezing, coughing, laughing, lifting, walking, running, intercourse, positional changes, etc. will be ascertained. Associated urinary symptoms including *obstructive symptoms* such as urinary hesitancy (a stream that is slow to start), decrease in force and caliber of the urinary stream, intermittency (a stream that stops and starts), straining to void, and dribbling, as well as *irritative symptoms* including urgency (a sudden desire to urinate), frequency, precipitancy (having to run to the bathroom in a hurry to avoid leakage), urgency incontinence, and nocturia (nighttime urination) will be determined.

Prior medical problems and their treatment, especially the presence of diabetes and neurological disease is essential knowledge. Prior surgery, especially anti-incontinence surgery, radical pelvic surgery, and vaginal or prostate procedures is fundamental background information. A complete discussion of all medications taken is important because of the profound effect on urinary function that many medications have. For all female patients, a thorough obstetric and gynecological history is mandatory.

At the time of the first visit, it is imperative to rule out “transient” causes of urinary incontinence. Dr. Neil Resnick, a geriatrician from Harvard, has come up with “D.I.A.P.P.E.R.S.” as an acronym for such causes of incontinence. These include the following: **D**—delirium (acute confusional state); **I**—infections of the urinary tract; **A**—atrophic urethritis/vaginitis (atrophy of the urethra and vagina as a result of menopause);

P—pharmaceuticals (drugs); **P**—psychological problems; **E**—excessive urine production; **R**—restricted mobility; **S**—stool impaction.

Many drugs can have a significant effect on urinary function. Medications that have been implicated in contributing to urinary incontinence include the following:

- Sedatives
- Diuretics
- Anti-histamines
- Anti-depressants
- Anti-psychotic agents
- Anti-spasmodics
- Anti-Parkinsonism agents
- Adrenergic agonists
- Adrenergic blockers
- Calcium channel blockers

Excessive urine production causing transient incontinence can occur under a variety of circumstances:

- Excessive fluid intake
- Elevated serum calcium
- Elevated serum glucose (diabetes mellitus)
- Decreased serum vasopressin (diabetes insipidus)
- Lower extremity swelling (edema)

Physical examination of both males and females will include examination of the abdomen for the presence of lower abdominal fullness that may be indicative of a bladder that empties poorly. Examination of the lower extremities will rule out the presence of edema. Female examination includes a thorough pelvic examination in order to evaluate the presence of **atrophic urethritis/vaginitis**, pelvic prolapse such as **cystocele** (a bladder that drops into the roof of the vagina), **rectocele** (a rectum that ascends into the floor of the vagina), and **uterine hypermobility** (loss of uterine support resulting in outward movement with straining), or a pelvic mass. The vaginal muscle tone needs to be evaluated as well as the presence of descent of the anterior vaginal wall and urethra with straining. In the male, a thorough examination of the genitalia is performed as is a rectal examination, which will determine the presence of sensation and sphincter tone and will evaluate the prostate as well as rule out stool impaction.

Depending on the type of incontinence and the suspected underlying cause, some of the following tests will need to be performed in order to accurately confirm the precise diagnosis and enable proper treatment:

Urinalysis is a dipstick and microscopic examination of the urine that will test for the presence of sugar in the urine (possibly indicating the presence of diabetes), protein in the urine (possibly indicating kidney disease), and pus cells and bacteria in the urine (often indicative of a urinary tract infection), as well as the presence of blood in the urine (which may indicate an abnormality in the urinary tract).

Urine culture is a test to see if bacteria are present in the urine, and if so, what particular type of bacteria.

Voiding diary is a twenty-four hour record of urination in which the time of urination and the precise volume of urination is recorded by the patient. This is a simple and objective means of documenting the frequency of urination as well as the bladder capacity.

Post-void residual urine is the amount of urine remaining in the bladder immediately following urination. The measurement can be accomplished by passing a small catheter (hollow tube) into the bladder to empty it, or alternatively, by using ultrasound to calculate the residual volume. The normal residual volume is less than 1 ounce.

Urodynamics

- **Uroflowmetry** is a simple test that involves urinating into an electronic device that measures and records the force of the urinary flow.
- **Filling cystometry** is a test used to assess the function of the bladder by measuring the pressure and volume relationship of the bladder. After the bladder is emptied by urinating, a small catheter is placed via the urethra into the bladder and the residual volume is measured. Next, the bladder is slowly filled and an electronic device measures and records both the volume and the pressure. The first desire to urinate usually occurs at about 3 to 5 ounces, the urgent desire to urinate at about 8 to 10 ounces, and the capacity occurs at about 12 to 15 ounces. The normal bladder is *compliant* (elastic, stretchy, and accommodating), meaning that the pressure in the bladder when full is not much different from the pressure when the bladder is empty. The normal bladder is *stable*, meaning that the bladder does not contract (squeeze) until its owner wishes it to do so.
- **Voiding cystometry (Pressure–Flow Study)** is a test where the patient is asked to urinate and simultaneous measurement of urinary flow rate and bladder pressure are recorded. This is very useful to distinguish between obstruction versus impaired bladder contractility (weak bladder) in a person with obstructive voiding symptoms. In

general, low flow–low pressure implies impaired contractility while low flow–high pressure implies obstruction. This test is also useful to document satisfactory bladder contractility in the female patient prior to surgery to correct incontinence.

