

**Department of Rehabilitation Services
Physical Therapy****Standard of Care: Urinary Incontinence****ICD-10 Codes:**^{1,2}

- Urge Incontinence-N39.41
- Stress Incontinence, female/male-N39.3
- Mixed Incontinence-N39.46
- Urinary Incontinence Unspecified-R32

Additional ICD-10 codes may be used to address common coexisting impairments, such as:^{1,2}

- Urinary frequency-R35.0
- Nocturia-R35.1
- Dysuria-R30.0
- Retention of urine-R33.9
- Muscular disuse atrophy-M62.50
- Incomplete bladder emptying-R39.14
- Muscle incoordination-R27.8
- Old laceration of pelvic muscles-N81.89
- Spasm of muscle-M62.40
- Overflow incontinence-N39.490

Case Type / Diagnosis:

The International Continence Society (ICS) has developed a standardization of terminology to encourage effective communication between health care providers across various specialties. Urinary incontinence (UI) is defined by the International Continence Society as the complaint of any involuntary leakage of urine.³ One component of the ICS standardization divides pelvic floor muscle dysfunction symptoms into five groups: lower urinary tract symptoms, bowel symptoms, sexual function, prolapse, and pain.⁴ It is of note that many of these symptoms occur simultaneously and are relevant to each other. In this report, we will focus on lower urinary tract symptoms: urinary incontinence, urgency and frequency, slow or intermittent urine stream and straining, and feeling of incomplete emptying.

Urinary continence is maintained by a combination of pelvic, spinal, and supraspinal factors. Strength, endurance, and coordination of the pelvic floor muscles (PFM), the focus in physical therapy management of incontinence, are some of the many factors that contribute to the urethral closure mechanism required for continence. Other necessary factors for continence include: intact pelvic anatomy, ligaments/fascia support of the bladder and urethra, urethral smooth muscle contraction, patent vascular plexi, and cognition. If any of these additional factors are predominantly contributing to a patient's presentation of incontinence, pelvic floor muscle training may compensate for these factors or it may be unsuccessful.⁵

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Patients are generally classified into sub-categories of urinary incontinence based on subjective reports:³

- Stress Urinary Incontinence (SUI): the complaint of involuntary leakage of urine on effort or exertion such as cough, sneeze, laugh, sporting activity, etc.
- Urgency Urinary Incontinence (UUI): the complaint of involuntary leakage of urine accompanied by or immediately preceded by urgency.
- Mixed Urinary Incontinence: the complaint of involuntary leakage of urine associated with urgency, exertion, and effort.
- Functional Incontinence: the complaint of involuntary leakage of urine associated with the inability to reach the toilet in a timely manner due to mobility impairments.
- Retention Urinary Incontinence: symptoms may include continuous leakage, post-void dribbling, and/or trouble starting stream/interrupted stream due to a hypotonic detrusor.
- Postural Urinary Incontinence: involuntary loss of urine associated with change in body position, such as sit to stand or supine to stand.
- Nocturnal Enuresis: involuntary urinary incontinence which occurs during sleep
- Continuous Urinary Incontinence: complaint of continuous involuntary loss of urine
- Insensible Urinary Incontinence: loss of urine when the patient is not aware of how the leakage occurred
- Coital Incontinence: involuntary loss of urine with coitus (can be divided into leakage occurring during penetration and also with orgasm)

The incidence and prevalence of urinary incontinence is higher in women compared to men throughout the entire lifespan. It is important to note that the prevalence of UI, particularly in women, is not well established due to differing measurement tools within relevant studies. It must also be noted that UI is likely underreported due to its embarrassing nature and normalization within Western society. Prevalence varies quite substantially between 5-69% in the general population. Studies consistently suggest that isolated stress urinary incontinence is the most common type of UI followed by mixed and finally isolated urge UI. It is estimated that 10% of women who experience UI do so weekly. Only age, BMI, parity, and mode of delivery are consistently associated with UI (stress UI greater than urge UI).⁶

UI is a distressing and socially disruptive condition, potentially effecting employment, recreation, personal hygiene, and socialization. It has been reported in women with incontinence: 50% avoid leaving their home, 45% avoid public transportation, and 50% avoid sexual activity due to fear of an incontinence episode.⁷ The estimated total annual cost of managing UI in the USA is reported as \$19.5 billion.⁸

Indications for Treatment:

1. Poor knowledge of pelvic floor muscle contraction/relaxation
2. Impaired pelvic floor muscle contraction/relaxation
3. Poor coordination of pelvic floor muscle contraction with increase in intra-abdominal pressure
4. Impaired bladder habits/fluid intake
5. Limited social activities due to urinary urgency, frequency, and/or incontinence
6. Sleep disturbed by nocturia or nocturnal enuresis

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Contraindications / Precautions for Treatment:¹

Contraindications for internal vaginal/rectal exam: active infections of the vagina, bladder, or rectum, open skin lesion, high-risk pregnancy, absence of patient consent, impaired cognitive understanding of the exam, absence of previous pelvic exam by an MD (pediatric population)

Precautions for internal vaginal/rectal exam: severe atrophic vaginitis, severe pelvic pain, history of sexual abuse

Precautions for internal vaginal/rectal exam (obtain permission from MD): pregnancy, immediately post-partum before 6-8 weeks, immediately post-vaginal, prostate, pelvic, or rectal surgery before 6-8 weeks, and/or immediately post-pelvic radiation treatment.

