OAB

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- **OAB = urgency, with or without urgency incontinence, usually with frequency and nocturia, in absence of other causes of similar symptoms.**
- **HALLMARKS =**
  - **Urgency (pivotal symptoms)**
  - **Frequency**
  - **Urgency incontinence**
- **Urgency** : **the complaint of a sudden compelling desire to void that is difficult to defer.**
- ***Unstable bladder*** *: involuntary detrusor contractions seen during*urodynamic studies as the bladder was filled, where there was no obvious cause for the contractions
- ***Detrusor hyper-reflexia*** *: for pts whose involuntary contractions had a* neurologic cause .

overactive detrusor **-** used as the generic, overarching term

- **Detrusor overactivity** (DO) : a urodynamic observation, characterized by involuntary detrusor contractions during the filling phase, which may be spontaneous or provoked .

OAB and DO are thus **not interchangeable** term.

- **OAB dry** = only urgency & frequency
- **OAB wet** = urgency,frequency & urge incontinence

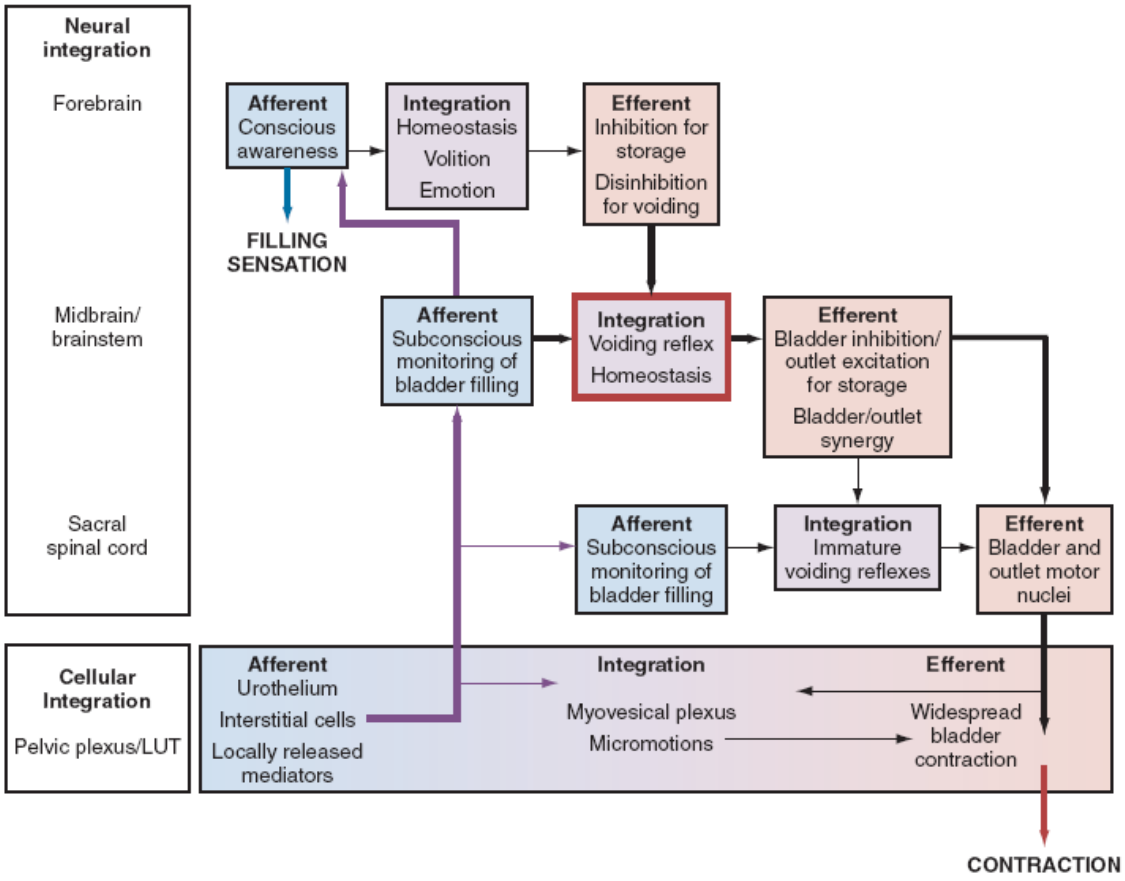
- The International Continence Society updated its definitions for OAB and other lower urinary tract dysfunctions in 2002.
- OAB is a symptomatic diagnosis and is distinct from detrusor overactivity (DO), which is a urodynamic diagnosis.
- Other causes of similar symptoms must be excluded before diagnosing OAB.
- OAB is defined by the presence of urinary urgency with at least one other relevant symptom.
- "Fear of leakage" is not part of the ICS definition of urgency, but it is a concept that OAB patients feel is important.

