Urinary Incontinence in the Elderly

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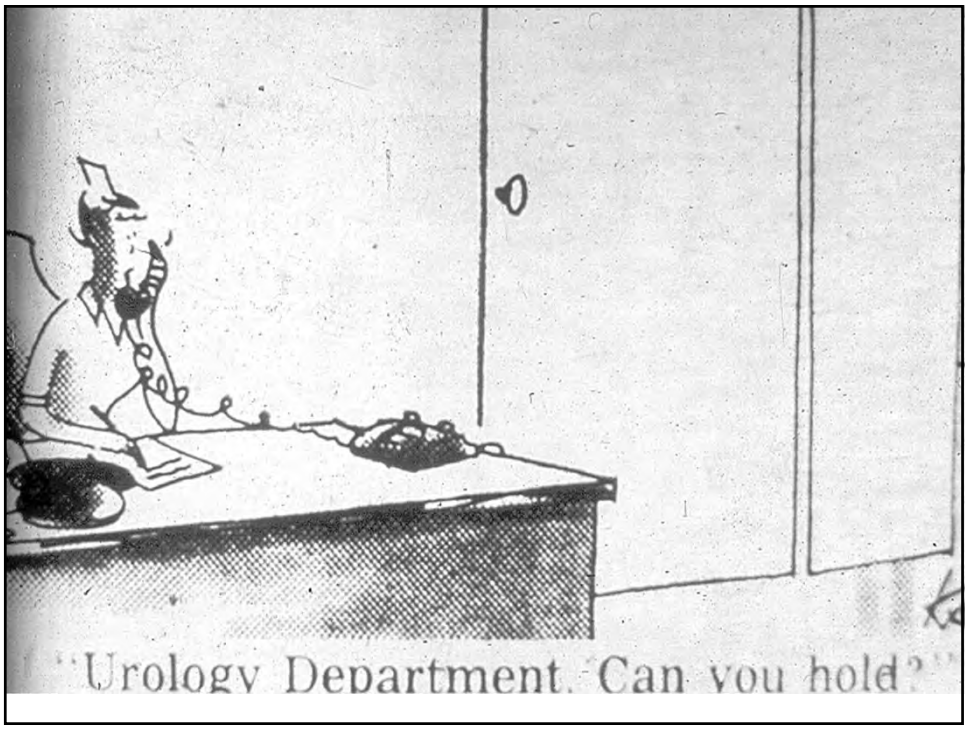
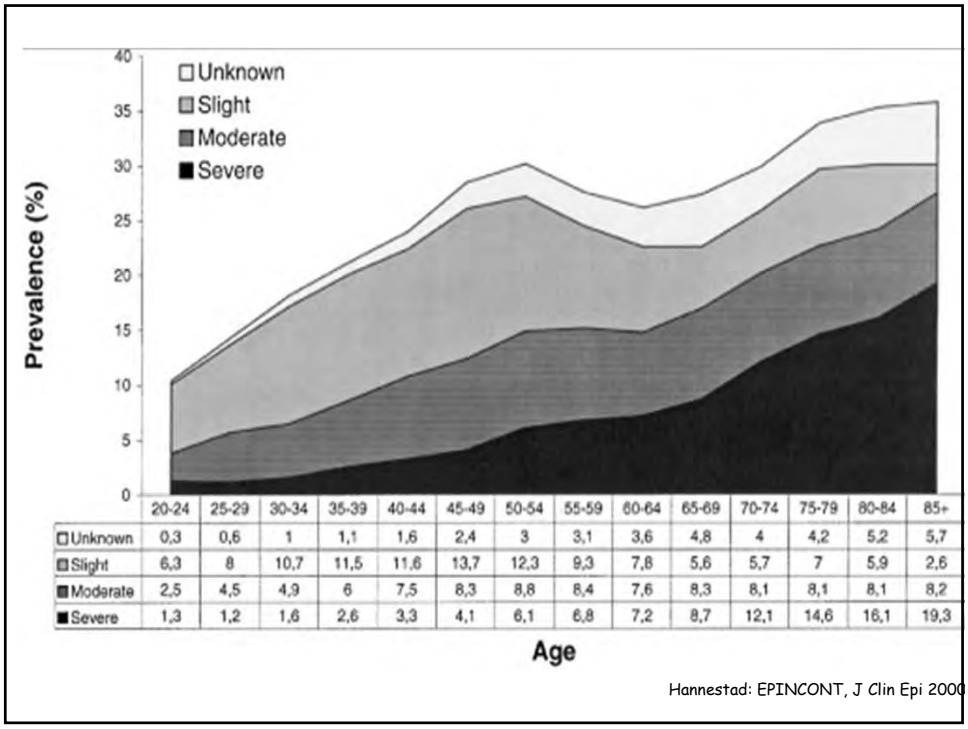
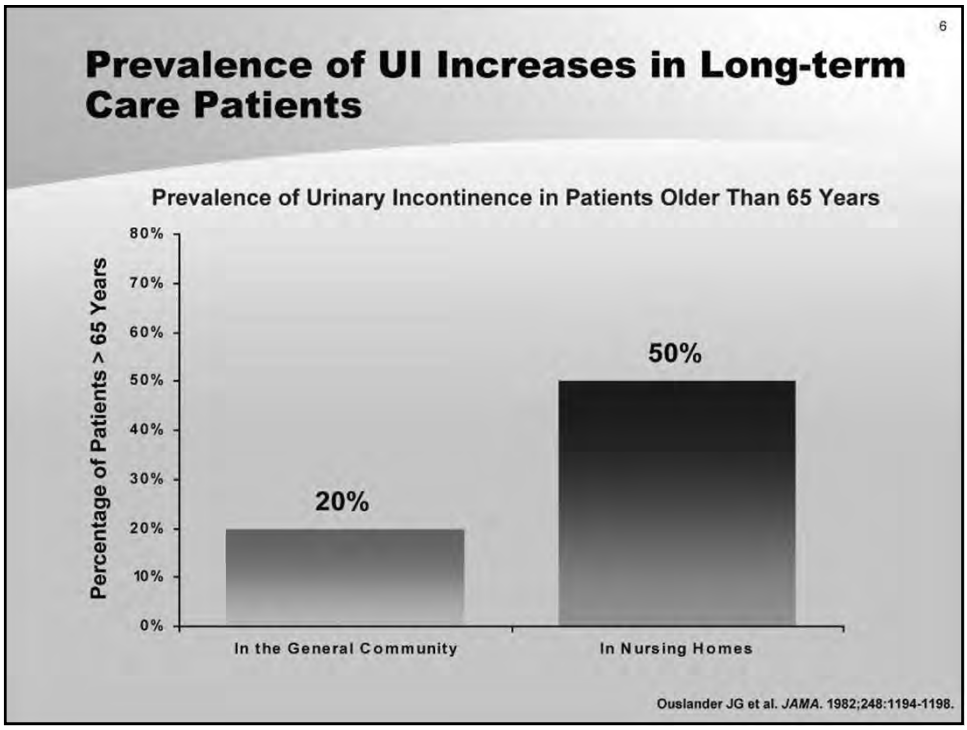




	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+
Unknown	0,3	0,6	1	1,1	1,6	2,4	3	3,1	3,6	4,8	4	4,2	5,2	5,7
Slight	6,3	8	10,7	11,5	11,6	13,7	12,3	9,3	7,8	5,6	5,7	7	5,9	2,6
Moderate	2,5	4,5	4,9	6	7,5	8,3	8,8	8,4	7,6	8,3	8,1	8,1	8,1	8,2
Severe	1,3	1,2	1,6	2,6	3,3	4,1	6,1	6,8	7,2	8,7	12,1	14,6	16,1	19,3

Age

Hannestad: EPINCONT, J Clin Epi 2000



Prevalence of UI increases with age

- Abnormal at any age
- At no age does incontinence affect the majority of individuals--even after 85
- Result of diseases and functional impairments more likely with growing older than age itself
- Treatable and often curable at all ages