Evaluation:

Medical History:

- Past medical history is obtained through reviewing the longitudinal medical record (LMR), medical history questionnaire, and patient interview.
- Of particular importance are the patient's obstetric history, presence and extent of perineal damage with childbirth, previous pelvic, spinal, or cerebral surgeries, medical diagnoses that increase intra-abdominal pressure such as COPD, smoking, allergies, obesity, constipation, chronic urinary tract/bladder infections, sexual dysfunction, sexually transmitted disease, medication usage, and previous bladder or bowel symptoms.

History of Present Illness:

- Past and current history of urinary incontinence is obtained, noting age of onset, mechanism of occurrence, and severity of symptoms.
- It is important to screen for other possible causes of urinary incontinence such as cauda equina syndrome, signs of spinal cord compression, signs of urinary tract infection, and other neurological signs.
- All details of bladder habits and symptoms should be discussed including daytime frequency, nocturia, presence of urgency, timing of leakage, amount of leakage, activity with leakage, number/type of pad usage, bladder sensation, and voiding symptoms (slow stream, spraying, intermittency, hesitancy, straining, terminal dribble).³
- All details of patient's defecation habits, sexual function, and pelvic or abdominal pain are discussed as these dysfunctions often occur simultaneously and are extremely relevant and related to each other.

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- Obtain a subjective pain rating based on the 0-10 verbal analog scale (VAS), with 0 as absence of pain and 10 as worst possible pain at each location, if pain is present. Pain rating and location can also be indicated on an external perineal drawing.
- Obtain results of any diagnostic testing (urodynamics, manometry, MRI, CT, X-Ray) to identify a pathophysiological cause of symptoms.
- Inquire about previous treatments for this condition and the results of each treatment.

Social History:

- Information on the patient's work and social environment should be obtained. Certain details such as attitudes toward bathroom breaks, bladder habits throughout the day, and patient hygiene should be noted.
- Mobility issues such as difficulty with transfers, ambulation, or inability to manage clothing could contribute to incontinence.
- Obtain information regarding bowel habits, frequency of bowel movement, presence of constipation, consistency of stool (Bristol Stool Chart), medications or supplements, if needed, to facilitate defecation, and/or tendency to strain to defecate or use of manual maneuvers to defecate.
- Inquire about activity level and participation in exercise. Document the type, frequency, duration, and intensity of exercise; alternately document avoidance of exercise due to fear of urinary incontinence.
- Respectfully inquire regarding their sexual activity as well as any symptoms of urgency, frequency, pain, or incontinence during sexual activity.

Medications:

- Common medications to treat urgency or urgency urinary incontinence have historically included anticholinergics/antimuscarinic agents: oxybutynin, tolterodine, solifenacin, hyoscyamine, fesoterodine and darifenacin. These drugs are sold under the names of: Ditropan, Detrol, Vesicare, Enablex, Levbid, Cytospaz, Toviaz and Oxytrol. Anticholinergic/antispasmodic drugs are one of the first choices for OAB, as they have been proven to be the most effective agents in suppressing premature detrusor contractions, enhancing bladder storage, and relieving symptoms.^{9,10} Anticholinergic and antispasmodic agents act by antagonizing cholinergic muscarinic receptors, through which different parasympathetic nerve impulses evoke detrusor contraction. Side effects of these medications can be bothersome and include dry mouth, headache, constipation, blurred vision, and confusion.¹ Many patients do not continue medications beyond 9 months due to these bothersome side effects.¹¹ A newer class of drugs, beta-3 adrenergic agonists, are mostly currently being used if anticholinergic agents are not effective. One medication, called mirabegron, sold under the name Myrbetriq, works differently than the anticholinergics, as it relaxes the bladder's smooth muscle while it fills with urine, thereby increasing the bladder's capacity to hold/store urine.¹²
- Only one drug is available over-the-counter (OTC), and it is in a skin patch called Oxytrol, for women only.
- Other medications that may be used to treat SUI in females include vaginal estrogen (Estring, Estrace, Premarin, Vagifem) and Duloxetine.

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- Oral hormone therapy has been found in multiple RCT's to increase the risk and severity of incontinence symptoms, especially urinary urgency.^{13,14}
- Bethanechol may be used to address incomplete bladder emptying, but this is currently rarely used.
- Some medications may contribute to incontinence:¹
 - Alpha-adrenergic antagonists (alpha blockers) dilate blood vessels and can also relax the urinary sphincter and urethra.
 - Alpha agonists tighten the urinary sphincter; can cause urine to be retained in the bladder and possible overflow incontinence.
 - Antidepressants can impair the contractility of the bladder; may also decrease awareness of the need to void.
 - Diuretics increase urine production.
 - Angiotensin-converting enzyme (ACE inhibitors) can cause cough and worsen stress urinary incontinence.
 - Antihistamines, Opioids, and Calcium Channel Blockers interfere with bladder contraction; can worsen constipation.
 - Sedatives can slow mobility and worsen urge incontinence.
 - Narcotics cause detrusor relaxation and can contribute to retention of urine
 - OTC cold remedies can cause detrusor relaxation or increased bladder outlet muscle tone, causing retention of urine²

Examination:

The following information is intended to capture the most commonly used assessment tools for this case type/diagnosis. It is not intended to be either inclusive or exclusive of assessment methods.