PATHOPHYSIOLOGY :

- **Hypotheses of DO =**

1. The neurogenic hypothesis states that DO arises from generalized, nerve-mediated excitation of the detrusor muscle .
2. The myogenic hypothesis suggests that overactive detrusor contractions result from a combination of an increased likelihood of spontaneous excitation within smooth muscle of the bladder and enhanced propagation of this activity to affect an excessive proportion of the bladder wall.

HYPOTHESIS OF OAB & DO



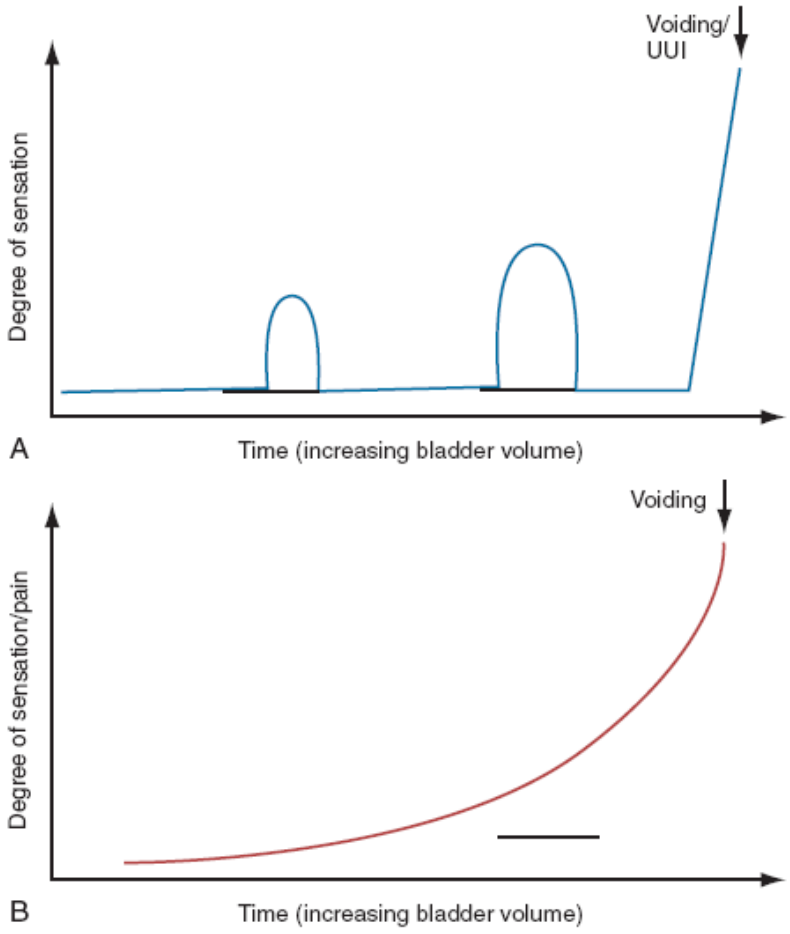
- Overall prevalence of OAB in the EPIC study, using ICS standardized definitions, was 11.8%.
- Storage LUTS have a greater impact on health-related quality of life than other LUTS.
- Both genders have similar rates of OAB, but "OAB wet" is more prevalent in women and "OAB dry" is more prevalent in men.