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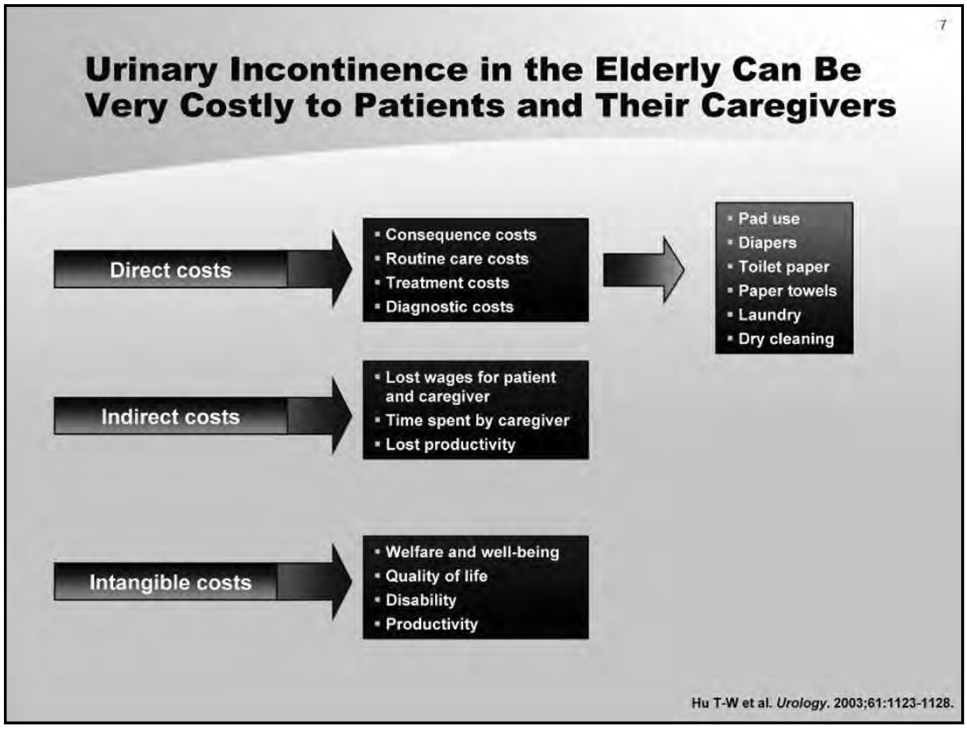
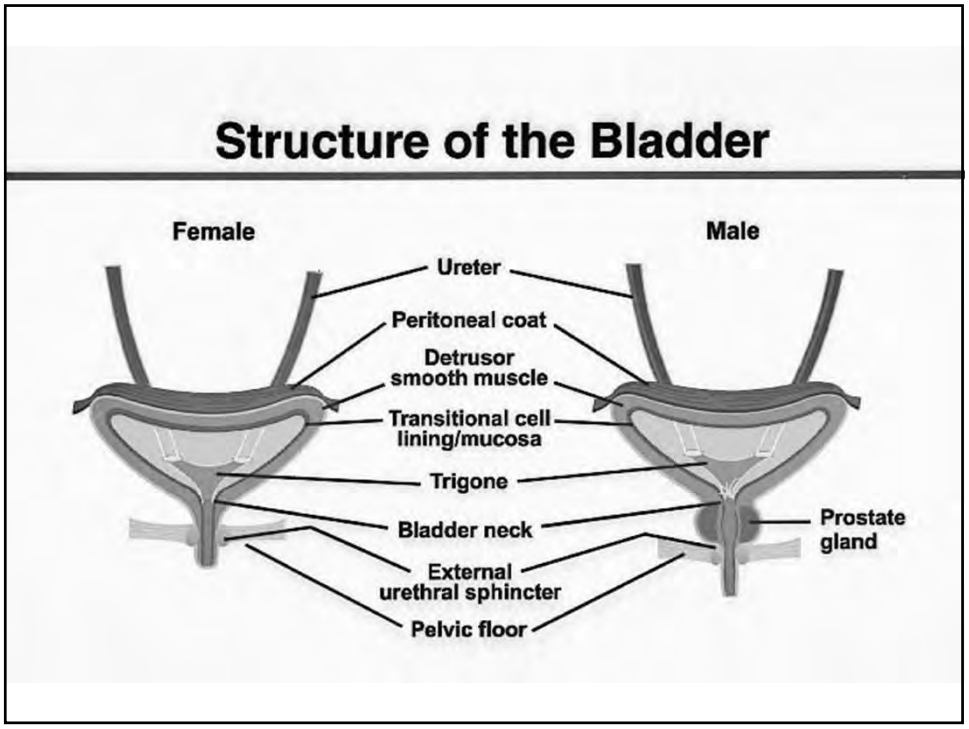
Urinary Incontinence Can Have a Devastating Impact on Elderly Patients

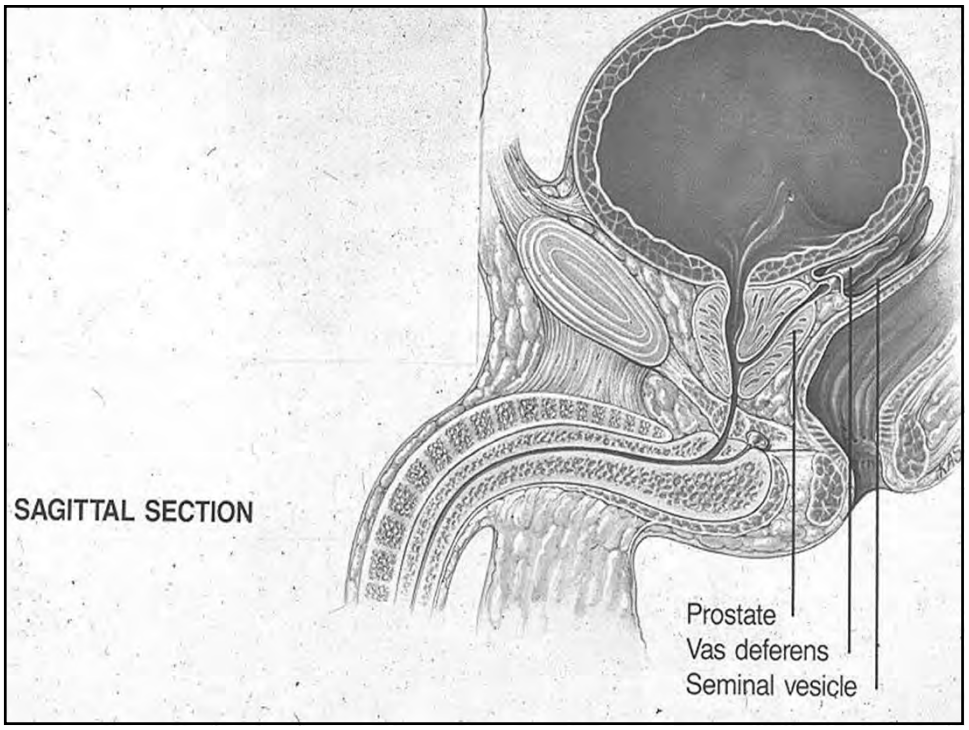
- Left untreated, urinary incontinence, a bothersome symptom of overactive bladder, can lead to:
  - Fear of wetting accidents, increased social isolation, and depression
  - Increased risk of falls and fractures by 26% and 34%, respectively
  - Decline in health-related quality of life
  - Sleep disturbances and decreased daytime function

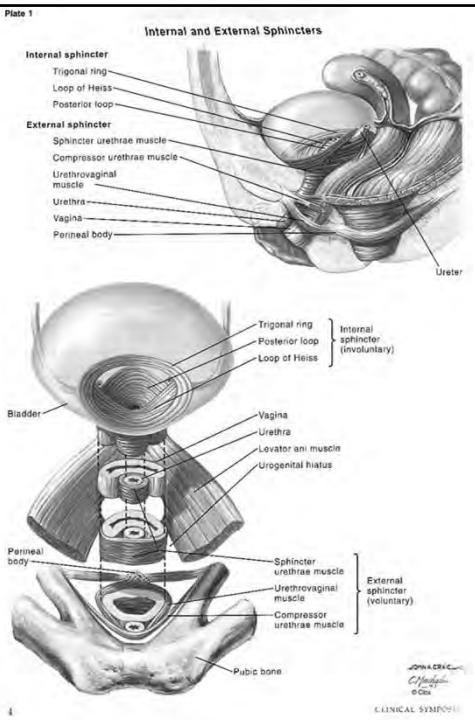
McGhan WF. *Am J Manag Care*. 2001;7(suppl):S62-S75.
Brown JS et al. *J Am Geriatr Soc*. 2000;48:721-725.
Hu T-W et al. *Urology*. 2003;61:1123-1128.
Wein AJ et al. *Int J Fertil*. 1999;44:56-66.