Please refer to the *Pelvic Girdle Pain Standard of Care* to rule out/in any co-existing dysfunctions of the pelvic girdle region.

Informed Consent for Evaluation: Before conducting an examination, the therapist should always begin with an introduction to the anatomy and function of the pelvic floor and physiology of the urinary system to ensure the patient understands the necessity of an internal exam. Provide a thorough explanation as to what the examination will involve, including any potential pain or discomfort, and allow the patient the opportunity to ask questions. It is essential to obtain the patient's verbal or written consent for internal examination, with the understanding the patient may discontinue the exam at any time. Patient modesty and dignity should be valued at all times during the exam. If at any point in the examination the patient exhibits signs of embarrassment, distress, or other need to cease the exam, discontinue the exam.^{1,15}

Observation: Visual inspection for females is commonly done in supine lithotomy position with hips and knees flexed and slightly abducted/externally rotated. The patient's legs should be relaxed and supported in this position. Male patients should be positioned in left side lying, testicles and penis draped away from the visual field, with a pillow between the legs for comfort.

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- The vulva (in females), perineum, and anus are inspected for potential skin pathology and anatomical variations.
- The patient is instructed to perform a voluntary pelvic floor muscle contraction; during this movement the therapist is observing for the perineum to move ventrally and cranially.
- The patient is then instructed to cough (testing for an involuntary pelvic floor contraction); the perineum should maintain its position or move ventrally during this increase in intra-abdominal pressure.
- During these observations, the therapist is viewing the superficial perineal muscles as well as the levator ani muscles.¹⁶
- An isolated pelvic floor muscle contraction does not involve any visible movement of the boney pelvis.
- It should be documented if accessory muscles (abdominals, gluteal, adductor muscles) are engaged during any of these tests.⁴

External Palpation: External palpation of the muscles surrounding the hip girdle muscles, superficial perineal muscles, and levator ani muscles is performed in both males and females to assess for over-activity, hypersensitivity, and pain. In females, palpation of the vulva and vestibule is performed noting pain and/or the presence, quality, and mobility of potential scars and adhesions.

Sensory Function: The perineum should be assessed for pain or impaired sensation. If nerve involvement is suspected, lumbosacral dermatomes should also be tested. Most importantly, test: L1-L2 (labia-minora), L3 (anterior knee), S1 (plantar surface and lateral area of the foot), S1-S3 (perineal and anal skin), and S2-S4 dermatomes (sacral nerve roots which innervate both the external urethral and the anal sphincter). The anal reflex (S2-S5) can be tested by lightly stroking the skin surrounding the anus causing a visible contraction. Absence of this reflex suggests sacral nerve disease, may be a consequence of trauma from vaginal childbirth, or may also be absent in individuals without dysfunction.¹

Internal Digital Palpation: Please refer to the *Hand washing Protocol* for details in preparation of the internal exam. The same patient position is utilized as described in the ‘Observation’ section. Internal digital palpation of the pelvic floor muscles is performed by placing one gloved and lubricated index finger in the distal one third of the vagina or rectum and assessing the pelvic floor muscles and surrounding tissues at rest, during contraction, and during relaxation. The patient is cued to contract and, subsequently, relax around the therapist’s finger. Various verbal cues should be given until the correct movement of the pelvic floor muscles is achieved. The instructions “squeeze and lift” is best, however additional verbal cues should be given until the desired contraction is confirmed such as, “try to hold back gas”, or “try to stop your flow of urine”. Digital palpation is the recommended method for instruction and documentation of correct use of the pelvic floor muscles.^{1,16} The four valid and reliable tests used to help determine a correct PFM contraction are described by Messelink et al.¹⁷ The Digital Assessment Scheme has been found to have moderate to substantial intra-observer reliability and face validity, therefore it “can be considered reliable in clinical practice”.⁴ The following items are assessed both externally and internally:⁴

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Voluntary contraction is assessed by asking the patient to contract their pelvic floor muscles; the response is documented as absent, weak, normal, or strong.

Voluntary relaxation is assessed by asking the patient to relax their pelvic floor muscles, after a contraction has been performed; the response is documented as absent, partial, or complete.

Involuntary contraction is the contraction that occurs just prior to an increase in intra-abdominal pressure and can be assessed by asking the patient to cough; the response is documented as absent or present.

Involuntary relaxation is the relaxation that occurs when a patient is asked to strain or bear down as if they were defecating; the response is documented as absent or present.

