URINARY INCONTINENCE

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OBJECTIVES

- Understand the demographics and types of urinary incontinence
- Report anatomical changes in the urinary system with age
- Describe the evaluation and treatment of urinary incontinence.

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TOPICS COVERED

- Demographics of Incontinence
- Risk Factors and Associated Comorbid Conditions
- Pathophysiology
- Evaluation
- Treatment
- Nursing Homes, catheters and catheter Care

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PREVALENCE OF UI

- Approximately 1:4 community-dwelling older adults
- 2/3 of long-term-care resident
- Increases with age
- Affects women than men (2:1) until age 80 (then 1:1)

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Impact of urinary incontinence

- Dermatitis, cellulitis, pressure ulcers, UTIs
- Sleep deprivation, falls with fractures, sexual dysfunction
- Depression, social withdrawal, impaired quality of life

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Risk factors for Urinary Incontinence

- Obesity
- Functional impairment
- Dementia
- Medications
- Diabetes
- Environmental barriers to toilet access

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Comorbidities that cause or worsen incontinence

- Affective disorders
- Alcoholism
- Chronic cough
- CHF
- Constipation
- DJD
- Delirium
- Dementia
- Diabetes
- Hypercalcemia
- Mobility impairment
- Multiple sclerosis
- NPH
- Parkinson disease
- Psychosis
- Rheumatoid arthritis
- Sleep apnea
- Spinal cord injury/ stenosis
- Stroke
- Vitamin B_{12} deficiency

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Medications that can cause or worsen incontinence

- Alcohol
- α-Adrenergic agonists (M)
- α-Adrenergic blockers (W)
- ACE inhibitors
- Anticholinergics
- Antipsychotics
- Calcium channel blockers
- Cholinesterase inhibitors
- Estrogen (oral)
- GABAergic agents
- Loop diuretics
- Narcotic analgesics
- NSAIDs
- Sedative hypnotics
- Thiazolidinediones
- Tricyclic antidepressants

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Age changes in the urinary tract

- Decreased bladder contractility
- Increased uninhibited bladder contractions
- Diurnal urine output shifted later in the day
- Sphincteric striated muscle attenuation
- Decreased bladder capacity
- (Modest) Increased postvoid residual (PVR)
- Decreased urethral closure pressure, increased vaginal mucosal atrophy (women)
- Benign prostatic hyperplasia and prostate hypertrophy (men)

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What causes incontinence

- Urge incontinence = detrusor overactivity (uninhibited bladder contractions)
- Stress incontinence = impaired urethral sphincter support and/or closure
- Mixed incontinence = features of stress and urge
- Overflow incontinence = bladder outlet obstruction and/or detrusor underactivity

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Urge incontinence

Detrusor overactivity:

- Age-related
- Idiopathic
- Lesion in central inhibitory pathways (eg, stroke, cervical stenosis)
- Bladder outlet obstruction or bladder irritation (eg, stones, infection, tumor)

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Stress incontinence

Leakage due to:

- **Damage to pelvic floor supports** (levator ani, connective tissues)
  - Failure to adequately compress the urethra when intra-abdominal pressure increases
- **Sphincter failure**
  - Surgical damage or severe atrophy
  - Subsacral spinal cord injury rarely

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Stress incontinence

- Cough can trigger an uninhibited detrusor contraction
  - Leakage occurs after and not coincident with the cough, is large in volume, and is difficult to stop
- Often coexists with urge UI (mixed UI)

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Impaired emptying

- From detrusor underactivity, bladder outlet obstruction, or both
- Outlet obstruction causes
  - Men: prostate hyperplasia
  - Women: urethral scarring or large cystocele/prolapse that kinks urethra

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Impaired bladder emptying

- Detrusor underactivity results from:
  - **Intrinsic bladder smooth muscle damage** (eg, ischemia, scarring, fibrosis)
  - **Peripheral neuropathy** (eg, diabetes, vitamin B_{12} deficiency, alcoholism)
  - **Damage to spinal cord or spinal bladder efferent nerve** (eg, from disc herniation, spinal stenosis, tumors, or degenerative neurologic disease)