Anatomy/Physiology


Structure of the Bladder
Female
Male
Ureter
Peritoneal coat
Detrusor smooth muscle
Transitional cell lining/mucosa
Trigone
Bladder neck
Prostate gland
External urethral sphincter
Pelvic floor


SAGITTAL SECTION
Prostate
Vas deferens
Seminal vesicle



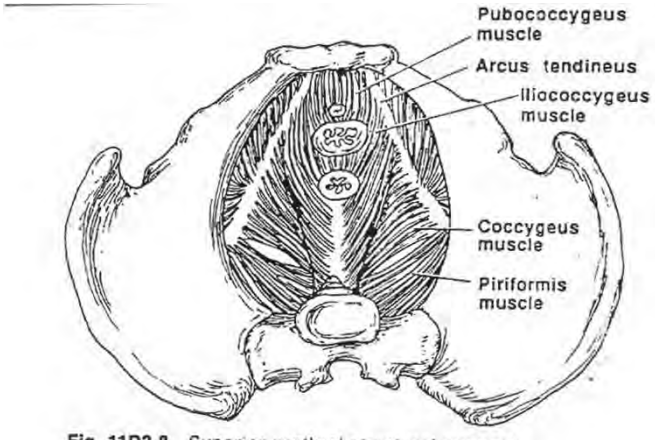
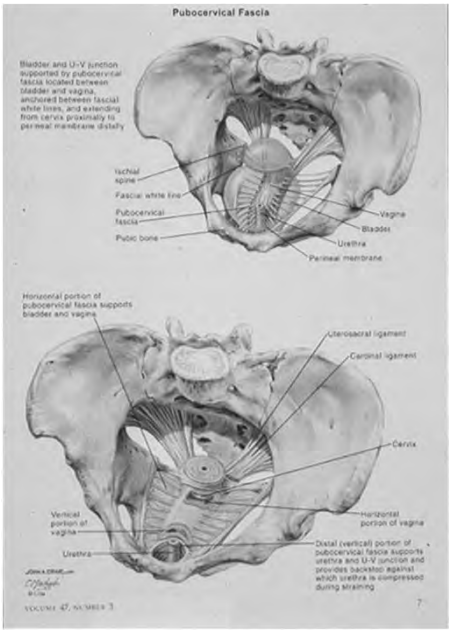
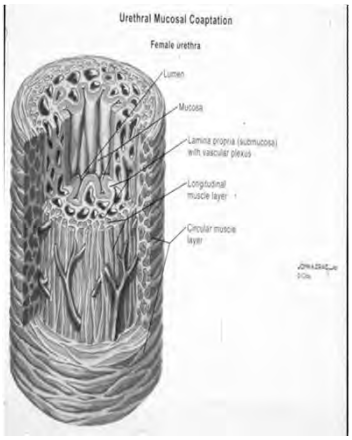


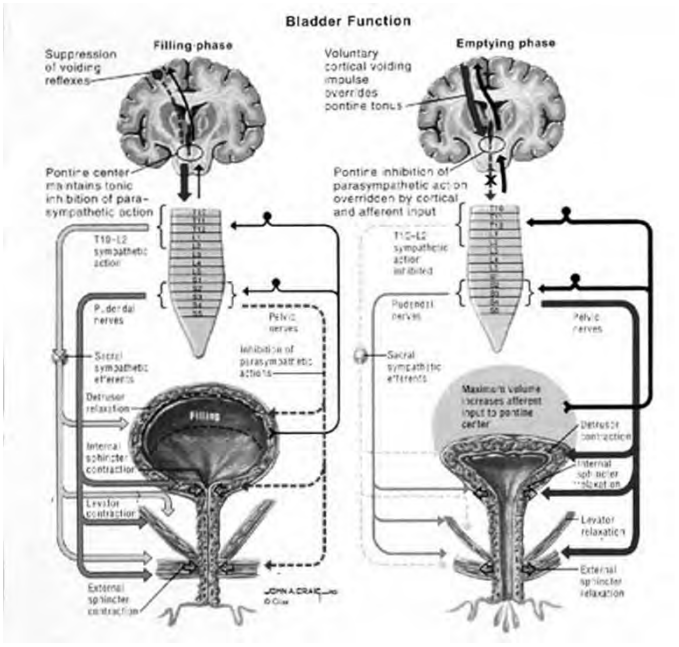
Fig. 11D2-8 Superior urethral structural supports.



Intrinsic Urethral Closure Mechanism

- Smooth muscle of urethra
- Striated muscle of urethra
- Non-neuromuscular
  - Connective tissue
  - Vascular plexus
  - Urethral mucosa




Bladder Function
Filling phase
Emptying phase
Suppression of voiding reflexes
Voluntary cortical voiding impulse overrides pontine tonus
Pontine center maintains tonic inhibition of parasympathetic action
Pontine inhibition of parasympathetic action overridden by cortical and afferent input
T10–L2 sympathetic action
T10–L2 sympathetic action inhibited
Pudendal nerves
Pelvic nerves
Sacral sympathetic efferents
Inhibition of parasympathetic actions
Detrusor relaxation
Filling
Internal sphincter contraction
Levator contraction
External sphincter contraction
Maximum volume increases afferent input to pontine center
Detrusor contraction
Internal sphincter relaxation
Levator relaxation
External sphincter relaxation

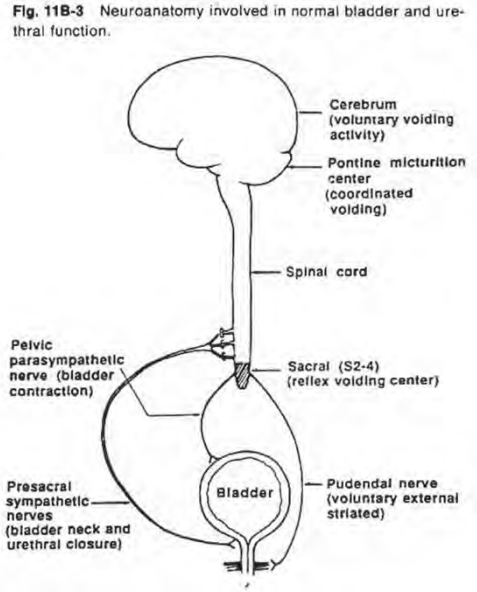
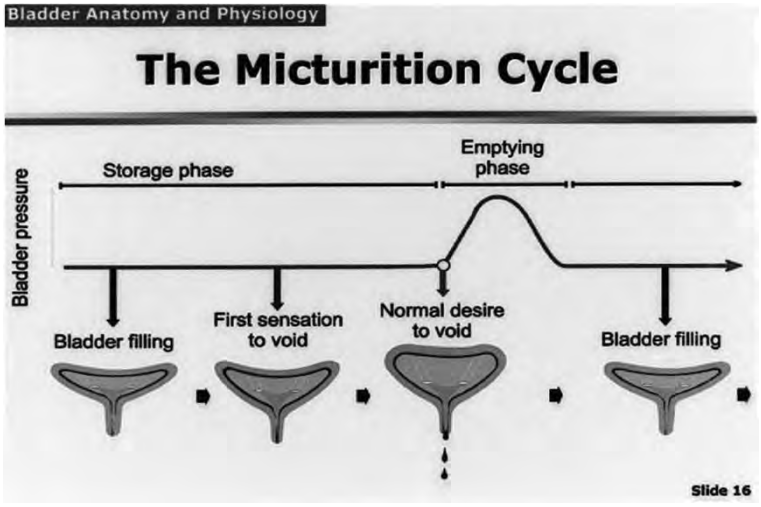