- **Pelvic Floor EMG (Electromyography)** is a simple test in which patch electrodes (similar to EKG pads) are placed adjacent to the anal area. These will detect pelvic floor muscle activity during filling and voiding. Under normal circumstances, there is increasing pelvic floor muscle activity during the filling phase and relaxation during the voiding phase.
- **Leak point pressure test** is helpful in the evaluation of stress urinary incontinence to distinguish between urethral hypermobility and intrinsic sphincteric deficiency. The patient is asked to strain and cough until leakage occurs. The precise pressure in the abdomen at the time of leakage is noted. A very low leak point pressure is indicative of intrinsic sphincteric deficiency while a high leak point pressure indicates urethral hypermobility.

Videourodynamics is a sophisticated study whereby simultaneous measurements of bladder and abdominal pressures, urinary flow rates, pelvic floor muscle activity, and fluoroscopy (dynamic x-ray imaging) of the bladder and urethra during the filling and emptying phases are obtained and recorded on a computer. This highly sophisticated method of correlating urodynamic testing with imaging is invaluable in the evaluation of patients with complex urinary incontinence or voiding dysfunction.

Urinary cytology is a “PAP smear” of voided urine. A specimen is sent to a laboratory where a pathologist will examine it under a microscope. This test can detect early cancers of the bladder and urinary tract and is useful in the evaluation of blood in the urine and irritative urinary symptoms.

Cystoscopy is a test in which a tiny lighted instrument is inserted to directly visualize the urethra, bladder neck, and bladder in the female and the urethra, prostate, and bladder in the male. Anesthetic jelly is placed in the urethra to minimize any discomfort. This is a very helpful test to assess bladder neck obstruction, urethral hypermobility, and sphincteric dysfunction, as well as to evaluate the bladder for changes such as trabeculation (visible “ruffles and ridges” often seen with prostate enlargement and bladder overactivity).

Marshall test is a simple test helpful in the evaluation of stress incontinence. With the bladder full, the patient is asked to cough and strain to induce urinary leakage. Next, the urethra is gently supported by placing a finger in the vagina underneath the urethra and the patient is again asked to cough and strain. If gentle support of the urethra abolishes the

stress incontinence, this indicates the likely success of a sub-urethral sling, an operation designed to cure stress incontinence by surgically recreating urethral support.

What Forms Of Help Are Available For People With Urinary Incontinence?

There are many forms of treatment available for urinary incontinence, depending upon the precise underlying causes. Treatment will fall into one or more of the following four categories: behavioral therapy, medications, surgery, and supportive measures.

Behavioral Therapy

Behavioral Therapy is a broad term for non-invasive strategies to improve bladder control:

- ***Treatment of the inciting conditions*** – Incontinence is often provoked by increases in abdominal pressure, particularly when asthma causes wheezing, seasonal allergies cause sneezing, or cigarette smoking, bronchitis, sinusitis, or post-nasal drip cause coughing. By properly managing the provoking condition, incontinence can be avoided.
- ***Fluid moderation*** – Incontinence often will not occur until a “critical” urinary volume is reached and, by limiting fluid intake, it will take a longer time to reach this critical volume. Try to limit your fluid intake to four 8 ounce glasses per day. This will not always be possible, but any restriction in fluid intake will decrease the volume of urine output. Caffeine and alcohol increase urinary output so it is best to limit intake of these beverages. Caffeine is present in tea, coffee, cola, and chocolate. Additionally, many foods—particularly fruits and vegetables—have a generous amount of hidden water content, so moderation applies best here as well.
- ***Timed voiding*** – Urinating by the “clock” and not by your own sense of urgency will keep your bladder as empty as possible. By emptying the bladder before the “critical” volume is reached, the incontinence can be controlled. Voiding on a two-hour basis is usually effective, although the specific timetable has to be tailored to the individual. Such “preemptive” voiding has been proven to be a very useful technique insofar as *voluntary* urinary frequency is more desirable than *involuntary* incontinence.