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NOCTURIA

- **Nocturnal polyuria** (nocturnal output >33% of total 24-hour urine output)
  - Late day/evening fluids, especially with caffeine or alcohol
  - Pedal edema (eg, due to medications, venous stasis, heart failure)
  - Heart failure
  - Obstructive sleep apnea

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Nocturia

- **Sleep disturbance**
  - Obstructive sleep apnea
  - Medications
  - Cardiac or pulmonary disease
  - Pain
  - Restless leg syndrome
  - Depression
  - Sleep partner

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Nocturia

Lower urinary tract

- Detrusor over activity
- Benign prostatic hyperplasia
- Impaired bladder emptying

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Assessment of urinary incontinence

- **Screen**: all patients, they don't report
- **History**: include what matters and quality of life
- **Physical examination**: include cardiovascular, abdominal, musculoskeletal, neurologic, & genitourinary exams
- **Testing**: urinalysis
- **Optional**: PVR, urodynamics, cytology, other lab tests

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Screening

- Ask:
  - Do you have any problems with bladder control?
  - Do you have problems making it to the bathroom on time?
  - Do you ever leak urine?
- **If positive, ask questions to determine the type of incontinence**

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CLASSIFICATION QUESTIONS TO FOLLOW UP POSITIVE SCREEN

Do you leak urine mostly:

- When you are performing some physical activity, such as coughing, sneezing, lifting, or exercising? **(stress UI)**
- When you have the urge or feeling that you need to empty your bladder but cannot get to the toilet fast enough? **(urge UI)**

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Do you leak urine mostly…

- With both physical activity and a sense of urgency? **(mixed UI)**
- Without physical activity and without sense of urgency? **(other)**

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ASSESSMENT: HISTORY

- **Should include**: onset, frequency, volume, timing, exacerbating and ameliorating factors, other LUT symptoms, amount/types of fluid intake, success or failure of past treatment(s), current management
- **Red flag symptoms**: abrupt onset, pelvic pain, hematuria (could herald neurologic disease or cancer—prompt evaluation and referral required)

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Assessment

- **Review**: medical conditions and their status, medications, functional status, access to toilets
- **Ask patients and/or caregivers about incontinence associated bother and impact on quality of life**

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Physical exam

- **General**: cognitive and functional status, sleep apnea screening if nocturia
- **Abdominal**: palpation / percussion, bladder scan
- **Neurologic**: tests for integrity of the sacral cord with sacral reflexes:
  - Perineal sensation
  - Anal wink
  - Bulbocavernosus reflex

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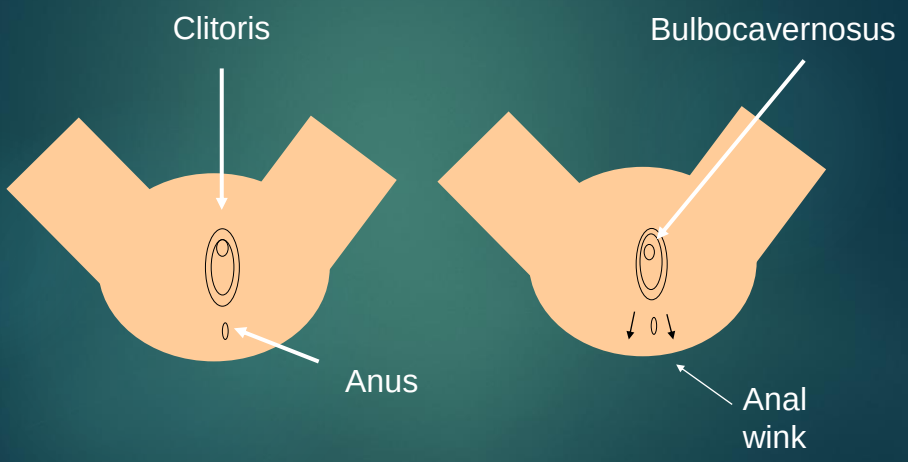
Physical: Testing Sacral Reflexes



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Physical exam

- **Genitourinary:**
  - Digital rectal exam to check for masses, fecal loading
  - **Men**: prostate nodules/firmness, masses
    - if uncircumcised, check for phimosis, paraphimosis, balanitis
  - **Women**: labial and vaginal lesions, marked pelvic organ prolapse

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Physical exam: Clinical Stress Test