Fig. 11B-3 Neuroanatomy involved in normal bladder and urethral function.
Cerebrum (voluntary voiding activity)
Pontine micturition center (coordinated voiding)
Spinal cord
Pelvic parasympathetic nerve (bladder contraction)
Sacral (S2-4) (reflex voiding center)
Bladder
Presacral sympathetic nerves (bladder neck and urethral closure)
Pudendal nerve (voluntary external striated)



Age-related Changes in the Lower Urinary Tract

Bladder: decreased contractility, capacity and ability to post-pone voiding (increase prevalence of OAB, PVR 50-100cc)

Uretha: decreased urethral length, closure pressure and striated sphincter muscle

Prostate: enlarges in most men and causes some obstruction in over 50%

Nocturia

Bladder/prostate often not primary issue. Consider fluid intake, vascular, renal, pulmonary and sleep disorders.

Elderly excrete most of fluid at night even without venous insufficiency, renal/heart disease.

Elderly have more sleep disorders

Normal elderly nocturia 1-2x/night

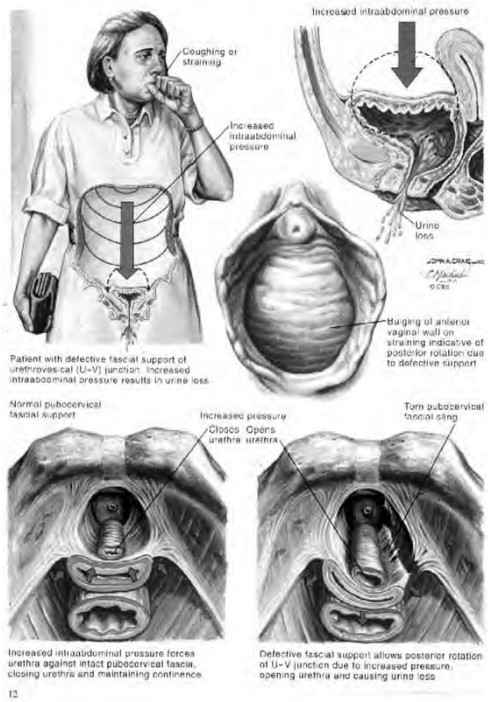
Types of Urinary Incontinence

- Stress
- Urge
- Mixed
- Overflow
- Transient
- Established
- Functional

Established Incontinence

Stress Incontinence

- Second most common cause of incontinence in older women
- Urethral hypermobility, ISD (intrinsic sphincter deficiency
- Men can experience after prostatectomy


Increased intraabdominal pressure
Coughing or straining
Increased intraabdominal pressure
Urine loss
Bulging of anterior vaginal wall on straining indicative of posterior rotation due to defective support
Patient with defective fascial support of urethrovesical (U–V) junction. Increased intraabdominal pressure results in urine loss.
Normal pubocervical fascial support
Increased pressure
Closes urethra
Opens urethra
Torn pubocervical fascial sling
Increased intraabdominal pressure forces urethra against intact pubocervical fascia, closing urethra and maintaining continence.
Defective fascial support allows posterior rotation of U–V junction due to increased pressure, opening urethra and causing urine loss
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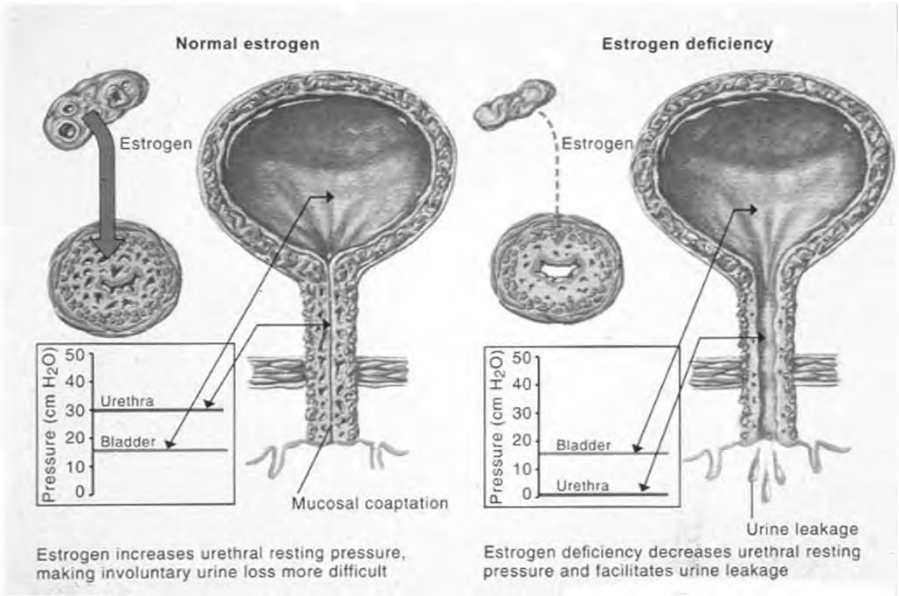

Normal estrogen
Estrogen
Pressure (cm H_2O)
50
40
30
20
10
0
Urethra
Bladder
Mucosal coaptation
Estrogen increases urethral resting pressure, making involuntary urine loss more difficult
Estrogen deficiency
Estrogen
Pressure (cm H_2O)
50
40
30
20
10
0
Bladder
Urethra
Urine leakage
Estrogen deficiency decreases urethral resting pressure and facilitates urine leakage

Urge Incontinence

- Most common type of lower urinary tract dysfunction in incontinent elderly of either sex
- Overactive Bladder: urinary frequency, urgency, with or without incontinence
- Detrusor overactivity: documented on urodynamics
- Other terms…detrusor instability, detrusor hyperreflexia

Overflow Incontinence

- Detrusor Underactivity
  - <10% geriatric incontinence
  - Neuropathy ie diabetes, obstruction
- Bladder outlet obstruction
  - Second most common cause of incontinence in older men
  - Prostatic hypertrophy, urethral stricture

Onset or exacerbation of incontinence in an older person in likely to be due to precipitants outside the urinary tract that are amenable to intervention.