- **Pelvic floor muscle exercises (PFM exercises)** – In the 1940's, Dr. Arnold Kegel described exercises of the pubococcygeus and perineal muscles. He discovered that by increasing the strength of these muscles, urinary control could be improved. The PC muscle (pubococcygeus muscle), present in both men and women, is a sling muscle that provides support to the bladder, vagina, and rectum. By contracting this muscle, you can interrupt your urinary stream completely. This muscle is also the muscle that is used to tighten up the vagina and rectum.

You must first learn awareness of this muscle and after this step is achieved, exercise it to increase its strength. This is not the muscle of the abdominal wall (rectus abdominus), the buttocks (gluteals) or the thighs (adductors). A simple means of recognizing the pubococcygeus muscle is to put a finger inside your vagina and to squeeze down until the vagina tightens around your finger. An alternative means of identifying this muscle is to start urinating and when about half completed, to abruptly stop the stream. Once you are fully aware of the location and nature of this muscle, you can then exercise it at times when you are not urinating.

Many people have trouble identifying and exercising these internal, hidden muscles. I have written two books on the subject, one geared for females: *The Kegel Fix: Recharging Female Pelvic, Sexual and Urinary Health*, and one for males: *Male Pelvic Fitness: Optimizing Sexual & Urinary Health*.

Please attend closely to those activities and events—incontinence triggers—that previously have resulted in incontinence. By actively squeezing the pelvic floor muscles just before and during these activities, the incontinence can often be avoided. I suggest that at the initial sensation of urgency, instead of running to find a toilet, several vigorous rhythmic “squeezes” of the PC muscle be performed. Such vigorous squeezes can often preemptively abolish an unwanted bladder contraction and thus eliminate or decrease the sense of urgency.

- **Vaginal cones** – An adjunct to pelvic muscle training in females. These are weighted vaginal cones that are placed intravaginally and retained for fifteen minutes twice a day in an effort to improve the strength of the pubococcygeus muscle.
- **Biofeedback** – The use of electronic instrumentation to relay auditory or visual feedback information about pelvic muscle contractility. This is useful to help learn the proper technique of doing PFM exercises.
- **Weight loss** – The burden of extra pounds can worsen incontinence by increasing abdominal pressure. Even a modest loss of excess weight may improve incontinence.
- **Ceasing smoking** – The use of cigarettes will often cause bronchial irritation and coughing that can provoke stress incontinence. By

eliminating cigarettes, the incontinence can be significantly improved.

- **Avoidance of constipation** – A colon and rectum that are full of stool can adversely effect continence by extrinsic pressure on the bladder. Moving one's bowels on a regular basis may prove very helpful in improving incontinence.

Pharmacological Treatment of Urinary Incontinence

Estrogen. The presence of the female hormone estrogen keeps the vagina and the urethra supple and contributes significantly to maintaining continence. At the time of menopause, estrogen production ceases, which can result in atrophic vaginitis and urethritis and can worsen urinary incontinence. Estrogen replacement can often improve urinary control by improving the condition of the urethral lining. Estrogen replacement should not be used in any woman who has had a malignancy of the breast or the genital tract including the cervix, uterus, and vagina. Additionally, estrogen has been found to increase the chances for leg and pelvic blood clots as well as pulmonary emboli. Estrogen may also increase the chance of gallbladder disease. On a positive note, estrogen replacement is an effective therapy for osteoporosis. Estrogen can be administered in a topical form that works locally and systemic absorption is limited.

Bladder relaxants. There are a variety of medications that are useful to suppress bladder overactivity. It may take several trials of different medications or combinations of medications to achieve optimal results. The medications include the following, Tolterodine (Detrol LA), long-acting Oxybutynin (Ditropan XL), Transdermal Oxybutynin (Oxytrol Patch), Trospium (Sanctura), Solifenacin (Vesicare), Darifenacin (Enablex), Fesoterodine (Toviaz), Oxybutynin Gel (Gelnique), and Mirabegron (Myrbetriq). The most common side effect of the bladder relaxant medications, with the exception of Mirabegron, is dryness that can involve any moist body area, particularly the mouth. The older bladder relaxants include Oxybutynin (Ditropan), Propantheline (Probanthine), Hycoscyamine (LevBid or Levsin SL), Flavoxalate (Urispas), and Dicyclomine (Bentyl). These medications cannot be used in the presence of urinary retention, gastric retention, or uncontrolled narrow-angle glaucoma.

Tricyclic agents. The major drug utilized in this category is Imipramine (Tofranil). This is a useful agent for children with bed wetting but is also

effective in adults with bladder overactivity when one bladder relaxant medication is not completely effective. Imipramine has the combined effect of both relaxing the bladder as well as stimulating increased tone of the bladder neck and urethra.

Adrenergic blocking agents. A typical medication in this category is Tamsulosin (Flomax) or Alfuzosin (Uroxatral). These drugs are useful for incontinence related to failure to empty the bladder due to bladder outlet obstruction. By relaxing the smooth muscle tone of the prostate and bladder neck, they can facilitate urinary emptying and improve urinary incontinence.