Support of the pelvic organs should be evaluated as pelvic organ prolapse can contribute to or mask urinary incontinence. Vaginal vault size (in females), muscle tone, and muscle volume can also be assessed during the internal assessment. Internal anal sphincter tone is assessed with an anal internal exam.⁴

Strength Testing:

Digital palpation is used to assess the patient's pelvic floor muscle strength for both males and females. There are currently two scales available in the literature to objectively document pelvic floor muscle strength. The Modified Oxford Scale developed by Laycock is a validated grading system used widely in clinics to document pelvic floor muscle strength.^{16,18,19} The Messelink Scale is not used often in the clinic setting, however the clinician should be familiar with this scale as it is used often in research.⁴ The Messelink Scale is correlated to the Modified Oxford Scale as shown in the table below:

Laycock's Modified Oxford Scale¹⁸	Messelink Scale⁴
0: No contraction	Absent
1: Flicker	
2: Weak	Weak
3: Moderate	Moderate/Normal
4: Good (with lift)	
5: Strong	Strong

In addition to testing PFM strength via the above scales, it is helpful to assess other aspects of PFM strength, endurance, and coordination; The Laycock PERFECT Scale, shown below, can be used to document these various aspects of PFM function.¹⁸

Laycock PERFECT Scale¹⁸

Power: test of voluntary PFM contraction

Endurance: time the PFM contraction can be sustained before a 50% reduction in power (maximum 10 seconds)

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Repetitions: number of repetitions the PFM contraction can be performed before a 50% reduction in power is observed (maximum 10 repetitions)

Fast twitch: number of quick 1-second contractions with full relaxation in between, that can be performed in 10 seconds

Elevation: presence or absence of lifting posterior vaginal wall or anus toward pubic bone and head

Co-contraction: presence or absence of co-contraction of the transversus abdominus muscle

Timing: presence or absence of involuntary PFM contraction

Abdominals

The current evidence discusses the role of the transversus abdominus with the pelvic floor muscles for trunk stabilization. When activated correctly, the transversus abdominus and pelvic floor muscles, along with the diaphragm and multifidus provide local or regional trunk stabilization.²⁰ With dysfunction (back pain, urinary incontinence, etc), concurrent activation of the PFM and TrA is not always present. It has been shown that women with urinary incontinence who attempted PFM contraction actually depressed their bladder base and showed greater abdominal activity and less PFM activity on sEMG than continent women.²¹ This could potentially result in worsening of urinary incontinence due to the chronic increase in intra-abdominal pressure that occurs with over-activation of TrA over PFM. Therefore, it is essential to confirm via internal digital palpation sufficient activity of the pelvic floor muscles in relation to the abdominal muscles.²²

Pain: Digital palpation is also used for pain assessment. Varying pressure, beginning with mild pressure, is directed toward each specific muscle bilaterally; the patient responds with a subjective report of pain on a verbal analogue scale (0-10). It is common to evaluate the pubococcygeus, puborectalis, iliococcygeus, coccygeus, and obturator internus muscles bilaterally. It is also useful to document muscle guarding, facial expressions, breathing, or other non-verbal responses to pain.

Range of Motion (ROM): Range of motion of the spine and lower extremities is essential to rule out co-existing dysfunctions. Range of motion of the pelvic floor muscles is difficult to assess and document.

Functional Assessment:

- Surface electromyography (sEMG), internally or externally, can be used to detect the electrical activity of the pelvic floor muscles measured in microvolts; this value is based on the outflow of motor neurons in the ventral horn of the spinal cord as the patient contracts and relaxes their pelvic floor muscles.

Surface electrodes placed on the external anal sphincter or a specially designed vaginal probe with embedded surface electrodes is inserted vaginally. A specially designed rectal probe can also be used rectally (in males or females) or can be used vaginally for women with very small vaginal openings.

This signal then relays the information to a computer screen where the information

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can be seen visually. During a voluntary pelvic floor muscle contraction, the intensity of the sEMG signal (microvolts) should increase and be sustained as the patient holds this contraction. The intensity of the sEMG signal should fall to or below baseline upon relaxation following a contraction, showing derecruitment of motor units. This method of pelvic floor testing is best used to assist in patient education and training by giving the patient visual input, however, it should not be used as an absolute measure of force production or measure of actual strength, as there is no data correlating microvolt activity with muscle strength. There is also a risk of variability of electrode placement in the vagina and cross talk from other local muscles, which leads to inconsistent information between sessions.²³

- Pad testing can be helpful in objectively quantifying the amount of urine lost during a 24-hour period, or after a short provocative activity (i.e. jumping). The pad is weighed before and after the test to attain the amount of urine lost.
- Gait/Transfers: bed mobility, sit to stand, gait speed, and balance should all be assessed and considered for functional mobility to the bathroom.

Posture/Alignment: A dynamic standing and sitting examination is performed to identify and document any postural dysfunctions or malalignment that may contribute to or be as a result of urinary incontinence.