Causes of Transient Incontinence

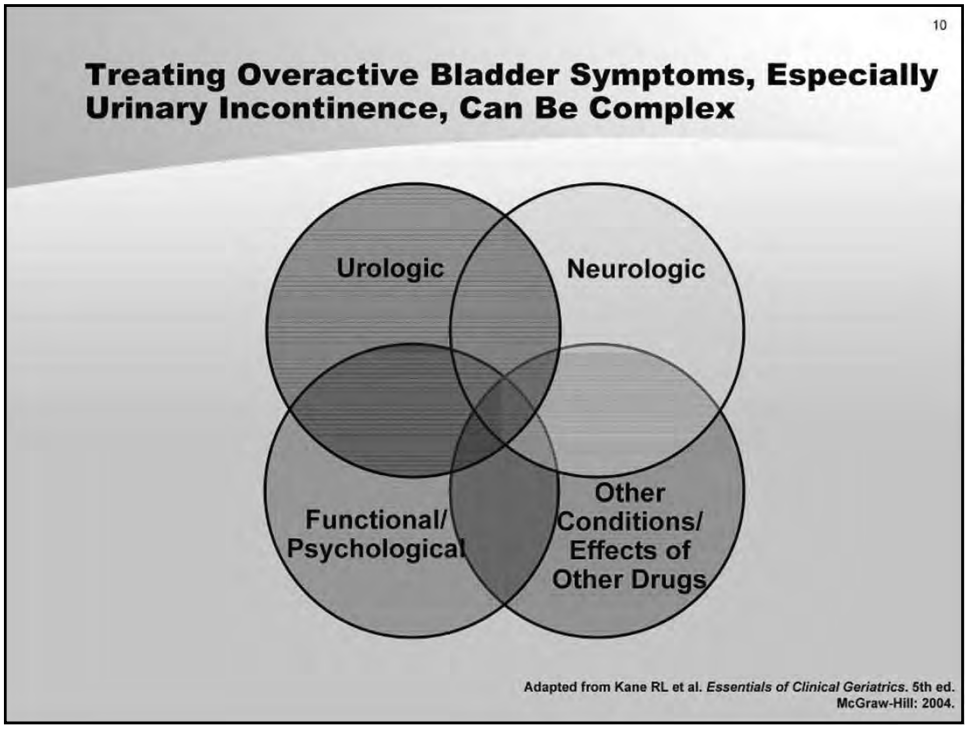
- Delirium/confusional state
- Infection-urinary (only symptomatic)
- Atrophic vaginitis
- Pharmaceuticals
- Excess urine output (e.g. CHF)
- Restricted mobility
- Stool impaction

Commonly used medications that may affect continence

- Sedatives/hypnotics
- Antichcolinergics
  - Antipsychotics, antidepressants,anti Parkinson's
- Narcotics
- Alpha-blockers
- Alpha-agonists
- Calcium channel blockers
- Diuretics
- ACE inhibitors

Functional Incontinence

- ? Distinct type of geriatric incontinence attributed to deficits of cognition and mobility?
  - 17% severely demented institutionalized were continent, if could transfer from bed to chair half were continent. Resnick et al 1988
- Functional impairment is an important factor contributing to incontinence



Diagnostic Approach

- Identify patient's goals
- Identify transient and established causes
- Assess environment and support

History

- Review transient causes
- Voiding pattern and type of incontinence
  - Urgency: 20% older individuals with OAB do not have
  - Frequency: habit, anxiety, large urine production
  - Nocturia: sleep disorder, large urine production

Voiding diary

Bladder Diary

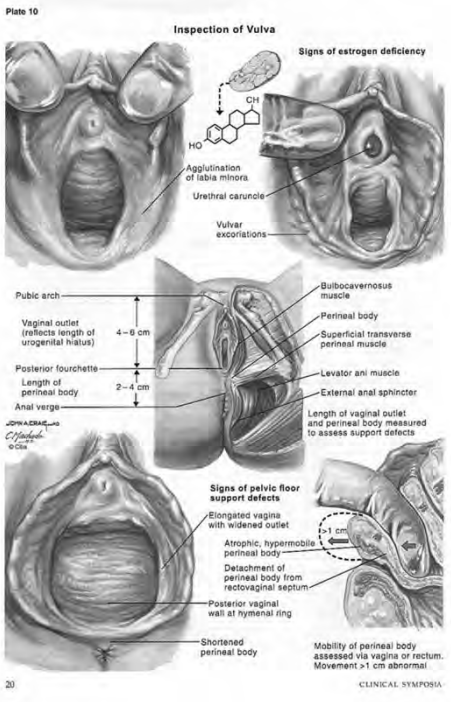
Date ..... **Name** Jane Jones

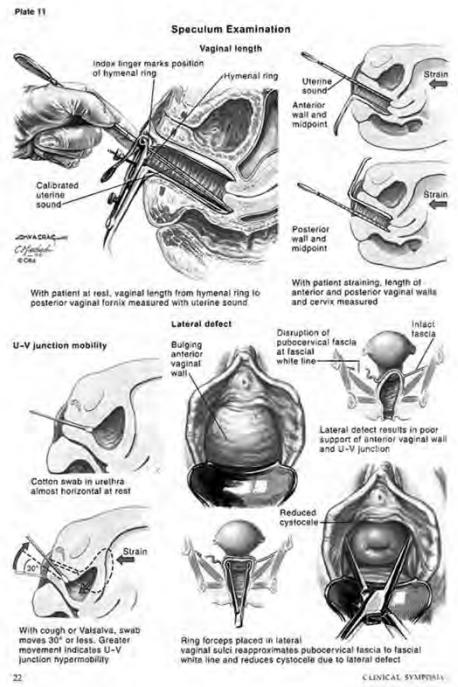
Day 1 **DoB** ...20/09/57

Fluid In			Urine out		Comments		
Time	**Type of drink**	**Amount of drink (ml)**	**Time**	**Amount** in ml	**How urgent** 1-3 3 = most urgent	**Activity at the time** e.g. reaching front door	**Leakage** damp / wet / soaked
			02.30	370	2	Woke to use toilet	None
			05.30	200	3	Woke to use toilet	Wet
07.30	Orange juice Coffee	150 300	07.45	150	2	Brushing teeth	Damp
08.00	Coffee	250	08.20	110	3	Waited too long	Wet
09.00	Water Diet	100 330					

Physical Exam

- Abdominal: masses, palpable bladder
- Neurologic: stroke, Parkinson's, etc
- Pelvic/Rectal:atrophy, prolapse, urethral hypermobility, impaction, prostate size/tenderness/nodularity
- General exam: lower extremity edema, strength/balance-observe getting up from chair and walking





Other diagnostics

- Post-void residual
- Stress test
- Urinalysis/urine culture
- Creatinine, glucose
- Urodynamics (if needed/more complex)

Therapy

Tx for Detrusor Overactivity

- Behavioral Therapy
- Pelvic floor muscle exercises
- Medications
- Neuromodulation
  - Posterior tibial nerve stimulation (PTNS)
  - Sacral neuromodulation (Interstim)
  - Botox

Diet Modification

- Daily fluid intake: Reduce nighttime fluids to manage nocturia
- Eliminate bladder irritants such as caffeine, alcohol, nicotine, and for some spicy/acidic foods
- Add fiber to diet if constipation is a problem

Behavioral Treatment Options Are Useful in Managing Overactive Bladder With Urgency Urinary Incontinence

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- Education regarding overactive bladder and treatment expectations
- Fluid management
- Bladder training (voiding strategies)
  - Delayed voiding with urgency suppression
  - Timed or prompted voiding
- Pelvic floor muscle (Kegel) exercises
- Biofeedback
  - Used to assist teaching of Kegel exercises
  - Used to assist bladder training and urge suppression
    - Eg, teaching sphincter contractions to aid urge suppression

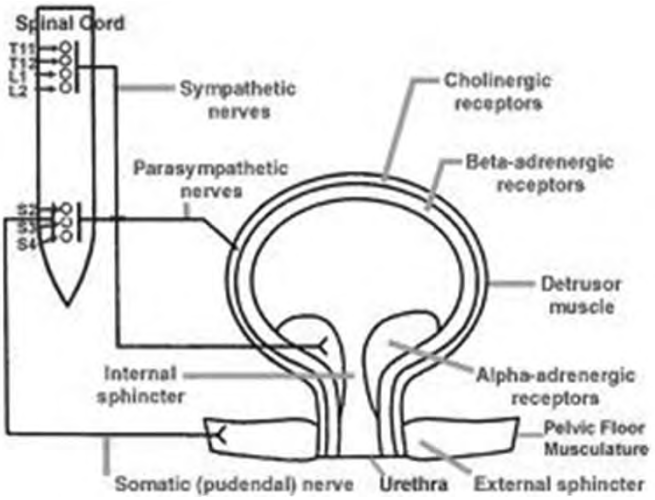
Kane RL et al. *Essentials of Clinical Geriatrics*. 5th ed. McGraw-Hill: 2004.