Bethanechol (Urecholine). This is an agent that triggers the bladder to contract and is sometimes useful in patients without obstruction who are unable to generate sufficient bladder contractions to empty the bladder effectively.

DDAVP (Vasopressin). This is a synthetic hormone that is useful in children who are bed wetters and in some adults with elevated nocturnal urinary production causing frequent nocturnal voiding and works by reducing production of urine by the kidneys.

The Surgical Treatment of Female Stress Urinary Incontinence

Stress urinary incontinence (SUI) is an involuntary spurt-like loss of urine due to a sudden increase in abdominal pressure. It is often provoked by sneezing, coughing, laughing, exercising, changing positions, etc. Underlying contributing factors include childbirth (in particular, traumatic vaginal deliveries of large babies), menopause, hysterectomy, aging and any condition causing a chronic increase in abdominal pressure such as cough, asthma, and constipation. SUI is usually due to a combination of *intrinsic* and *extrinsic* causes. The intrinsic factor, *intrinsic sphincteric deficiency*, is a weakness of the urethral sphincter muscles. The extrinsic factor, *urethral hypermobility*, is an acquired laxity in the tissue support of the urethra that allows urethral descent with increases in abdominal pressure.

The goal of surgical management of SUI is to provide support to the urethra in order to correct the intrinsic and extrinsic deficiencies. There are many variations on surgical techniques to provide sub-urethral support to SUI. The surgical treatment of SUI has evolved significantly over the past several decades. The current procedure represents an evolution of surgical technique that has merit because of its effectiveness, durability, relative simplicity, and need for only tiny incisions.

Mid-urethral Sling

This surgical procedure for repair of SUI is a *mid-urethral sling*. Its purpose is to cure SUI. It is also performed in conjunction with cystocele (bladder prolapse) repair to prevent the occurrence of SUI that may be unmasked as a result of the cystocele repair. The sling procedure works by providing support and a “backboard” to the urethra such that with “stress” maneuvers such as coughing and sneezing, the urethra can be compressed against the sling to provide continence.

Mid-urethral refers to the placement of the sling beneath the urethra, the tubular channel that leads from the bladder to the urinary opening. The sling placed underneath the urethra recreates the “backboard effect”.

Sling refers to the “hammock” that provides urethral support and that allows compression of the urethra with stress maneuvers.

The sling is an outpatient procedure most often performed in a Surgicenter. The procedure is performed under a light general anesthesia. The anesthesiologist will discuss these options with you to help you determine the type of anesthesia that is best for you. The entire procedure is performed with your legs in padded stirrups. After completion of the surgery, the vagina will be gently packed with gauze that will be removed in about two hours. Most women are able to urinate adequately after the sling procedure, but some will have difficulty that generally lasts only a few days. If you are unable to urinate by several hours after the sling placement, a small catheter will be placed into the bladder. You will then need to go home with the catheter and it will be removed within 48 hours.

Your normal diet and medications can be resumed immediately. You can resume most of your normal activities very quickly. In fact, walking and stair climbing are desirable as rapid return to activities facilitates recovery. You may bathe or shower. Any non-strenuous activity is permissible as long as pain is not experienced. Avoid heavy lifting, strenuous exercise, straining at bowel movements, and sexual intercourse for about four to six weeks after the sling placement. The operative site may hurt more with excess activities – this should signal for you to ease up. Vaginal, groin, and pelvic soreness are normal for several weeks. Vaginal discharge (often bloody), is also typical for several weeks following surgery and it is therefore recommended that you wear a pad initially.

Prior to being discharged from the Surgicenter, you will be given a prescription for antibiotics and pain medication. It is imperative to complete the prescription for antibiotics to avoid a urinary tract or pelvic infection. The pain medication can be used as needed. Many women have adequate pain relief with Tylenol, aspirin, or over the counter anti-inflammatory medications.

Benefits and Potential Risks of the Sling Procedure

Benefits:

- 90% cure/improvement of stress urinary incontinence
- 65% of patients with pre-existing urgency incontinence that accompanies the stress urinary incontinence will have resolution of the urgency incontinence

Potential Adverse Effects:

- Failure of the procedure to cure the SUI in 5-10%
- New onset of urgency incontinence in 5-10% Urgency incontinence is a sudden urge to urinate with the inability to make it to the bathroom on time. If this occurs, it can be treated with a bladder relaxant medication.
- Prolonged time before resumption of spontaneous voiding in 2.5%
- Inability to urinate in less than 1% requiring self-catherization or takedown/revision of the sling
- Injury to the urethra, bladder, bowel, or vascular structures: extremely rare.
- Extrusion of sling material: extremely rare

Urethral Bulking Agents

Bulking agents are alternative treatments for intrinsic sphincteric dysfunction in which a special material is injected into the tissues around the bladder neck and urethra. This “plumps up” the bladder neck and urethra to help close the urethra, resulting in improved urinary control. The procedure is simple to perform and is generally done on an outpatient basis. Several treatments may be necessary for lasting results. Bulking agents include: Carbon-coated beads suspended in a water gel (Durasphere), Calcium hydroxylapatite (Coaptite) and Silicone microparticles (Macroplastique).