- Full bladder is full
- Patient relaxes perineum and buttocks, examiner positioned to observe or catch any leakage with single vigorous cough

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Laboratory Tests

Only recommended test for all patients: urinalysis, to check for hematuria and glycosuria in diabetics

- Diagnosis of UTI requires additional signs and symptoms
- Do not treat asymptomatic bacteriuria

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TESTING: Bladder Diary

- Frequency, timing, and circumstances
- record the time and volume of all continent voids and UI episodes for 2–3 days, including day and evening

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TESTING: Postvoid Residual (PVR)

- Consider PVR measurement in those with:
  - Prior urinary retention
  - Longstanding diabetes
  - Recurrent urinary tract infections
  - Severe constipation
  - Complex neurologic disease
  - Higher than routine risk for prostate enlargement (men)
  - Marked pelvic organ prolapse

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TESTING: Urodynamic Testing

- **Routine urodynamic testing is not necessary or desirable**
- **Consider only if:**
  - The cause of UI is unclear and knowing it would change management
  - Empiric treatment has failed and the patient would consider invasive or surgical therapy

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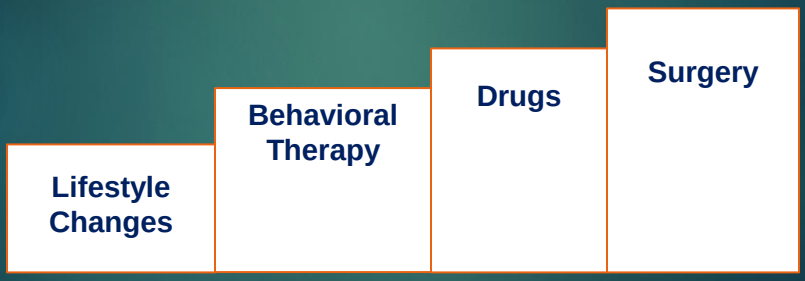
Management

- Stepped management strategy:



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LIFESTYLE FACTORS

- Weight loss (young old)
- Non evidenced but sensible:
  - Avoid extreme fluid intake, caffeinated beverages, alcohol
  - Minimize evening intake in those with nocturia
    - Elevate feet one hour before bedtime
  - Quitting smoking

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Behavioral therapy

- **Bladder training and pelvic muscle exercise (PME):** effective for urge, stress, and mixed UI
- **Prompted voiding**: cognitively-impaired patients with urge incontinence

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Bladder training

- Urgency suppression using CNS and pelvic mechanisms
  - Be still, don't run to the bathroom
  - Do several pelvic muscle contractions
  - When urgency decreases, then go to the bathroom
- Success may take several weeks; reassure patient

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Bladder training

- Frequent voluntary voiding to keep bladder volume low
  - Initial toileting frequency: About 2 hr, or use the shortest interval between voids from bladder diary if possible
  - Increase time between scheduled voids by ~30–60 minutes until reach a comfortable level balancing voiding frequency and continence

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Bladder training for cognitively impaired

- Only prompted voiding is proven effective
- Caregiver:
  - Monitors the patient and encourages him or her to report any need to void
  - Prompts the patient to toilet on a regular schedule during the day (usually every 2–3 hours)
  - Leads the patient to the bathroom
  - Gives the patient positive feedback when he or she toilets
- Habit training and scheduled voiding are not effective

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PELVIC MUSCLE EXERCISES

- Effective for urge, mixed, and stress UI
- Requires motivated patient & careful instruction,
  - Instruction books work
- **Perform an isolated pelvic muscle contraction**; avoid buttock, abdomen, thigh muscle contraction. Hold 6–8 seconds
- **Repeat the contraction 8–12 times (one set);** relax the pelvis between each contraction
- **Complete 3 sets daily at least 3–4 times a week**; continue at least 15–20 weeks

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Medications: antimuscarinic agents

- Moderately effective for urge, overactive bladder, and mixed urinary incontinence
- **Contraindicated in patients with narrow-angle glaucoma, impaired gastric emptying, or urinary retention**
- Work by increasing bladder capacity; they do not ablate uninhibited contractions
- Routine PVR monitoring is unnecessary