Functional Outcomes:

- The Pelvic Floor Distress Inventory-short form 20 (PFDI-20) and the Pelvic Floor Impact Questionnaire (PFIQ-7) can be used for both females and males as a baseline functional measure at initial examination, then re-assessed at discharge. These instruments were published by Barber et al in 2005 and found to be valid and reliable measures for capturing the presence and impact of symptoms associated with pelvic floor disorders.²⁴
 - Questions are divided into three categories assessing the lower urinary tract, lower GI tract, and pelvic organ prolapse. Scores range from 0-300; higher scores correlate with worse symptoms.
 - The minimum clinically important difference (MCID) is the smallest change in score associated with a clinically meaningful change in a questionnaire. The MCID of the urinary scales of the PFDI and PFIQ in women receiving conservative management of stress urinary incontinence (SUI) has been shown to be 11 points for the urinary scale of PFDI and 16 points for the urinary scale of PFIQ.²⁴
- The NIH-Chronic Prostatitis Symptom Index and Female NIH-Chronic Prostatitis Symptom Index are used to assess voiding symptoms and pelvic pain in males and females.
 - The NIH Chronic Prostatitis Collaborative Research Network developed and validated these questionnaires.²⁵
 - The index is comprised of 9-questions divided into three categories: pain/discomfort, urinary symptoms and quality of life.
 - Symptom scale score is the combination of the pain and urinary symptom score: Mild =0-9, moderate=10-18, severe=19-31.
 - Total score (range 0-43). This allows assessment of a patient at their initial baseline and then can be compared over time. The patient can act as their

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own control and be used to compare to the established and published “norms”.

- Male index is available at: <http://www.prostatitis.org/symptomindex.html> (male)
- Female index is available at: <https://www.medscape.com/answers/458391-85774/what-is-the-national-institutes-of-health-chronic-prostatitis-symptom-index-nih-cpsi-and-how-is-it-used-in-the-evaluation-of-chronic-bacterial-prostatitis-cbp>
- The Genitourinary Pain Index (GUPI) is a valid, reliable and responsive instrument that can be used in men and women to assess the degree of symptoms in both men and women with genitourinary pain²⁶

Differential Diagnosis:¹

- Urinary tract infection/bladder infection
- Cord compression, cauda equina syndrome
- Fistula (ureterovaginal, vesicovaginal, urethrovaginal)
- Urethral stricture/obstruction
- Bladder calculus
- Kidney infection
- Pelvic organ prolapse
- Multiple Sclerosis
- Prostatitis, Benign prostatic hyperplasia
- Spinal cord neoplasms/trauma
- Excessive vaginal discharge/sweating: The Pyridium pad test is a useful tool to rule out whether leakage is actually urine. With the lead of the referring doctor, the patient ingests pyridium which will turn urine orange; the patient then monitors their pad for orange staining, indicating urine. If the pad does not have an orange staining, the substance is likely not urine.

Assessment:

A detailed assessment includes information based on the subjective report of the patient in combination with the examination findings.

The type of incontinence (SUI, UUI, mixed UI, functional UI, or overflow UI) can be determined based on the patients’ subjective report of when, where, and how leakage occurs. SUI occurs with movement, exertion, and/or during increases in intra-abdominal pressure. UUI occurs in the presence of an urgent desire to urinate and is often accompanied by reports of frequency. Mixed UI is a combination of SUI and UUI with various episodes of leakage during exertion as well as accompanied by an urgency to urinate. Functional UI may be suspected if the patient demonstrates difficulty with ambulation, transfers, or fine motor skills which impairs their ability to get to a toilet or doff clothing. Overflow UI may be suspected if the patient reports symptoms consistent with continuous leakage, post-void dribbling, and/or trouble starting their stream of urine. Further questioning may be necessary for patients without awareness of when leakage is occurring, and/or instructing the patient to spend time without wearing a pad to possibly improve the awareness of leakage occurrences.

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The ICS has classified pelvic floor muscle dysfunction into the following general categories:⁴

- *Non-contracting pelvic floor*: there is no palpable voluntary or involuntary contraction of the pelvic floor muscles
- *Non-relaxing pelvic floor*: there is no palpable voluntary or involuntary relaxation of the pelvic floor muscles.
- *Non-contracting, non-relaxing pelvic floor*: there is neither a palpable contraction nor relaxation of the pelvic floor muscles

Additional descriptors can be used in conjunction with the above categories to give a more vivid picture of the dysfunction:⁴

- *Normal pelvic floor muscles*: the pelvic floor muscles have shown the ability to voluntarily contract (normal or strong), voluntarily relax (complete), involuntarily contract, and involuntarily relax.
- *Overactive pelvic floor muscles*: the pelvic floor muscles (cannot voluntarily or involuntarily relax or contract when relaxation is required, such as during micturition) have demonstrated the inability to relax upon command or during micturition, which results in obstructed voiding.
- *Underactive pelvic floor muscles*: the pelvic floor muscles have demonstrated the inability to voluntarily or involuntarily contract when needed or upon command or during an increase in intra-abdominal pressure.
- *Non-functioning pelvic floor muscles*: there is no palpable pelvic floor muscle contraction or relaxation.