The Surgical Treatment of Male Post-Prostatectomy Urinary Incontinence

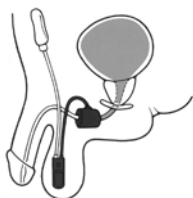
Post-prostatectomy urinary incontinence most commonly follows radical prostatectomy performed to treat prostate cancer, although it also can occur after a prostatectomy done for benign conditions. An involuntary urine loss is often provoked by sneezing, coughing, bending, exercising, and positional change. It often occurs as a result of a deficient sphincter muscle that is scarred in a fixed open position.

The artificial urinary sphincter is a hydraulic device composed of silicone and is the “gold standard” in the treatment of incontinence following prostate cancer surgery. It consists of 3 parts: a fluid-filled, *balloon reservoir* inserted into the lower abdomen responsible for pressure regulation; a small inflatable *cuff* placed around the urethra; and a *pump*, which is placed into the scrotal sac next to the testicle.

At rest, the fluid-filled cuff occludes the urethra, thus maintaining dryness. When the patient desires to urinate, he squeezes the pump 2 or 3 times, which transfers fluid from the cuff to the reservoir and allows for urination. The fluid automatically refills the cuff within several minutes. When the cuff is full, it squeezes the urethra closed again. The patient maintains his normal sensation to urinate.

Ninety percent of patients who are treated with an artificial urinary sphincter are greatly improved, with about 50% achieving complete dryness. Many patients will have occasional episodes of minor *stress* leakage with vigorous activity, but overall they are significantly drier and extremely pleased with the results.

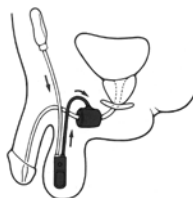
How the Artificial Sphincter Works:



The cuff, which is filled with fluid, gently squeezes the urethra closed to keep urine in the bladder.



To urinate, the cuff is opened by squeezing the pump several times. This moves the fluid out of the cuff and into the balloon. Because the empty cuff does not press the urethra closed, urine can flow from the bladder.



Within several minutes after urinating, the fluid automatically flows from the balloon back to the cuff. When the cuff is full, it squeezes the urethra closed.

Male sling – This is an alternative to the artificial urinary sphincter. Similar to the female sling, a piece of support material is positioned underneath the bulbar urethra via an incision in the perineum (area between scrotum and anus). This provides continence by creating compression of the urethra. It is indicated for mild to moderate post-prostatectomy incontinence.

The Surgical Treatment of Refractory Bladder Overactivity

Botox is the brand name for botulinum toxin. It is used medically to relax muscle and is commonly employed to improve the appearance of facial wrinkles. It is used for bladder over-activity to relax the bladder muscle, resulting in a reduction in urgency, frequency and incontinence. Under light general anesthesia, Botox is injected into the bladder via cystoscopy. The beneficial effect lasts between four and nine months or so. As a consequence of Botox, the bladder may temporarily be unable to completely empty, requiring an indwelling catheter or possibly the need to learn how to self-catheterize. Blood in the urine may occur after injections of Botox, as a needle is used to inject the Botox within the bladder wall. Urinary infections may develop, but antibiotics are given to avoid them. Allergic reactions occur very rarely.

Interstim Therapy: Sacral Nerve Stimulation – It was approved in Europe in 1994 and by the U.S. Food and Drug Administration in 1997. It uses mild electrical pulses to stimulate the sacral nerves in your lower back. These nerves control the bladder and the muscles that manage urinary function. For certain patients, stimulating the nerve relieves the symptoms of urgency incontinence as well as urgency/frequency. A neurostimulator provides the mild electrical pulses, very similar to a pacemaker for the heart. A small lead, or thin wire, carries the pulses to stimulate a selected sacral nerve in the lower back. Before the permanent “pacemaker” is placed, a temporary lead is placed and connected to a external stimulator that is worn on the belt. If significant improvement occurs during this test stimulation phase, then consideration for a permanent Interstim implant can be made.

The Surgical Treatment of Bladder Outlet Obstruction

When bladder outlet obstruction is the cause of urinary incontinence, appropriate therapy will need to be directed at the particular area of the urinary tract that is obstructed. When there is a urethral stricture (scar tissue present in the urethra), often an endoscopic incision or dilation of the stricture will result in relief of the obstruction. When there is obstruction at the level of the bladder neck and/or prostate, an incision in the prostate, transurethral resection of the prostate or laser prostatectomy will be necessary to relieve the obstruction.