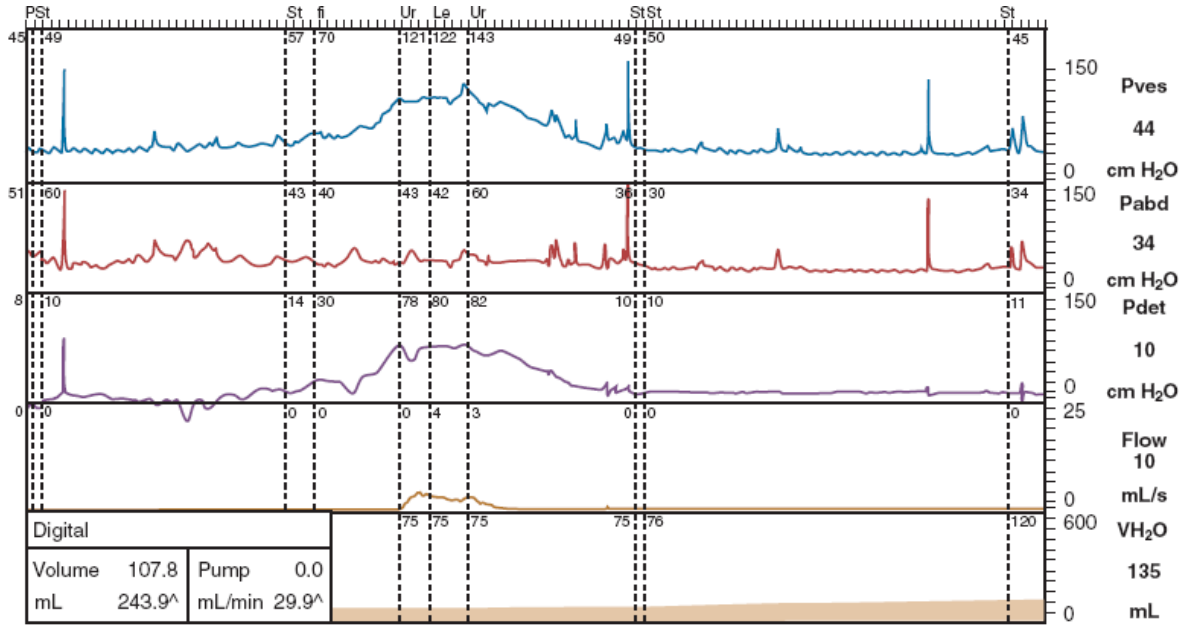
Measuring Bladder sensation and Storage Symptoms:

- The **urinary sensation scale as** follows:
- 1. No urgency: “I felt no need to empty my bladder but did so for other reasons.”
- 2. Mild urgency: “I could postpone voiding as long as needed without fear of wetting myself.”
- 3. Moderate urgency: “I could postpone voiding for a short time without fear of wetting myself.”
- 4. Severe urgency: “I could not postpone voiding but had to rush to the toilet in order not to wet myself.”
- 5. Urgency incontinence: “I leaked before arriving at the toilet.”
- The **urgency percentage scale** :
- 1. I am usually not able to hold urine.
- 2. I am usually able to hold urine until I reach the toilet if I go immediately.
- 3. I am usually able to finish what I am doing before going to the toilet.
- The **“Urgency Severity Scale” ,**
- 0. None, no urgency

- 1. Mild, awareness of urgency but easily tolerated
- 2. Moderate, enough urgency/discomfort that it interferes with usual activities/tasks
- 3. Severe, extreme urgency/discomfort that abruptly stops all activities/tasks

Difference In development of bladder sensation in OAB and BPS :





D/D OF OAB:

- UTI
- Pelvic mass or malignancy
- Stress /mixed incontinence
- BPS
- Neurogenic bladder dysfunction
- Atropic vaginitis
- Bladder or ureteric calculus

DIAGNOSIS:

- **Medical history** :

medication,endocrinal / neurological disorder,renal failure,malignancy,surgery-evaluated for impact on urine production & functional bladder capacity

Physical exam :