For example, a patient's assessment might include the category of non-contracting, non-relaxing pelvic floor muscles that are also overactive. Some practitioners also use additional descriptors such as 'hypertonic' or 'short pelvic floor', however, these descriptors are not the recommended ICS terminology and should be avoided.³

Problem List

Potential Impairments/Dysfunctions Include:

1. Decreased involuntary contraction/relaxation of the pelvic floor muscles
2. Decreased voluntary contraction/relaxation of the pelvic floor muscles
3. Decreased strength of the pelvic floor muscles as demonstrated by the Modified Oxford Scale
4. Decreased endurance of the pelvic floor muscles as demonstrated by the Modified Oxford Scale.
5. Impaired coordination of the pelvic floor muscles as shown on sEMG biofeedback or determined by palpation.
6. Presence of pelvic floor trigger point(s)
7. Impaired knowledge of pelvic floor muscle contraction/relaxation
8. Impaired knowledge of bladder retraining strategies and bladder habits
9. Impaired knowledge of bowel habits and the impact of constipation on lower urinary tract symptoms

Prognosis:

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Many studies have results showing that pelvic floor muscle training is more effective than no treatment or placebo, however the degree of this improvement varies widely. A recent Cochrane Review analyzed 27 studies (through 2017) that investigated the effects of pelvic floor muscle training (PFMT) compared to controls and found that women were far more likely to report subjective cure or improvement after following a comprehensive PFMT program. Percentages of participants reporting these outcomes varied from 35-74% depending on the nature of UI. Satisfaction and self-efficacy also generally improved in these groups.²⁷

In the case of long-term effects of PFMT it is important to note that many studies included treatment for study groups with less favorable outcomes after cessation of the study period, making follow up difficult. In relevant literature through 2017 satisfaction rates hovered around 70% at five year follow ups, however there was significant variability in the meaning of the term “satisfaction”.²⁸

Goals

Short Term Goals (to be met in 4-6 weeks)

1. Patient will demonstrate decreased accessory muscle activity while performing a pelvic floor muscle contraction.
2. Patient is able to demonstrate improved pelvic floor muscle coordination for contraction and relaxation as shown on sEMG or determined by palpation.
3. Patient will demonstrate improved PFM strength by 0.5 to 1.0 MMT grade.
4. Patient will demonstrate improved PFM endurance to 10 seconds.
5. Patient will have reduced PFM trigger point pain to <2/10.
6. Patient is able to perform a pelvic floor muscle contraction just prior to and during an increase in intra-abdominal pressure 60% of the time to prevent/reduce leakage.
7. Patient will have adequate fluid intake of at least 40-50 oz water/day to maintain hydration.
8. Patient will report reduced pad usage by 50%.
9. Patient will demonstrate improved ability to defecate without straining.

Long Term Goals (to be met in 8-12 weeks)

1. Patient is able to perform a pelvic floor muscle contraction just prior to and during an increase in intra-abdominal pressure 85-100% of the time to prevent/reduce leakage.
2. Patient will demonstrate proper PFM relaxation and posture on toilet to facilitate complete emptying of bladder and bowel.
3. Patient will maintain 2-5 hour void interval with urge suppression techniques.
4. Patient will demonstrate improved PFM strength 1 MMT grade.
5. Patient will demonstrate improved PFM endurance to 10 seconds.
6. Nocturnal voiding reduced to 0-2x/night for improved sleep.
7. Patient will report reduced pad usage by 75-80%.
8. Patient will report at least 75% reduction in UI/urgency/frequency.
9. Patient will tolerate ability to perform previously limited activity (exercise, walk, jump, lift, etc) without leakage 75% time.
10. Patient will report reduced urinary urgency triggers by 75%.

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The timeframe for reduction of impairments and achievement of goals will vary depending on the individual patient, severity of urinary incontinence, and existence of co-morbid factors.

Treatment Planning / Interventions

Established Pathway ___ Yes, see attached. _X_ No

Established Protocol ___ Yes, see attached. _X_ No

Interventions Most Commonly Used for this Case Type/Diagnosis.

The following information is intended to capture the most commonly used interventions for this case type/diagnosis. It is not intended to be either inclusive or exclusive of appropriate interventions.

Pelvic Floor Muscle Training (PFMT)

- Clinical practice guidelines recommend supervised PFMT as first-line treatment for stress, urge, or mixed urinary incontinence.²⁸⁻³¹
- Research clearly identifies that when given simple verbal or written descriptions of a pelvic floor muscle contraction, only 49% of women performed the contraction correctly and at least 25% of the women displayed a pelvic floor muscle technique that would promote incontinence, as they were bearing down instead of contracting. Internal digital palpation is needed for instruction and confirmation of isolated levator ani muscle contraction without overflow or substitution.³²
- Tactile cues such as muscle tapping may be needed for facilitation of PFM contraction.
- PFMT can be prescribed to increase strength, endurance, and coordination of the pelvic floor muscles.²⁹ A specific prescription should be based on their performance of the PERFECT scale at initial evaluation, progressing as the patient improves.
- Progressive strength training of the pelvic floor can be achieved through repetitive contraction and relaxation, holding for prescribed duration and repetitions, and integration into gravity-resisted positioning such as sitting and standing. It is recommended to build up to 8-12 repetitions performed three times per day.¹⁶
- Once symptoms improve and the patient is satisfied organized training may be discontinued. No studies have addressed the number of repetitions needed to maintain PFM strength, however earlier studies suggest that more than one day of organized training is required.³³ At this time it is also unknown if a voluntary pre-contraction before an increase in abdominal pressure will maintain or increase PFM strength. Results of related research have been variable.²⁸
- Voluntary contraction before and during an increase in intra-abdominal pressure (known as the ‘knack’) should be included in all PFMT programs. Improving the timing of PFM contraction can be incorporated in the patient’s functional activities to prevent descent of the pelvic floor.²⁹ A randomized controlled trial showed this ‘knack’ to reduce urinary leakage by 98.2% during a medium cough,

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and 73.3% during a deep cough, however, there is currently no data to determine how much strength is required to prevent urinary leakage during a cough.³⁴

- Functional training of the PFM can be achieved by asking the patient to consciously contract their pelvic floor muscles during activities of daily living where leakage may occur, such as while squatting, lifting, reaching, performing abdominal exercises, laughing, cheering at a sporting event, etc.²⁸
- PFMT can be effectively used to treat urge urinary incontinence (UUI) by instructing the patient to contract the PFM during urinary urgency, facilitating inhibition of detrusor contraction.³⁵ The strength of the PFM contraction needed to inhibit detrusor contraction is not known or studied.
- sEMG biofeedback is often a helpful adjunct to PFMT, however, it is not a treatment on its own. It can be beneficial to provide visual and auditory feedback to the patient, however it must be noted that overflow of accessory muscles or straining maneuvers may erroneously show increased sEMG activity.²⁸
 - PFM exercises with sEMG biofeedback have been shown to be effective in treating urinary incontinence.³⁶
 - In an RCT comparing treatment with and without sEMG biofeedback, the percentage of women who were cured in the biofeedback group was 69% compared to 50% in the non-biofeedback group. Cure was defined as less than 2g of leakage on a pad test.³⁷
 - A meta-analysis which studied the effectiveness of 3 interventions (PFMT, sEMG biofeedback, no treatment) found PFMT, with or without sEMG biofeedback, significantly better than no treatment.³⁸
- Vaginal weights/cones: no significant difference has been found in reported symptoms of treatment consisting of vaginal weights combined with PFMT when compared to PFMT alone and can be associated with side effects such as pain and bleeding, therefore they are not recommended.²⁷ However, if needed for a particular patient, vaginal weights can be added to a home exercise program.

Bladder Retraining³⁹⁻⁴¹

- Bladder diary: For at least three days, the patient records the times of voiding, voided volumes, incontinence episodes, the degree of urgency, pad usage, fluid intake, and other information (see appendix 1). This diary creates a baseline from which to create goals and measure progress.
- A systematic review of 96 randomized control trials showed that PFMT combined with bladder retraining reduces urinary incontinence significantly more than other treatments (drug, electrical stimulation, injectable bulking material, and estrogen therapy).⁴²
- Components of bladder training includes:
 - Behavioral modification
 - Voiding interval training
 - Reduction of known bladder irritants
 - Urge suppression techniques
 - Use of the Voluntary Urinary Inhibition Reflex (VUIR)/Bradley's Loop 3¹
 - Fluid management
 - Education on self-management

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- See also: ***Bladder Retraining/Normalization Protocol*** for more information

Manual Therapy^{43,44}

- Myofascial release (ischemic compression, modified Thiele massage, strain/counterstrain) to address pain and trigger points of PFM.
- Manual techniques, such as transverse friction massage, to abdominal and perineal scars and tissue adhesions (superficially and internally)
- Pain reducing modalities (before and/or after manual treatment), as needed.
- Treatment of joint dysfunctions (lumbar, SI, pubic, coccyx, hip)
- Education on performing soft tissue mobilization to self

Therapeutic Exercise

- Stretches directed toward tight and/or restricted hip girdle and trunk musculature
- Strengthening exercises for weak and/or dysfunctional hip girdle and/or trunk musculature
- Appropriate abdominal muscle contractions, coordinated with pelvic floor muscle contractions
- Education on correct technique for lifting, bed mobility, and transfers
- Aerobic exercise for weight loss and to increase functional activity level.
 - A 6-month behavioral intervention targeting weight loss of around 10% of body weight reduced the frequency of self-reported urinary-incontinence episodes among overweight and obese women as compared with a control group.⁴⁵
- Postural re-education:
 - It has been shown the neutral spine is the best position for transversus abdominus (TrA) contraction and for pelvic floor muscle activation. There is decreased activation of the PFM in a flexed spinal position.³⁵
 - Sapsford found subjects with SUI had significantly less lordosis than controls and reduced pelvic floor muscle activity measured through surface sEMG.⁴⁶
 - Intravaginal sEMG testing of pelvic floor muscles in women confirm that in erect posture, the pelvic floor muscles show increased resting tone and the ability to gain greater strength in this posture.³⁵

Electric Stimulation^{28,35}

- Electrical current can be used to stimulate/modulate the visceral nerve supply.
- For patients with UUI, the goal of electrical stimulation is to facilitate reflexive inhibition of detrusor contractions (using 12.5 Hz), preventing urinary urgency and leakage. Most evidence regarding the benefit of using electrical stimulation for urinary incontinence supports its use for treatment of UUI.
 Electrical stimulation can be used as an adjunct to therapy for patients with stress urinary incontinence who have failed to improve pelvic floor muscle strength via conservative methods. The goal of electrical stimulation in SUI is to facilitate the strengthening of the PFM when the patient is not voluntarily able to sufficiently recruit enough motor units to result in pelvic floor muscle contraction (using 35-50 Hz). Upon ability to voluntary contract the PFM, it is recommended to

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continue PFMT without the use of electrical stimulation. It has been found that voluntary PFM contraction increases urethral closure significantly more than electrical stimulation.^{28,47}

- Can also be used as a tactile cue for locating PFM in patients demonstrating difficulty achieving a correct pelvic floor muscle contraction.
- However, conclusive evidence is lacking regarding specific protocols and outcomes for patients using electrical stimulation for PFMT.