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ANTIMUSCARINIC AGENTS

Agent	Dosing	Considerations
Oxybutynin IR	2.5–5 mg q6–12h	
Oxybutynin ER	5–20 mg/day	
Oxybutynin patch	3.9 mg/24 h, 2x/week	
Oxybutynin gel	3% gel or 10% sachet daily	P450 interactions
Tolterodine IR	1–2 mg q12h	P450 interactions; consider dose adjustment in renal impairment
Tolterodine ER	2–4 mg/day	
Trospium IR	20 mg q12h or q24h	Renal clearance; give once daily in pts with renal impairment; should be taken on empty stomach
Trospium ER	60 mg daily in AM	
Darifenacin	7.5–15 mg/day	P450 interactions
Solifenacin	5–10 mg/day	P450 interactions; consider dose adjustment in renal impairment
Fesoterodine	4–8 mg/day	P450 interactions; prodrug that is metabolized to tolterodine; consider dose adjustment in renal impairment

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Medication side effects

- Dry mouth with increased risk of **caries and constipation**
- Class effect: **cognitive impairment**
- **Do not combine with cholinesterase inhibitors** because of lack of efficacy, risk of increased functional and possibly cognitive impairment

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Mirabegron

- β_3-adrenergic agonist that stimulates detrusor relaxation and increases bladder capacity
- Dosing: 25–50mg/d
- Similar moderate efficacy as antimuscarinics
- No cognitive issues
- May raise blood pressure
- Drug-drug interactions: digoxin, metoprolol, venlafaxine, desipramine, dextromethorphan

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OTHER MEDICATIONS

- **Duloxetine** (off-label) decreases stress incontinence
- **Vaginal estrogen** — may decrease recurrent UTIs, insufficient evidence for improvement of incontinence
- **Do not use vasopressin for nocturia** (risk of hyponatremia in older adults)
- **Insufficient evidence** for propantheline, dicyclomine, imipramine, hyoscyamine, calcium channel blockers, NSAIDs, flavoxate

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Procedures

- **Sacral nerve neuromodulation** has some effect for urge UI refractory to drug treatment and urinary retention (idiopathic and neurogenic)
- **Posterior tibial nerve stimulation** — less invasive form of neuromodulation with a response rate of 60–81% in small short-term trials
- **Intravesical injection of botulinum toxin** is effective for refractory urge UI
- **Pessaries** for women with stress or urge UI exacerbated by bladder or uterine prolapse

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SURGERY

- Highest cure rates for stress UI in women
- Most common:
  - Colposuspension (Burch operation)
  - Slings (midurethral and bladder neck)
- Periurethral injection of a bulking agent for short term (≤1 year)
- Artificial sphincters for refractory stress incontinence from sphincter damage (eg, after radical prostatectomy)

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SUMMARY

- Urinary incontinence is common
  - impaired quality of life, morbidity, and increased costs
- Age-related changes and common disorders increase risk of incontinence
- Evaluation is based on history, physical, and focused laboratory testing

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SUMMARY

- Treatment is stepwise, starting with remediation of comorbid and lifestyle factors, progressing to behavioral therapy, medications, and, if necessary, surgery

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CASE 1 (1 of 4)

- An 82-year-old man is seen for routine follow-up. He states that he is not sure he empties his bladder completely when he voids.
- He has had gradual onset of urgency with the need to void, and occasionally is incontinent on the way to the bathroom.
  - On average, he voids 8 times daily and twice overnight.
  - He occasionally experiences hesitancy when initiating a void, and the stream is interrupted and weak.
  - He describes post-void dribbling and staining on his undergarments.
- History: hypertension, hypercholesterolemia; he had a stroke 2 years ago, with no residual weakness.
- Medications: amlodipine, hydrochlorothiazide, rosuvastatin, aspirin

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CASE 1

- Examination
  - BP 118/64 mmHg.
  - The suprapubic area is slightly tender and dull to percussion. Genitalia are normal.
  - The prostate is moderately enlarged and nontender, without nodularity or other abnormality.
  - Bladder ultrasonography after attempted void shows postvoid residual of 175 mL.
  - Urinalysis reveals no evidence of infection.
  - Creatinine level is 1.1 mg/dL.

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CASE 1

Which one of the following is the most appropriate next step?

A. Stop hydrochlorothiazide.
B. Start oxybutynin.
C. Start tamsulosin.
D. Refer for urodynamic evaluation.

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