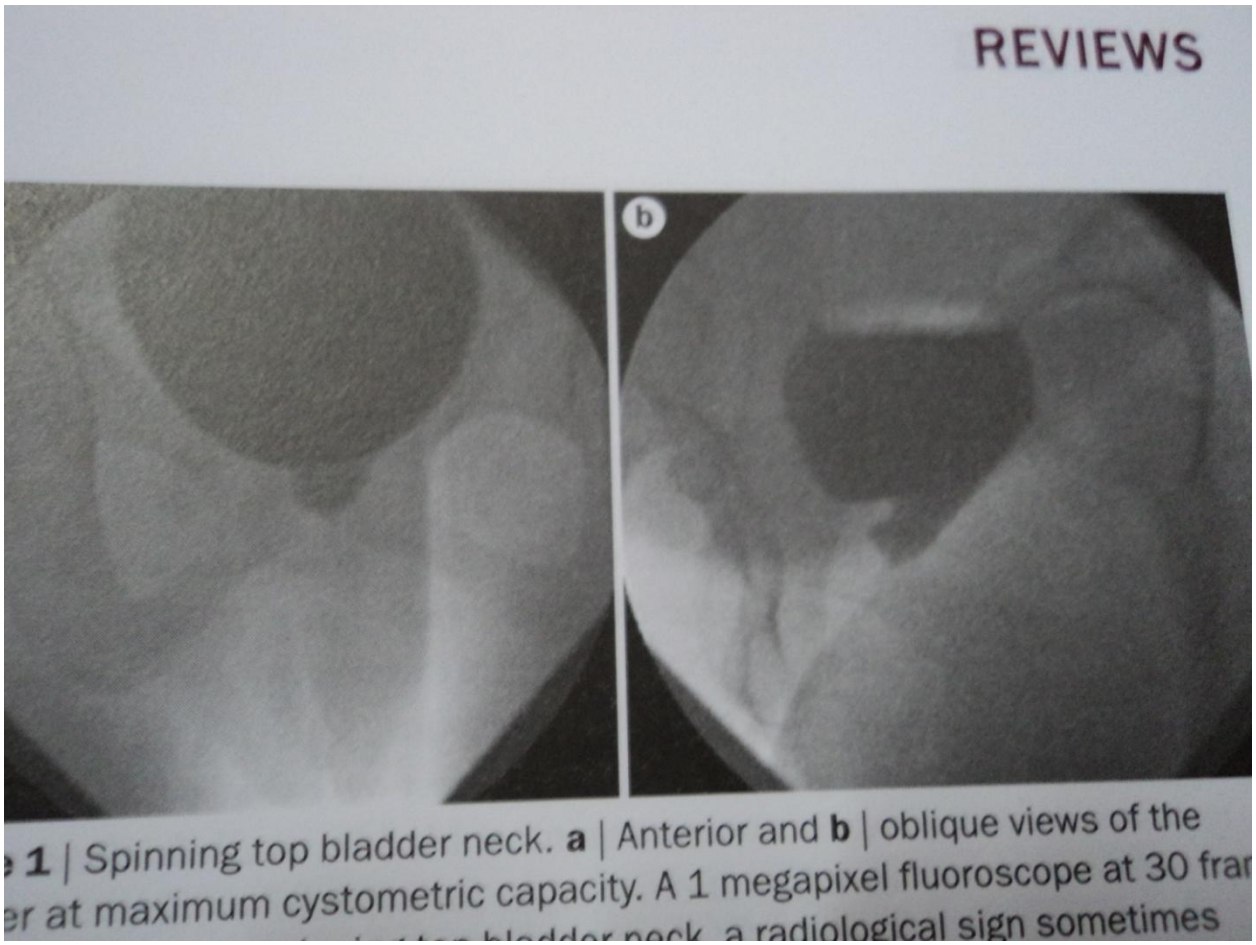
general health status,dependent edema,PVR

Vaginal exam: to look for epithelial atropy,SI,pelvic organ prolapse,pelvic mass

In male : BPH/CA prostate should be considered

- **Urine analysis**
- **Supplementary investigation**:
  - USG, CPE,Voided urine cytology -needed if there is h/o risk factors for OAB
- **FVC**: to gauge overall fluid output,nocturnal output,maximum voided volume
- **FVC + urgency scale**= help to assess response to tx
- Urgency + absence of risk factor + appropriate finding on FVC + normal dipstic urinanalysis =sufficient for initial diagnosis of OAB
- **Urinary biomarkers =**
  - PGE2
  - NGF –correlate well with OAB but not received formal assessment of diagnostic accuracy
- **Bladder wall thickness** is ↑ in OAB,however result is conflicting

- **Genetic biomarker** =rs4994 SNP of B3adenoreceptor suggested as possible contributor
- **Classic biomarker**,using filling cystrometry=detruSor overactivity fails to be a diagnostic tools,provides no evidence of ds severity or prognosis & too invasive for use as a routine surrogate outcome.
- **Current evidence -** supports cystometry only for limited indication, including previous failled incontinence sx.
- **Video UDS**=
  - SPINNING TOP bladder neck-considered for detrusor overactivity
  - Proximal post urethra dilated during filling
  - 'Blow out' bladder diverticula in high pressure DO
  - VUR in neurogenic DO ,particularly in nulliparous women withintact urethral sphinter mechanism
    - But none of these signs are common,nor of sensitive or specific



e 1 | Spinning top bladder neck. **a** | Anterior and **b** | oblique views of the
er at maximum cystometric capacity. A 1 megapixel fluoroscope at 30 fra
bladder neck, a radiological sign sometimes

USG Biomerkers:

- Only currently accepted bio marker is - bladder wall thickness.
- > 5mm (measure at 50ml bladder volume) in women with OAB & Dosecondary to isometric bladder contruction
- UEBW (ultrasonic estimation of bladder weight)= measurement of bladder wall thickness with estimation of bladder volume
    - Less promising marker than urinary NGF

Fmri of brain:

- Shows activation of different brain regions when pt with OAB experience urgency