Rehabilitative Ultrasound Imaging (RUSI)⁴⁸

- RUSI is an adjunct to PFMT, using visual feedback to perform pelvic floor muscle contraction and relaxation
- This modality can be helpful to visualize abdominal musculature during pelvic floor muscle contraction and relaxation
- Refer to: *Rehabilitative Ultrasound Imaging of the Lumbopelvic Region Procedure* for more information

Frequency & Duration:

The frequency and duration of treatment will be determined following a comprehensive examination and evaluation. Typically, a patient will be seen 1-2 times per week for 8 to 12 weeks, depending of the severity of symptoms and pelvic floor dysfunction. It has been found in a systematic review that 3 or more visits per month are more effective and show better results than two or less visits per month.³⁸

Patient / Family Education:

It is important to assess the best method of education and learning for each patient and provide the appropriate visual handouts, auditory tapes, and additional reading directed toward the best type of learning for that individual patient.

Recommendations and Referrals to Other Providers:

- Urogynecologist/Urologist
- Nutritionist
- Gynecologist
- Gastroenterologist
- Sex Therapy/Counseling
- Social Work/Psychiatry: for problems with coping and depressive symptoms associated with this diagnosis
- Support Groups

Re-Evaluation:

The standard time frame for re-evaluation is 30 days or less. Possible triggers for an earlier reassessment include a significant change in status or symptoms or a failure to respond to physical therapy. All positive findings of the initial examination should be re-assessed for changes at the time of the re-evaluation.

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Discharge Planning:

Commonly Expected Outcomes at Discharge:

The patient is expected to be able to:

- Coordinate pelvic floor muscle contraction and relaxation
- Coordinate pelvic floor muscles contraction/relaxation with a correct transversus abdominus contraction
- Develop an appropriate voiding interval (2-5 hours) with ability to consistently suppress urinary urgency
- Coordinate pelvic floor muscle contraction with any increases in intra-abdominal pressure ('the knock')
- Demonstrate proper toileting techniques and coordination of pelvic floor muscles on the toilet to facilitate bladder and bowel emptying
- Maintain a consistent fluid intake as determined by the physical therapist
- Demonstrate improved pelvic floor muscle strength and endurance with the intention to continue this progression to reduce leakage
- Functionally, it would be expected that the patient reports decreased urinary incontinence, an increased ability to empty the bladder, and improved perineal structural support during activities of daily living.

Transfer of Care

At the time of discharge, care is transferred to the referring provider; a thorough discharge note with final functional status and discharge instructions is also sent through Epic or faxed to the referring provider.

Patient's Discharge Instructions

The patient should be independent with the modifications made to their bladder habits, voiding interval, fluid intake, and pelvic floor exercises. The patient should also be educated in preventing and managing reoccurrence of symptoms, including when to return to pelvic floor physical therapy if needed.

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Appendix 1

Keeping a Record of Bowel and Bladder Function

The main purpose of this diary log is to document how your bowel and bladder function. At first, the log is used as an evaluation tool. Later, it will be used to measure your progress. Please complete a bladder log every day for 3 consecutive days and bring it with you on your appointment. Your log will be more accurate if you fill it out as you go through the day. Nighttime voids can be filled in when you arise in the morning.

INSTRUCTIONS:

Column 1 -Time of Day

The log begins at midnight and covers a 24-hour period. Fill in the exact time of each event.

Column 2 - Amount Voided

S-Small= small amount; smaller than 6 oz

M-Medium= 6-8 oz; measure once or twice, using a small container to get a feel for this amount.

L-Large= like amount you urinate first in the morning or greater than 6-8 oz

OR COUNT the stream of urine (in Mississippi's) as it flows and record voided amount (i.e.: 5 Mississippi's)

Column 3 - Was Urge Present

Describe the urge sensation you had as:

0- no urge; emptied just in case

1-Mild= first sensation of bladder filling

2-Moderate= stronger sensation or need "but I can hold it"

3-Strong= Severe urge – "need to get to toilet, move aside!"

Column 4 -Type and Amount of Fluid Intake

Record the type and amount of fluid you drink by cups or ounces.

Column 5 - Type and amount of Food Intake

Record the type and amount of food you eat.

Column 6 -Amount of Leakage- urine or bowel

Record the amount of leakage at the time it occurred.

For urination, write:

S-Small= drop or two of urine

M-Medium=wet underwear

L-Large= wet outwear or floor

For bowel movement, write:

R-Residue on underwear

P-Partial movement

C-Complete loss

Column 7 – Felt leak with activity, urge, or unknown

Describe the activity associated with the leakage, i.e. coughed, heard running water, sneezed, bent over, lifted something or had a strong urge.

Column 8 - Bowel Movement

Record a bowel movement with a "BM" at the appropriate time

Describe "type" of stool (use Bristol Stool Chart)

How much time was spent on the toilet?

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