Supportive Measures and Devices

Methods of facilitating voiding. When incomplete emptying is the cause of the urinary incontinence, a means of facilitating voiding is necessary. This involves *relaxation* techniques so that the sphincter muscles can properly open, *double and triple voiding* (repeating the act of voiding a second and third time), *strain maneuvers*, and *manual pressure* on the lower abdominal wall to improve emptying.

Clean intermittent catheterization. If the above-mentioned maneuvers are not effective in eliminating residual urine, it may be necessary to learn the technique of intermittent catheterization. Patients are taught to catheterize themselves several times per day as a means of completely emptying the urinary bladder.

Indwelling catheter. This is a technique of last resort when no other method has resulted in cure of the urinary incontinence. In general, long-term use of an indwelling catheter (a catheter that remains in place indefinitely) is unsatisfactory due to side effects that may include infections, stone formation, and bladder irritability.

External collecting devices. These are also known as condom catheters and consist of a condom-like device that is placed around the shaft of the penis, secured by adhesive, and connected by tubing to a collecting bag.

Penile clamps. These are foam-padded, mechanical devices that pinch the urethra closed. These can be irritating and result in local penile discomfort and swelling.

Pessaries. These are doughnut-shaped devices that are designed to reduce pelvic prolapse in females. They are typically used in frail and infirm elderly females who are not candidates for a surgical procedure to correct pelvic prolapse. The side effects of pessaries include local irritation and ulceration.

Absorbent pads and garments. There are numerous diaper-like products available that absorb urine.

Appendix: Urodynamic Evaluation

Urodynamics are very important tests to assess the urinary incontinence. The two phases of bladder function, storage and emptying will be tested.

In preparation for the Urodynamic evaluation, kindly complete the incontinence questionnaires and voiding diary and bring them with you to the study. The goal of the urodynamic evaluation is to reproduce your symptoms while the doctor is present and to be able to obtain objective data at the time that the symptoms are reproduced.

The urodynamic test takes about one hour. The preparation involves only taking an oral antibiotic prior to the procedure and arriving with your bladder “comfortably” full.

You will be asked to empty your bladder into a special commode. A tiny tube called a catheter will be gently inserted into your bladder. It will be used to fill your bladder with fluid and measure the change in bladder pressure as it fills and empties. A very small tube will be inserted into your rectum. It will measure the pressure in your abdomen when you strain or cough. Two patches, or tiny electrodes, similar to an EKG test, will be placed at your anus. These will monitor the pelvic floor muscles and their ability to work properly when you wish to urinate.

As your bladder is filled with fluid, you will be asked to describe how your bladder feels. You may be asked to strain or cough several times. When your bladder is full, you will be asked to empty it. The entire test will be recorded on a computer, and you may want to watch it on the screen, as it is occurring. Everything will be explained to you during the test as it is being performed.

When the test is completed, you may have minor discomfort where the catheters were placed. This should last only a few hours. A warm tub bath will help to ease any discomfort. Drinking an adequate amount of water – usually two or three 8 ounce glasses – is important. This will help prevent a urinary infection. You may continue your diet, medications, and activities as normal.

After the urodynamic evaluation has been completed and all the information stored in the computer has been examined, the results of the study will be reviewed in detail with you. This study will provide the necessary information in order to initiate an appropriate treatment plan.

Urinary Incontinence Bother Questionnaire

Circle statements relevant to you:

1. I worry about wetting myself.
2. I feel embarrassed talking about my incontinence with others.
3. I have to watch how much I drink because of my incontinence.
4. I worry about coughing or sneezing because of my incontinence.
5. I have to be careful standing up after I've been sitting down because of my incontinence.
6. I worry about where toilets are in new places.
7. I feel depressed because of my incontinence.
8. Because of my incontinence, I do not feel free to leave my home for long periods of time.
9. Having incontinence hurts my self-esteem.
10. I feel frustrated because my incontinence prevents me from doing what I want.
11. I worry about others smelling urine on me.
12. Incontinence is always on my mind.
13. It is important for me to make frequent trips to the toilet.
14. I avoid laughing because of my incontinence.
15. I feel ashamed because of my incontinence.
16. Because of my incontinence, it is important to plan every detail of my day in advance.
17. I worry about my incontinence getting worse as I grow older.
18. I have a hard time getting a good night of sleep because of my incontinence.
19. I worry about being embarrassed or humiliated because of my incontinence.
20. I avoid hugging others because of my incontinence.
21. My incontinence makes me feel like I am not a healthy person.
22. My incontinence makes me feel helpless.
23. I get less enjoyment out of life because of my incontinence.
24. I worry about not being able to get to the toilet on time.
25. I feel like I have no control over my bladder.
26. My incontinence limits my choice of clothing.
27. I worry about having sex because of my incontinence.