Limitations of Behavioral Therapies

- Require motivation in both patient and caregiver
- Success depends on intensity of program
- High cost in terms of caregiver time
- May take > 2 months to have an impact

Medications for OAB

- Oxybutinin (Ditropan/Gelnique) IR, ER
- Tolterodine (Detrol) IR, ER
- Solifenacin (Vesicare)
- Trospium (Sanctura)
- Darifenacin (Enablex)
- Fesoterodine (Toviaz)
- Imipramine (Tofranil)
- Hyoscyamine (Levsin) IR, ER
- Mirabegron (Myrbetriq)



Bladder receptors

Anticholinergics for OAB

Tolterodine (Detrol)
- IR: 1 - 2 mg BID
- LA: 2 - 4 mg QD

Trospium (Sanctura)
- IR: 20 mg BID
- XR: 60 mg QD

Oxybutynin Chloride (Ditropan)
- IR: 5 mg BID - TID
- Patch: 3.9 mg QD
- ER: 5/10/15 mg QD

Darifenacin (Enablex): ER: 7.5/15 mg QD

Solifenacin (Vesicare): ER: 5/10 mg QD

Fesoterodine (Toviaz): ER: 4/8 mg QD

<u>Contraindications</u>
- Glaucoma
  - Narrow angle
- Bowel obstruction
- Kidney/Hepatic Dz.

<u>Side effects</u>

Dry mouth, Constipation, Blurred vision, Headace, CNS effects

<u>Dates of Release in US</u>
- 1999: Ditropan ER
- 2001: Detrol LA
- 2004: Sanctura
- 2005: Enablex
- 2005: Vesicare
- 2008: Toviaz

OAB Medications: Estrogen

- **Nelken RS, et al: Randomized trial of estradiol vaginal ring versus oral oxybutynin for the treatment of**

	Oxybutynin			Estradiol ring			
	Baseline	12 wk	*P*	Baseline	12 wk	*P*	Difference between groups
No. of voids in 24 h	14.7 (5.3)	11.7 (6.1)	0.003	14.9 (5.3)	10.4 (4.2)	<0.001	0.71
UDI-6 score	12.1 (4.3)	9.4 (4.8)	0.003	11.4 (3.5)	7.8 (4.3)	<0.001	0.58
IIQ-7 score	14.7 (5.8)	11.3 (6.9)	0.02	13.2 (4.8)	8.1 (6.4)	<0.001	0.37
Vaginal pH level	5.8 (0.9)	5.8 (0.8)	0.72	6.0 (1.0)	4.9 (0.9)	0.002	<0.001
Maturation index	36.3 (34.4)	34.8 (30.1)	0.76	24.3 (28.3)	70.1 (21.5)	<0.001	<0.001

Data are presented as mean (SD).
UDI, Urogenital Distress Inventory; IIQ, Incontinence Impact Questionnaire.

Mirabegron (Mybertriq)

- Class: Beta adrenergic (Beta 3 adrenergic receptors found in bladder, adipose tissue, heart, blood vessels, gastrointestinal tract, prostrate, brain and near-term myometrium.
- Beta 3 agonist relaxes detrusor muscle, decreases afferent signaling from the bladder, improves bladder compliance on filling and increases bladder capacity.
- FDA approved 2012
- Dosage 25mg, 50mg po QD
- Often not covered by insurance

Combination of Behavioral Treatment and Pharmacotherapy

- Combination therapy is more effective than either therapy alone
- Using combination therapy results in greater reduction in urge incontinence
  - 57.5% reduction with behavioral alone
  - 88.5% reduction with combined therapy

» Burgio KL, et al. J AM Geriatr Soc; 48:370-374

Nocturnal Polyuria: >65 yo->33% urine production at night

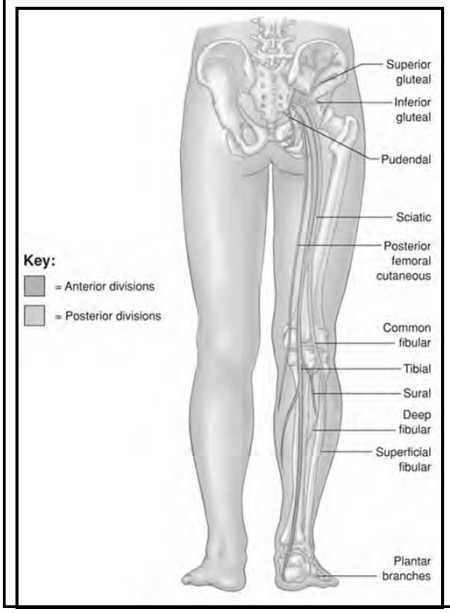
NOCTIVA/NOCDURNA

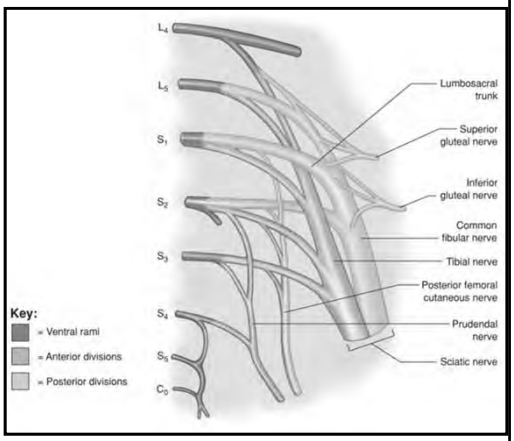
(DESMOPRESSION)

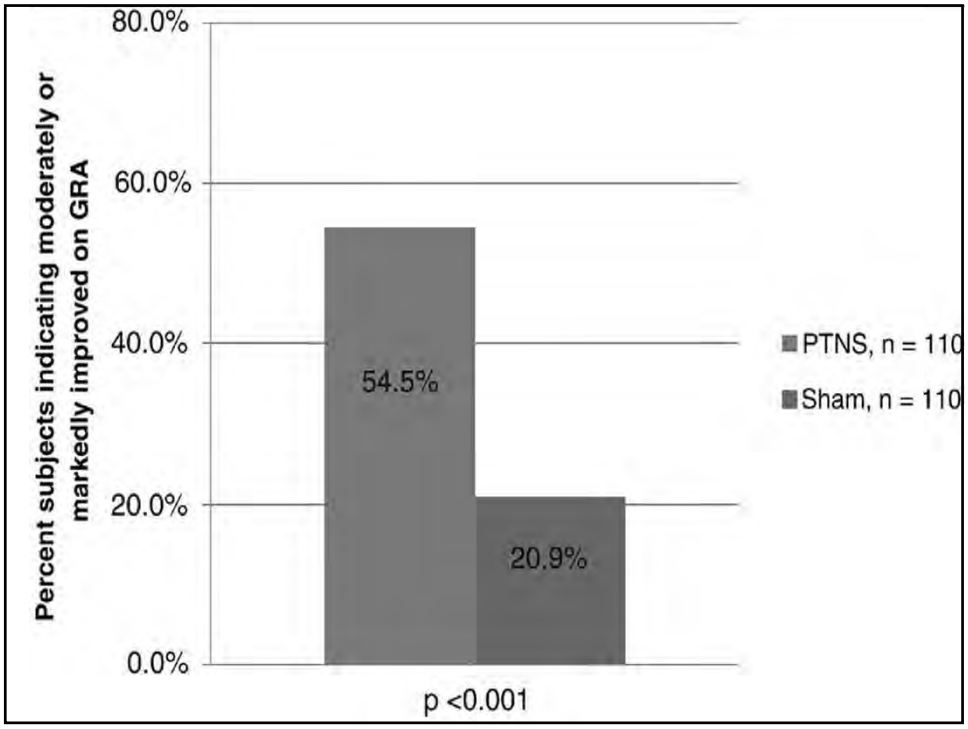
Treatment with PTNS

(Urgent® PC)