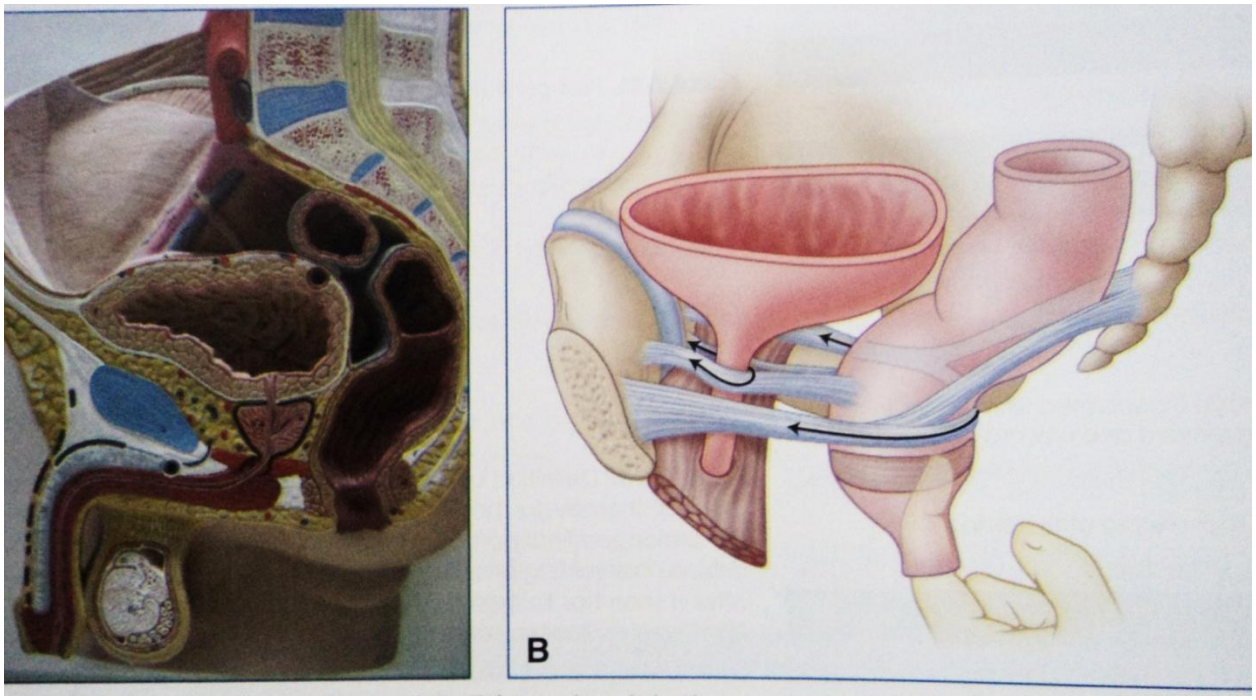
- Significant post treatment differences also shown in placebo –controlled trial of tolterodine

Management:

- **Standard first line tx** =

    1. **Behaviour tx**

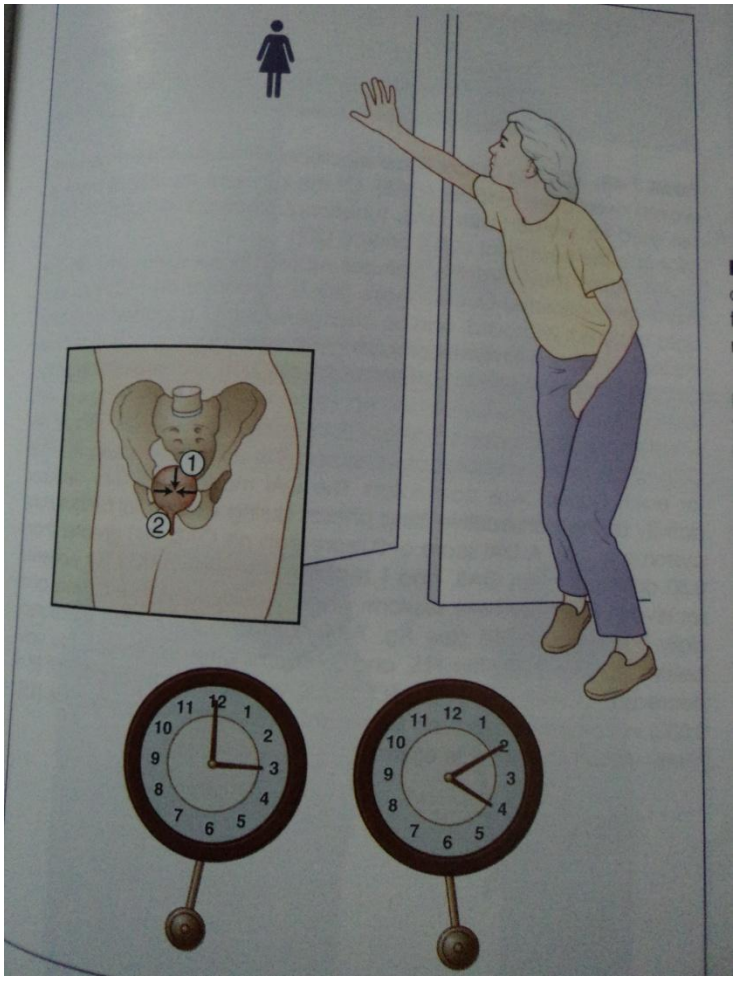
        - Advice on fluid intake
        - To trained consciously to defer voiding after onset of urgency
        - Pelvic floor muscle traing
        - Timed voiding –to reduce the no of occasions