If you were to spend the rest of your life with your urinary condition just the way it is now, how would you feel about that?

- Completely satisfied
- Mostly satisfied
- Mixed feelings; about equally satisfied and dissatisfied
- Mostly dissatisfied
- Unhappy
- Completely miserable

Incontinence Symptom Questionnaire

Instructions: Please answer the following questions about your urine leakage.

1. How long have you leaked urine? _____
2. Since you began leaking urine, has the amount you leak each time:
☐ Increased ☐ Decreased ☐ Stayed the same
3. Has the number of times you have leaked urine each day, week, or month:
☐ Increased ☐ Decreased ☐ Stayed the same
4. Please place a check next to the word that best describes how often each of the following activities causes you to leak urine.

	Never	Sometimes	Often
a) Exercising, including running and participating in other high-impact sports	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Sneezing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Coughing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Laughing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Lifting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Changing position from sitting or standing up	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g) Bending down	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h) Reaching	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i) Walking or rushing to the toilet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j) Seeing or hearing running water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k) Washing hands	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l) Feeling nervous or stressed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
m) Being out in cold weather	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
n) Unlocking the front door	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Do you have strong urinary urges that you cannot always control?
☐ Yes ☐ No
6. Once your bladder feels full, how long can you hold your urine?
☐ As long as I want
☐ Less than a minute
☐ A few minutes
☐ Cannot tell when bladder is full
7. How often do you leak urine?
☐ Once a week at most ☐ 2 or 3 times a week
☐ About once a day ☐ Several times a day
☐ Continuously
8. When does the leakage occur?
☐ Mainly during the day ☐ Mainly at night
☐ Both day and night
9. Do you ever find yourself wet or damp without realizing that you've leaked urine?
☐ Never ☐ Sometimes ☐ Always

10. Do you wake up in the night to urinate?
- | | |
|---|--|
| <input type="checkbox"/> Never or rarely | <input type="checkbox"/> 2-3 times per week |
| <input type="checkbox"/> Almost every night | <input type="checkbox"/> 1 time per night |
| <input type="checkbox"/> 2 times per night | <input type="checkbox"/> 3 or more times per night |
11. Please indicate how much urine you usually leak.
- ☐ A small amount (leaves you slightly damp)
- ☐ A moderate amount (1 or 2 tablespoons)
- ☐ A large amount (more than 2 tablespoons)
12. How much does leaking urine interfere with your everyday life?
- Please circle a number between 0 (not at all) and 5 (a great deal)
- 0 1 2 3 4 5
13. If you avoid any of the following activities because you might leak urine, please check them below.
- | | |
|--|---|
| <input type="checkbox"/> Exercising | <input type="checkbox"/> Playing sports |
| <input type="checkbox"/> Dancing | <input type="checkbox"/> Traveling |
| <input type="checkbox"/> Dating | <input type="checkbox"/> Shopping |
| <input type="checkbox"/> Working outside of the home | <input type="checkbox"/> Having sex |

14. Has urine leakage stopped you from doing any other activities during the past 5-10 years? If so, please list those activities below.

15. Please check anything listed below that has occurred when you urinate.

- ☐ Difficulty in getting urine started
- ☐ Very slow stream or dribbling
- ☐ Discomfort, burning or pain
- ☐ Blood in urine
- ☐ Feeling that your bladder did not empty completely
- ☐ Loss of urine in sudden, large amounts
- ☐ Stopping and starting urine stream
- ☐ Urinate, stand up, urinate again to empty bladder
- ☐ Lose urine as you walk away from toilet

16. Did you wet the bed as a child?

☐ Yes ☐ No

If so, until what age? _____ How often? _____

17. If you have been treated for bladder leakage, urgency, or frequency before, please check all of the treatments that you have received in the past.

- | | |
|--|--|
| <input type="checkbox"/> Acupuncture | <input type="checkbox"/> Surgery |
| <input type="checkbox"/> Medications | <input type="checkbox"/> Pelvic muscle exercises |
| <input type="checkbox"/> Electrical stimulation | <input type="checkbox"/> Bladder training |
| <input type="checkbox"/> Biofeedback | <input type="checkbox"/> Collagen injections |
| <input type="checkbox"/> Urethral inserts/incontinence pessaries | <input type="checkbox"/> Botox |
| <input type="checkbox"/> Other treatments? Please list them below. | <input type="checkbox"/> Interstim |

18. In the chart below, please place a check next to the medications you have used or are currently using to treat incontinence, and indicate whether or not they have improved your condition.