Posterior Tibial N. Stimulation: Urgent PC



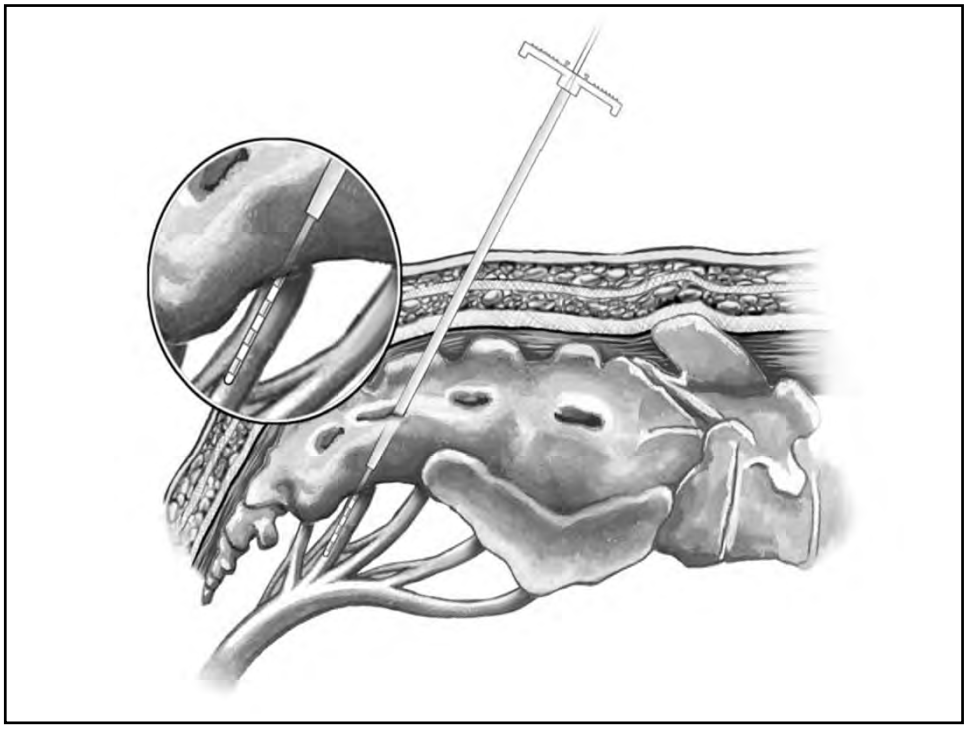




Interstim Therapy: Sacral Nerve Stimulation

- Currently indicated for:
  - Urinary urge incontinence
  - Urgency-frequency in patients who have failed 1st line Rx
  - Urinary retention
  - **Fecal incontinence**

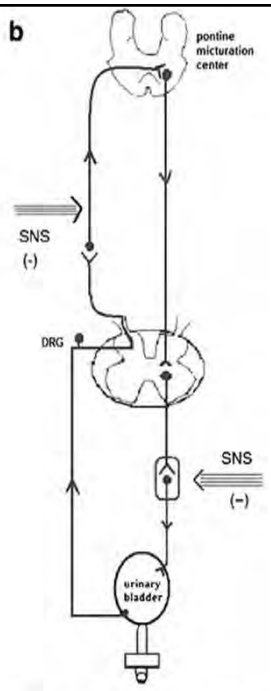
Foster R. Predicting implantation with a neuromodulator, 2007



Mechanism of Action

- Mechanism of action for SNS is **NOT** understood at this time

- Generally agreed that stimulation of the sacral nerves modulates the neural reflexes that influence the bladder, sphincter and pelvic floor that control/influence voiding.
- Evidence of impact from brain to bladder when SNM activated



Overactive Bladder and SNS

Elkeleni M, et. al. Int Urogynecol J. 2010 (21); S439-446

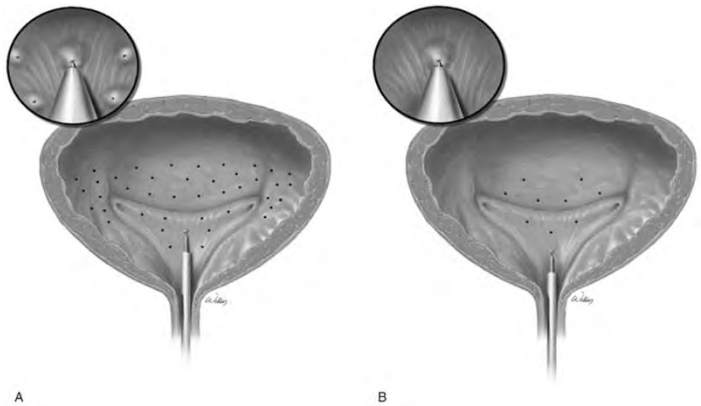
What is Botulinum Toxin

- Protein produced by *Clostridium botulinum*
  - Considered the most powerful neurotoxin ever discovered
  - Toxin purified in 1928
  - Mechanism described in 1949
  - San Francisco opthamologists, Scott & Schantz fist to start work with BT for therapeutic purpose in 1960
  - 1980 officially used in humans for the first time for strabismus and blepharospasm

Clinical Aspects of Botulinum Toxin Use

- FDA labeled indications: Botox®
  - Strabismus
  - Blepharospasm
  - Hyperhydrosis
  - Cervical Dystonia
  - Achalasia
  - Migraine
  - Cosmetic: glabellar lines in patients <65 years old
    - Most common cosmetic operation – 4.6 million procedures annually
- **FDA Approved for Neurogenic OAB in 2011**
- **FDA Approved for Idiopathic OAB in 2013**

Bladder treatment with Botulinum



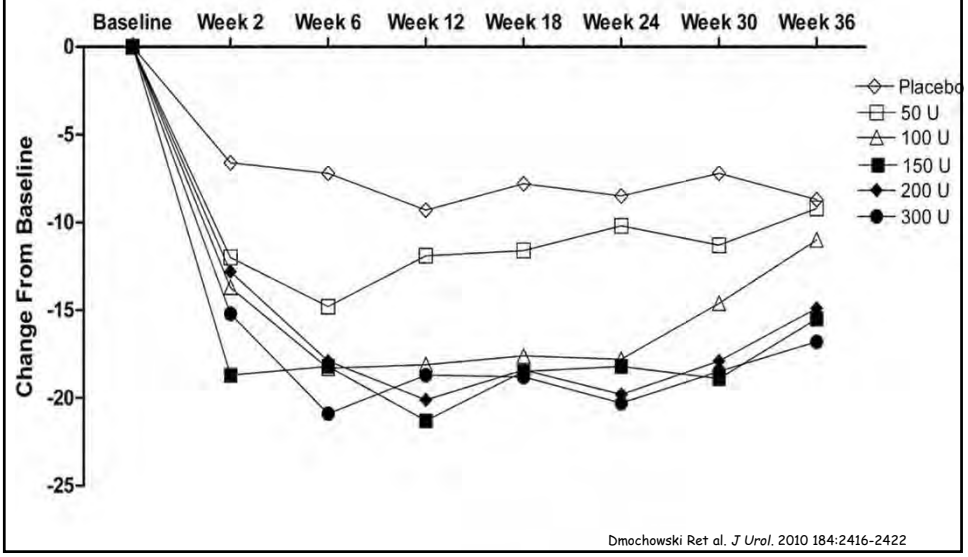
Type A most commonly used (longest t ½)

OnabotulinumtoxinA (Botox®) Allergan, Irvine, CA
AbobotulinumtoxinA (Dysport®) Ipsen, Brisbane, CA

Type B

RimabotulinumtoxinB (Myobloc®) Solstice Neurosciences San Francisco CA

Dose ranging study



Dmochowski Ret al. *J Urol*. 2010 184:2416-2422

Urge Incontinence

- Catheters:
  - Condom catheters can be helpful for men, but can see skin breakdown, bacteruria and decrease motivation to become dry
  - Indwelling catheters: use small catheter with a small balloon to avoid exacerbating bladder contractions

Tx for Stress Urinary Incontinence

- Pelvic floor muscle exercises
- Devices: pessary, urethral insert
- Medications: alpha agonists, imipramine
- Bulking agents: several agents, include:Coaptite, Macroplastique
- Surgery: mid-urethral synthetic sling, fascial sling, Burch urethropexy

GSUI Treatment/Outcomes

- Behavioral--?
- Exercises: 50% “not a problem”
- Bulking agents: collagen 60-80% dry
- Surgery
  - Sling (mesh/fascia): 77-100% dry, Burch 70-91% dry
- Devices
  - Pessary: 25% dry, Femsoft Insert: 93% dry
- Medications
  - Imipramine:35% dry, estrogen?,alpha-agonists?

Mesh Controversy

On April 16, 2019 the FDA ordered all manufacturers of surgical mesh intended for TV repair of cystocele **to stop selling and distributing their products immediately.**

Overflow Incontinence

- Poorly contractile bladder
  - Decompression trial
  - Clean intermittent self catheterization (if caregiver in institutional setting, sterile technique preferred)
  - Indwelling catheter
- Male outlet obstruction:
  - Alpha blockers
  - 5 alpha reductase inhibitors:less effective in elderly
  - Surgical resection

Incontinence is never normal.

Aging does decrease physiologic reserve, increasing the likelihood of incontinence in the setting of other physiologic, pharmacologic, environmental insults. Thus a multifactorial approach is often needed and will increase the chances of a satisfactory outcome.

Evaluation/Assessment

- Identify transient and established causes of incontinence, assess the patient's environment and available support and determine conditions that may underlie continence.
- Assessment must be tailored to the individuals's clincal status and goals tempered by the realization that not all detected conditions can be cured, that simple interventions may be effective even in the absence of a diagnosis.

Successful treatment of established incontinence especially in the elderly is usually multifactorial and requires addressing factors beyond the urinary tract.

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Case Studies

1. 74-year-old female
2. 75-year-old male
3. 86-year-old female receiving long-term care

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Case Study 1: 74-Year-Old Female

- Initial presentation
  - 74-year-old female
  - Complains of urinary frequency, urgency, and UUI
    - Voids: 10-11x per day; 2-4x per night
  - Coping behaviors
    - Restriction of fluid intake (1 cup water; 2 cups coffee)
    - Large volume leakage requiring 3-4 pads per day
  - Occasional UTIs; no hematuria

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Case Study 1: 74-Year-Old Female (cont'd)

- Medical history
  - Hypertension, hyperlipidemia, constipation
  - Medications: Lipitor® (atorvastatin calcium); Norvasc® (amlodipine besylate)
  - No previous surgical history
  - Tried and failed home self Kegel exercises
- Physical examination
  - Pelvic: No pelvic organ prolapse, no stress incontinence
  - Rectal: Full of hard stool
- Laboratory test
  - Urinalysis: Negative

Lipitor is a registered trademark of Pfizer Ireland Pharmaceuticals.
Norvasc is a registered trademark of Pfizer Inc.

DETROL® LA (tolterodine tartrate extended release capsules)

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Case Study 1: 74-Year-Old Female (cont'd)

- Initial treatment
  - Reduce caffeine intake
  - Increase fluid intake
    - 5 to 6 eight-oz glasses of water per day
  - Increase fiber
  - Rehabilitation of pelvic floor muscles with professional trainer
- Follow-up visit #1 (1 month)
  - Bowel movement every other day
  - Reduced frequency
  - Incontinence minimally improved
  - Treatment
    - DETROL LA 4 mg once daily
    - Patient educational materials on OAB
    - Pelvic muscle rehabilitation/initiation of urge suppression techniques
    - Bladder retraining with a goal of 3 hours between micturitions

Please see full prescribing information and patient information available at this presentation.

Case Study 1: 74-Year-Old Female (cont'd)

- Follow-up visit #2 (2 months after therapy initiation)
  - Patient reports via symptom diary:
    - 8 voids per day using timed voiding
    - Completed pelvic floor rehabilitation; does pelvic floor muscle exercises routinely; continues timed voiding every 3 hours
    - Experiences occasional leakage and uses pads when away from home
    - Feels more in control of bladder
    - No bothersome side effects from DETROL LA

Please see full prescribing information and patient information available at this presentation.

Case Study 2: 75-Year-Old Male

- Initial presentation
  - 75-year-old male
  - Complaining of urinary symptoms
    - Voids: 10-12x per day; 4-5x per night
    - Mild decrease in force of stream
  - Urgency with occasional leakage of a few drops
  - No hematuria or UTIs
  - Consumes 2-3 beers at night

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Case Study 2: 75-Year-Old Male (cont'd)

- Medical history
  - Hypertension
  - Medications: Cardura® 4 mg @ HS, HCTZ
- Physical examination
  - Abdomen: Normal, no palpable suprapubic mass
  - Rectal: Prostate (30 g) smooth, nontender, no nodules
- Laboratory tests
  - Urinalysis: Negative
  - PSA: 0.12

Cardura is a registered trademark of Pfizer Inc.

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Case Study 2: 75-Year-Old Male (cont'd)

- Initial treatment
  - Consideration: Male with OAB symptoms on an α-blocker for hypertension
    - Discuss treatment for OAB
    - Decrease alcohol consumption in evening
    - Patient given educational materials on OAB
    - Initiate DETROL LA 4 mg once daily
    - Continue Cardura® and HCTZ

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DETROL® LA (tolterodine tartrate extended release capsules)

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Case Study 2: 75-Year-Old Male (cont'd)

- Follow-up visit: 6 weeks
  - Patient reports improvement in symptoms
    - Waking up at night has decreased (now 1-2x a night)
    - Frequency much better (now voiding 8x per day)
    - Significant reduction in urgency, with no accident in past month
    - No bothersome side effects from DETROL LA
    - Overall, very pleased with outcome
  - Long-term plan
    - Continue with DETROL LA 4 mg once daily
    - Continue with Cardura®
    - Follow up in 1 year

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Case Study 3: 86-Year-Old Female

- Initial presentation
  - An 86-year-old female admitted to a long-term care facility following a hip fracture and hip replacement surgery
  - Uses walker for ambulation
  - Onset of UUI and bed wetting in hospital
  - Prior to surgery:
    - Voids: 8-10x per day; 3-5x per night
    - Had occasional UUI

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Case Study 3: 86-Year-Old Female (cont'd)

- Medical history
  - Type 2 diabetes
  - Hypertension
  - Osteoporosis
  - Medications: Linisopril 10 mg po qd, glipizide 5 mg po qd, calcium supplement
- Physical examination
  - Abdomen: No suprapubic masses; bladder not palpable
  - Pelvic: No prolapse visible at introitus, no stress incontinence
- Laboratory tests
  - Urinalysis: Specific gravity 1.020, dipstick positive for nitrites, leukocyte esterase, and trace blood
  - Culture: Positive for *E coli*

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Case Study 3: 86-Year-Old Female (cont'd)

- Initial treatment
  - Ciprofloxacin 250 mg po twice daily for 13 days
  - Timed voiding
- Follow-up visit #1 (1 week)
  - Daytime accidents better (ambulation is improved), but still wetting the bed
  - Initiate DETROL LA 4 mg once daily at night

Case Study 3: 86-Year-Old Female (cont'd)

- Follow-up visit #2 (4 weeks)
  - Urinalysis: negative urine dipstick
  - Improved ambulation—using cane
  - Urinating every 2-3 hours on her own
  - No longer having incontinence episodes
  - No bothersome side effects from DETROL LA
  - Continue DETROL LA 4 mg once daily

Please see full prescribing information and patient information available at this presentation.