A


C

Bladder training :



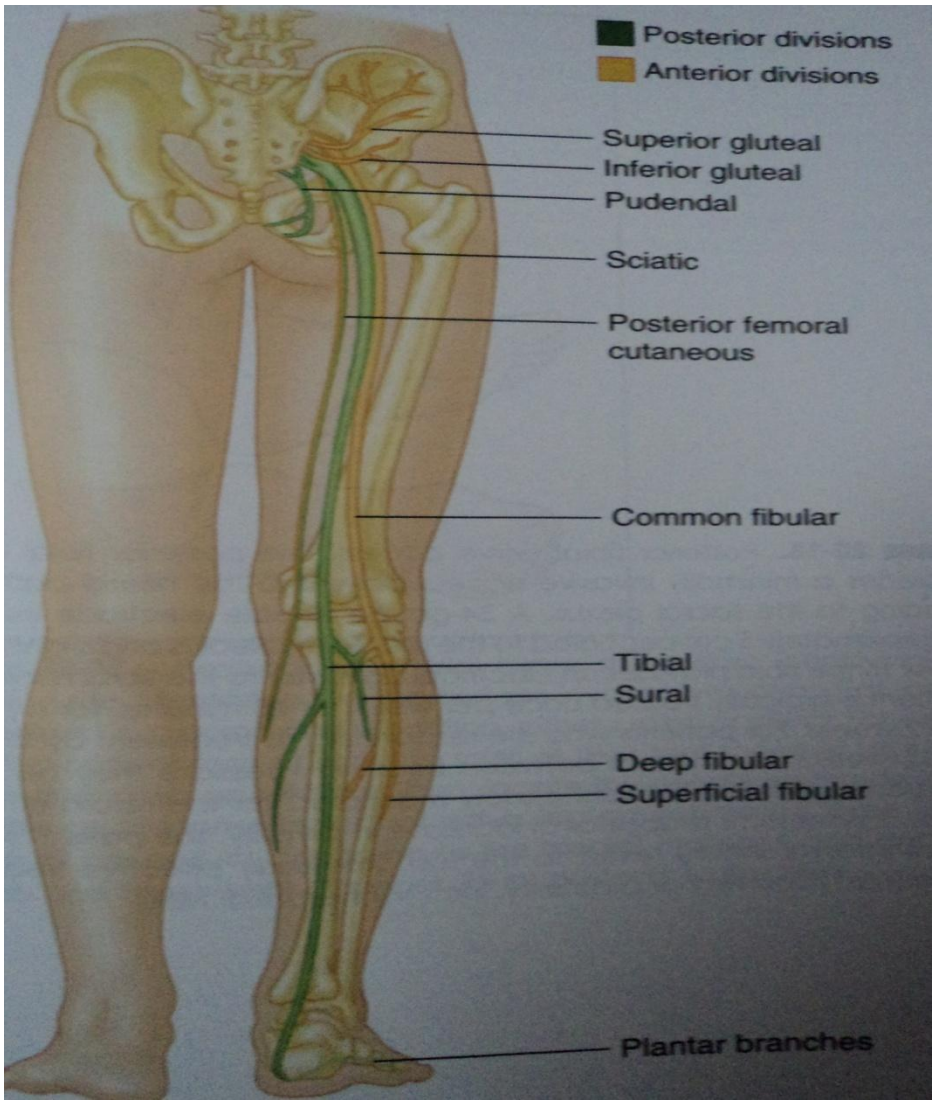
2. Anti muscarinic drugs:

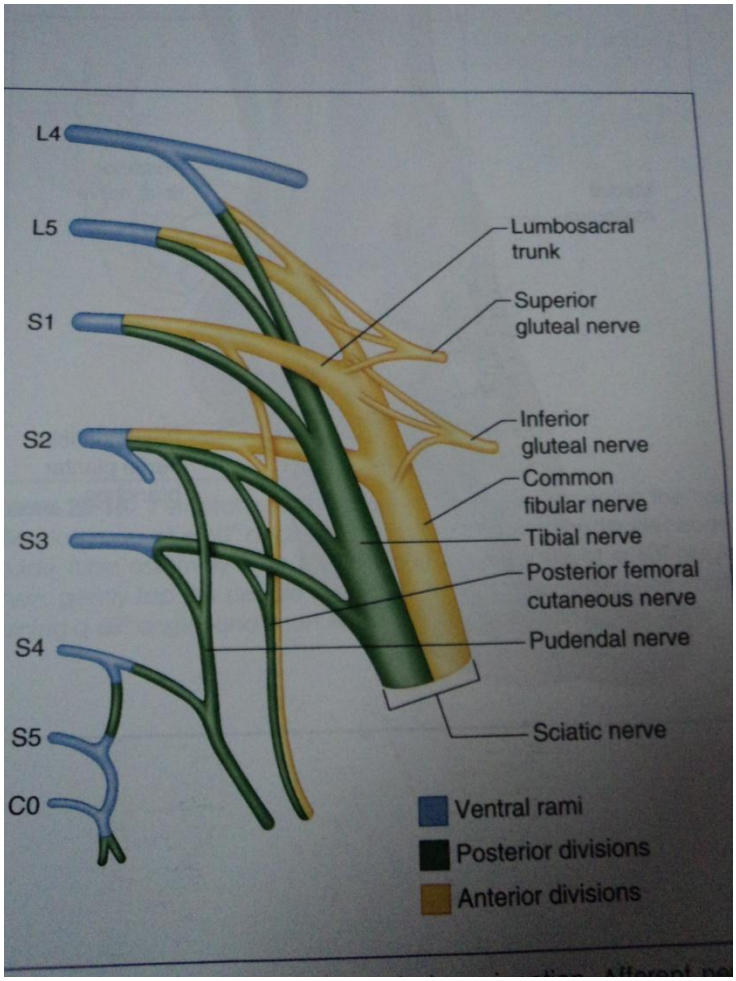
- Darifenacin
- Fesoterodine
- Oxybutynin
- Propeverine
- Solifenacin

- Tolterodine
- Trospium chloride
- ER formulation have efficacy & safety advantages
- Topical oxybutinin-lower s/e,
- Topical estrogen used in post-menopausal women
- Alfa blocker+ anti muscarinic = for tx of concomitant BOO + OAB in men
- Dose escalation can improve efficacy in some pt
- Repeating symptoms score + FVC after few wks of tx t0 compare improvement with tx.

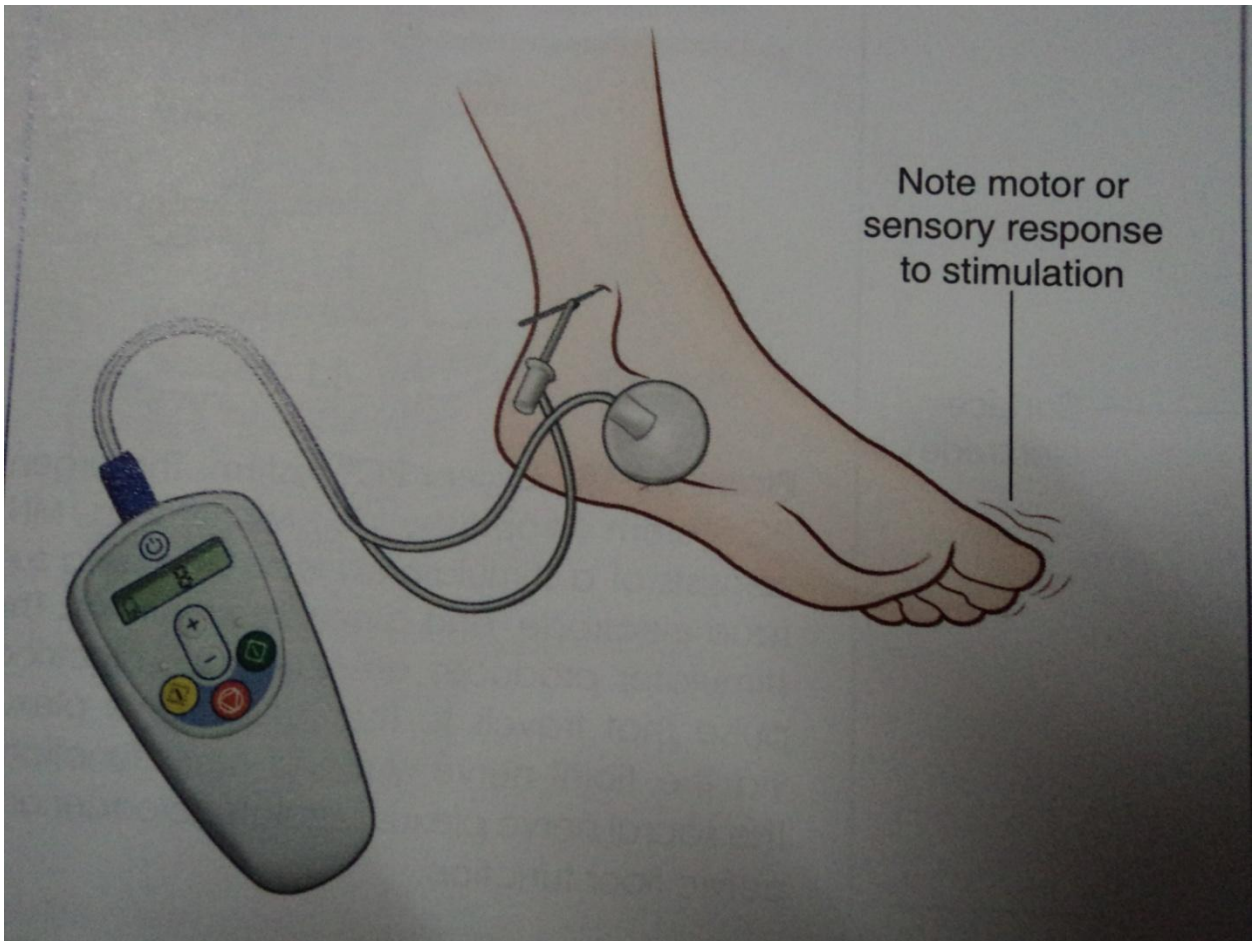
Specialized tx:

- This Tx should be guided by assessment of urodynamic parameters in refractory OAB
- **1)Nerve stimulation:**
    - A) **Sacral nerve stimulation**
        - Implantation of stimulator connected to an electrode permanently placed adjacent to one of the third sacral nerve root.
        - Cost is high.
        - Cure rate in pt with UUI 39%.
        - Improvement rate 67%.
        - S/E : pain at implant site, lead migration infections.
        - Battery depleted after 5 -10 years.


Posterior divisions
Anterior divisions
Superior gluteal
Inferior gluteal
Pudendal
Sciatic
Posterior femoral cutaneous
Common fibular
Tibial
Sural
Deep fibular
Superficial fibular
Plantar branches



- ***B)*** **Percutaneous Tibial nerve stimulation** (PTNS):
  - Although more distal location acts on sacral plexus
  - Effective in pt with refractory OAB
  - Comparision of PTNS with anti-muscarinic Tx shows equivalent efficacy and few S/E.



Reconstructive & sx

1. **Augmentation cystoplasty**.
2. **Urinary diversion –** re-routing the ureters into a stoma derived from an segment of intestine.
3. **Detrusor Myectomy or auto-augmentation** – excision of substantial portion of bladder muscles, leaving the bladder as thin walled reservoir with impaired contractility.

   Benefit – decrease severity of DO associated incontinence.

   outcome in neurogenic DO – disappointing.

Botox inj:

- Inhibits synaptic release of Ach.
- Improve UUI in pt with refractory idiopathic DO but duration of response less than neurogenic DO.
- Greater than 40% pts experience voiding impairment.
- Potential risk of needing CIC.

Tx of mixed urinary symptoms:

- Women with USI and DO who are undergoing Sx for SUI may experience an improvement in urgency but chance of deterioration in OAB which can be difficult to manage.
- OAB or DO co-exist with BOO due to BPH in males – urgency can improve after prostatic Sx but minority of pt can suffer deterioration in storage LUTs and DO persit after prostatic surgery

New tx :

- **Aim** = To reduce detrusor contractility

  To reduce lower UT afferent activity

  To alter CNS activity

  To inhibit transmission to detrusor

1. **β3 agonist** :

Stimulate elaboration of adenylyl cyclase- increase cAMP – increase PK – so muscle relaxation

2. **CCB** : decrease detrusor activity, however clinical trials to date not shown this effect.

3. **K+ channel antagonist** : 2 types: ATP sensitive K+ channel and Ca2+ activated K+ channels
    - However modification of this channels not produced therapeutic success.
4. **Terodiline** : this drug controls OAB by altering membrane ion channels, but cause cardiac arrhythmia.
5. **Intra vesical Capsaicin or Resiniferratoxin** : agonist of vanilloid channels
    - Afferent signalling from bladder to CNS accomplished by myelinated A-delta fibres and unmyelinated C fibres.

Therapeutic benefits noted with both agents