Medication	Used (✓)	Was the medication helpful?	
Detrol® (tolterodine)	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Ditropan® (oxybutynin)	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Enablex® (darifenacin)	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Vesicare® (solifenancin)	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Sanctura® (trospium)	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Tofranil® (imipramine)	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
DDVAP® (desmopressin)	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Oxytol Patch	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Gelnique (oxybutynin)	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Toviaz (fesoterodine)	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Myrbetriq (Mirabegron)	<input type="checkbox"/>	<input type="checkbox"/> Yes	<input type="checkbox"/> No

19. Have you ever had to use a catheter to drain your bladder?

☐ Yes ☐ No

20. Please check all of the “self-help” techniques you have used to deal with urine leakage.

- ☐ Wear panty liners
- ☐ Wear sanitary napkins or incontinence pads
- ☐ Wear adult pads or briefs designed for urine control
- ☐ Wear other protective underclothes
- ☐ Put toilet paper/paper towels inside briefs
- ☐ Drink less fluids
- ☐ Go to the toilet often
- ☐ Stay near a bathroom
- ☐ Use a bedside commode or bedpan

21. Have you used any other self-help techniques? Please list them below.

22. How often do you have a bowel movement?

- ☐ Once a day ☐ More than once a day
☐ 2-3 times a week ☐ Less than once a week

23. If you have had any of the problems listed below, please check them.

- ☐ Straining on more than 1 out of 4 bowel movements
- ☐ Using enemas or laxatives (not fiber or bulk) to relieve constipation more than once a month
- ☐ Diarrhea (how often? _____)
- ☐ Bloody stool
- ☐ Change in the pattern of your bowel movements over the past year
- ☐ Uncontrolled loss of stool

24. a) Are you sexually active now?

☐ Yes ☐ No

- b) If so, do you have trouble/pain urinating after intercourse?

☐ Yes ☐ No

- c) Do you have discomfort/pain with intercourse?

☐ Yes ☐ No

25. What changes would you like to see in your symptoms as a result of your treatment here?

Voiding Diary

For a 24-hour period, every time that you urinate, record the *time of day* and the *volume voided* by using a measuring cup calibrated in ounces. Please bring this completed diary with you at the time of your urodynamic evaluation.

TIME OF DAY	VOLUME VOIDED
Void #1	
Void #2	
Void #3	
Void #4	
Void #5	
Void #6	
Void #7	
Void #8	
Void #9	
Void #10	
Void #11	
Void #12	
Void #13	
Void #14	
Void #15	
Void #16	
Void #17	
Void #18	
Void #19	
Void #20	

About the Author

Dr. Andrew Siegel earned a medical degree from the Chicago Medical School, Chicago, Illinois, where he was elected to the Alpha Omega Alpha Honor Medical Society.

He completed a two-year residency in general surgery at the North Shore University Hospital, Manhasset, New York, an affiliate of Cornell University School of Medicine. Dr. Siegel then went on to undertake residency training in urology at the University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania. Dr. Siegel completed a fellowship in voiding dysfunction, urodynamics, reconstructive and female urology at the UCLA School of Medicine, Los Angeles, California, under the direction of Dr. Shlomo Raz, prior to joining Bergen Urological Associates.

Dr. Siegel is a diplomate of the American Board of Urology and the National Board of Medical Examiners and is board certified in both Urology and Female Pelvic Medicine & Reconstruction Surgery. He is a member of the American Urological Association, the American Uro-Gynecological Society, the International Continence Society, the Society for Urodynamics, Female Pelvic Medicine and Urogenital Reconstruction, and the Sexual Medical Society of North America.

Dr. Siegel has authored chapters in urology textbooks including *Current Operative Urology* and *Interstitial Cystitis*, and has published articles in numerous professional journals including *Urology*, *Journal of Urology*, *Urology Clinics of North America*, *Postgraduate Medicine*, *Neuro-Urology and Urodynamics*, and *International Urogynecology Journal*. He has presented papers at professional meetings for many medical societies including the Philadelphia Urological Society, the American Academy of Pediatrics, the American Urological Association, and the American College of Surgeons.

He is a urological surgeon at Hackensack University Medical Center and a Clinical Assistant Professor of Urology at Rutgers New Jersey Medical School. He is a 2016 Castle Connolly *Top Doctor: N.Y. Metro Area* and *Inside Jersey Top Doctor for Women's Health*.

Dr. Siegel has authored the books: *Finding Your Own Fountain of Youth – The Essential Guide to Maximizing Health, Wellness, Fitness & Longevity*; *Promiscuous Eating: Understanding and Ending Our Self-Destructive Relationship With Food*; and *Male Pelvic Fitness: Optimizing Sexual and Urinary Health*; and *The Kegel Fix: Recharging Female Pelvic, Sexual and Urinary Health*.

Notes:

