

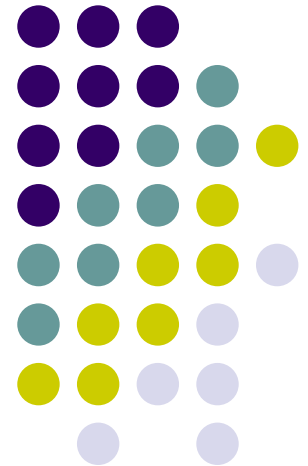
FALLS – organizing and addressing the top 100 causes

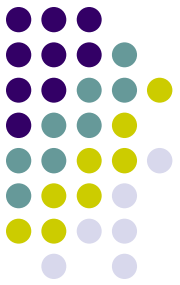
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Regional Geriatric Program of Eastern Ontario (www.rgpeo.com)
Ottawa Geriatric Assessment Outreach Teams (GAOT)
Champlain Geriatric Emergency Management (GEM) Program

Staff Physician, Geriatric Medicine

- The Ottawa Hospital
- The Winchester District Memorial Hospital
- The Cornwall Community Hospital





- **It is estimated that one in three seniors are likely to fall at least once per year**

(World Health Organization (WHO) 2007)

- **Falls are one of the most common cause of injury and the sixth leading cause of death for seniors.**

Senior Care Canada

- **Every 10 minutes in Ontario, at least one older adult visits an ED due to a fall**

- Ontario Injury Prevention Statistics, 2007-2008

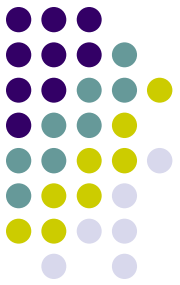
- **Every 30 minutes in Ontario, at least one older adult is admitted to hospital due to a fall**

- Ontario Injury Prevention Statistics, 2007-2008

- **Falls are the leading cause of overall injury costs in Canada and account for \$6.2 billion or 31% of total costs of all injuries**

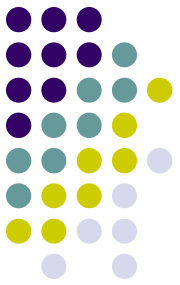
- Smartrisk, 2009

The Good News !!!



- The literature suggests that as many as 1/3 of falls- related adverse outcomes are preventable
 - Division of Aging and Seniors 2006
- The Vital sign concept (opportunity to help)
 - The *sudden* onset of falls in someone who previously did not have a falling tendency most likely represents underlying illness

Why are FALLS so difficult to assess?



- No other mammals spend their day standing upright - upright balance requires smooth functioning and integration of complex neurological and cardiovascular systems.
- Therefore FALLS can be caused by multiple problems: vertigo, strokes, cardiac and neurological diseases, neck disorders, physical deconditioning, and medications that do not fall under a single organ-specific specialty.
- The Assessment of FALLS is not a major focus of the medical curriculum.



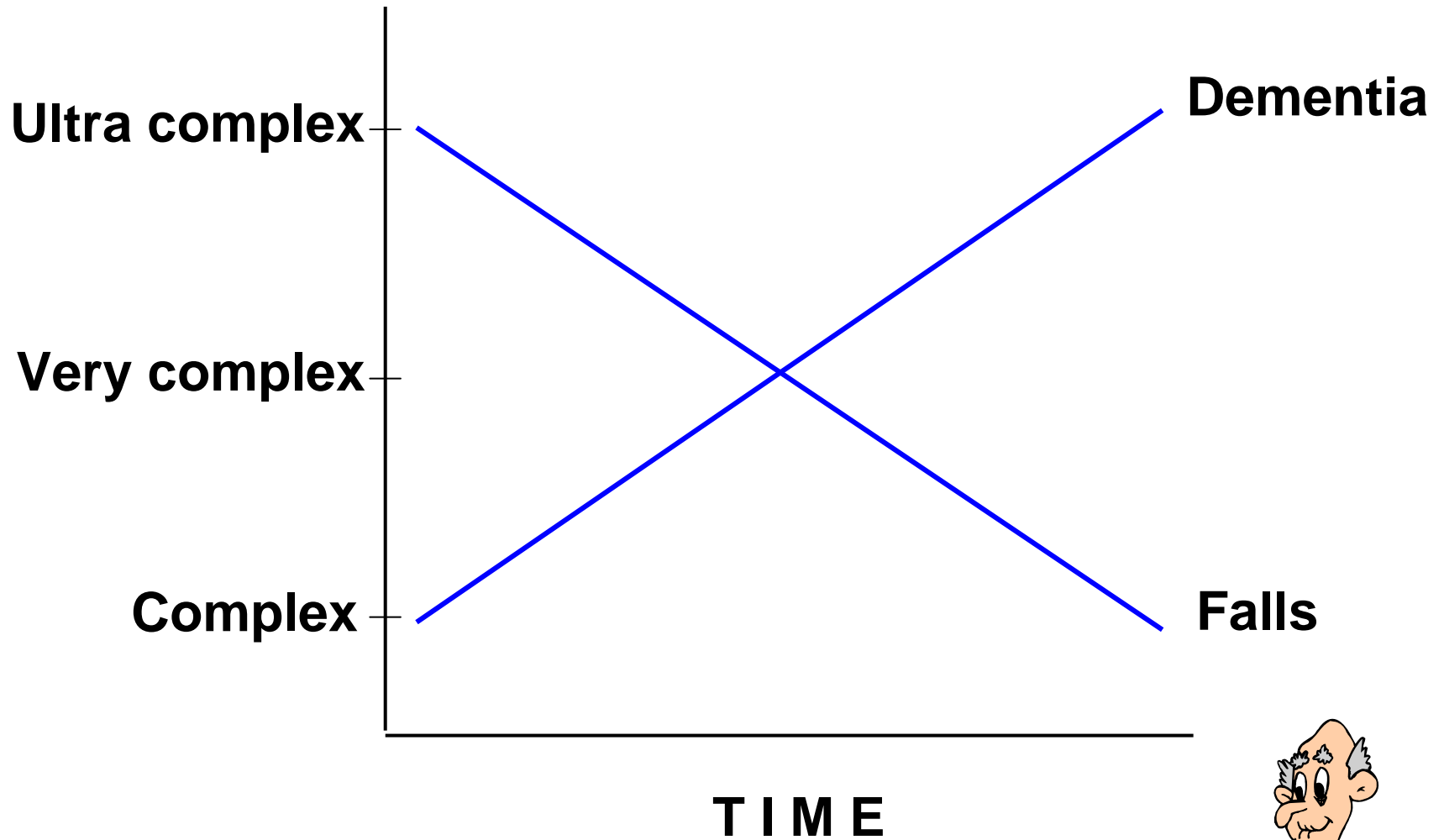
Specialties involved in diagnosis

DEMENTIA

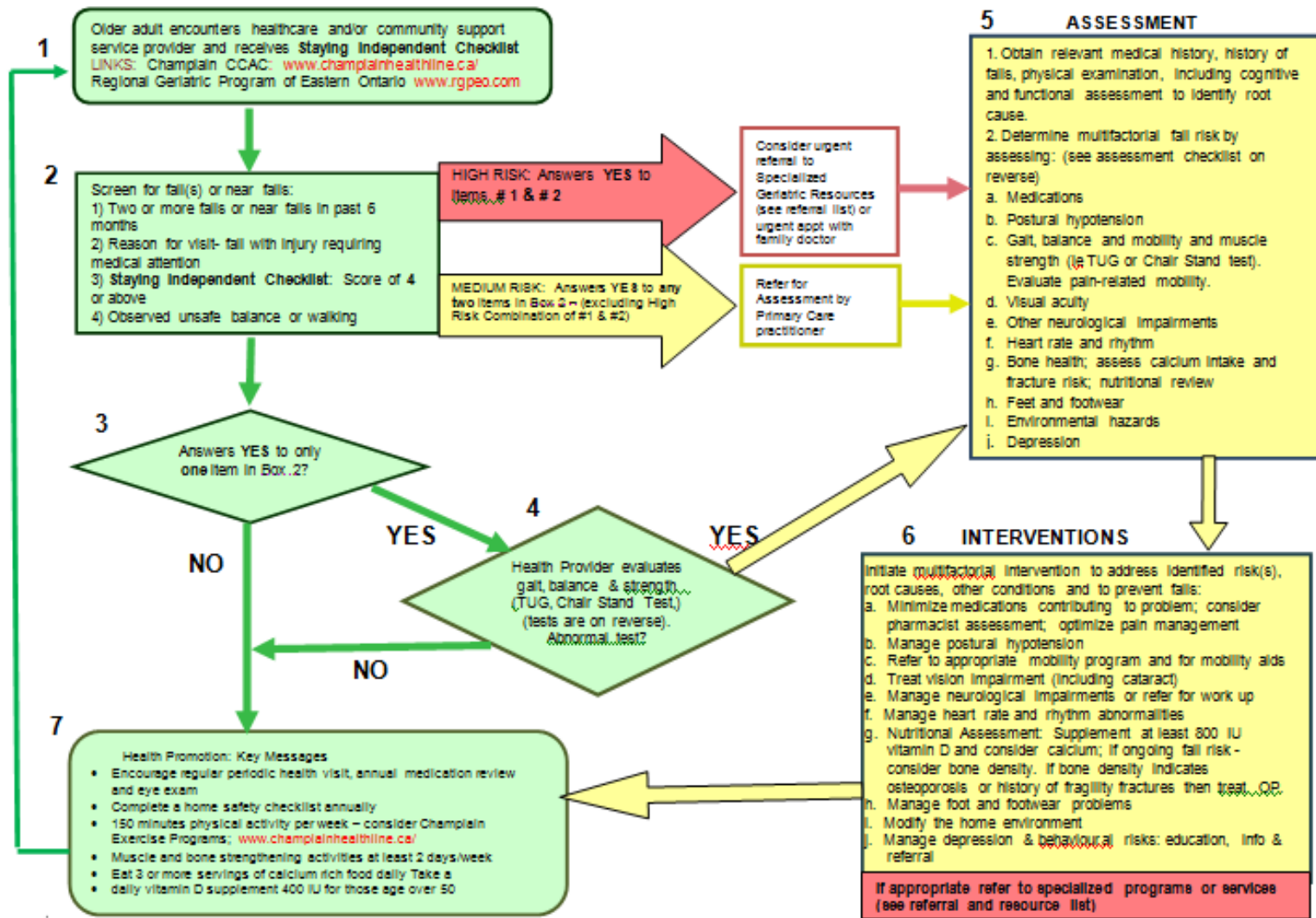
- Primary Care
- Geriatric Medicine
- Geriatric Psychiatry
- Care of the Elderly
- Neurology

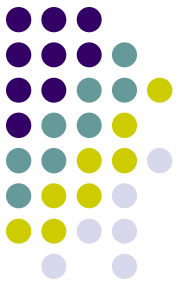
FALLS

- Primary Care
- Geriatric Medicine
- Geriatric Psychiatry
- Care of the Elderly
- Neurology
- Psychiatry
- Neurosurgery
- ENT
- Ophthalmology
- Orthopaedics
- Rheumatology
- Physical Medicine and Rehab
- Internal medicine
- Cardiology
- Cardiac Surgeons
- Endocrinologists
- Urologists (meds)
- Pain Specialists
- Pharmacy
- Occupational Therapy
- Physiotherapy
- Chiropractors
- etc



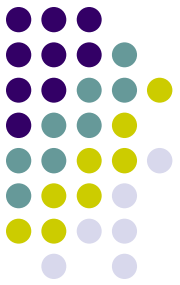
Champlain LHIN Falls Prevention Strategy; **FINAL** Algorithm Oct 2013





In Office Assessment

- Box 5 based on American Geriatrics Society and British Geriatrics Society Clinical Practice Guideline
- Priority influenced by prevalence of problems seen by Geriatric Assessment Outreach Teams (GAOT see 1800 seniors per year)
 - Most modifiable first

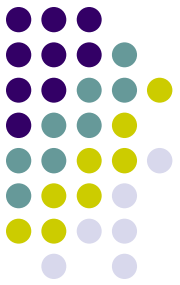


Box 5 (section 2): Assessment

- a. **Medications**
- b. **Postural Hypotension**
- c. Gait, balance, mobility and muscle strength
 - a. TUG and Chair Stand
 - b. **Evaluate Pain related mobility decreases**
- d. Visual Acuity
- e. Other Neurological Impairments
- f. Heart rate and rhythm
- g. Bone Health; nutritional review
- h. Feet and Footwear
- i. Environmental Hazards
- j. Depression

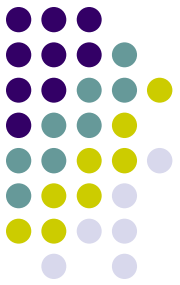
Box 5 – 2a.

Medications



1. Slow reaction time (drugs that cause delirium and slow mentation)
 - Narcotics, benzodiazepines, ETOH, Anticholinergics (e.g. Ditropan, Detrol, Tricyclic antidepressants).
2. Decrease cerebral perfusion (see Postural hypotension – 6 ANTIs)
 - Anti-hypertensives, Anti-anginals, Anti-parkinsonian medications (e.g. sinemet), Anti-depressants (e.g., Anti-cholinergic tricyclics), Anti-psychotics (Anti-cholinergic effect), Anti-BPH (e.g. Hytrin, Flomax)
3. Cause parkinsonism
 - Antipsychotics
 - GI – Stemetil, Maxeran
4. Vestibular Toxicity
 - Aminoglycosides, High dose loop diuretics
5. SSRIs
 - Evidence is building that SSRIs increase fall risk

Decrease or stop drugs that can cause Delirium



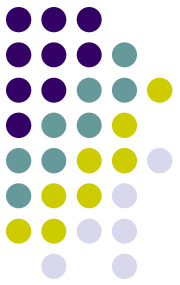
- Is the patient on delirium inducing drugs :
 - Benzodiazepines
 - Narcotics
 - Alcohol
 - Antihistamines
 - Neuroleptics (Antipsychotics)
 - Haldol, Respiridone, Olanzapine
 - Anticonvulsants (Seizure medications)
 - Dilantin (Phenytoin), Gabapentin, Pregabalin
 - Keep dilantin level at level that previously controlled seizures – if this info not available then try to keep level < 60)
 - Anticholinergics (see next slides)

Anticholinergic (ACH) Risk Scale for Commonly Prescribed Medications

From Carnahan RM, et al. The Anticholinergic Drug Scale as a Measure of Drug-related Anticholinergic Burden: Associations with Serum Anticholinergic Activity. Journal Clin Pharmacol 2006;46:1481-86.

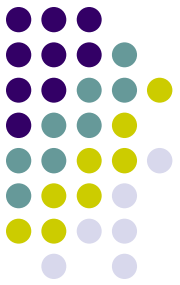
Level 3: Markedly anticholinergic (ACH)	Level 2: ACH adverse events, dose related	Level 1: Potential ACH activity, evidence by receptor binding activity
Antipsychotics Clozapine (Clozaril®) Thioridazine (Mellaril®)	Antipsychotics Loxapine (Loxitane®) Molindone (Moban®) Plimozide (Orap®)	Antipsychotics Fluphenazine (Prolixin®) Olanzapine (Zyprexa®) Perphenazine Prochlorperazine (Compazine®) Trifluoperazine (Stelazine®)
Antidepressant Amitriptyline (Elavil®) Desipramine (Norpramine®) Doxepin (Sinequan®) Imipramine (Tofranil®) Nortriptyline (Pamelor®) Protriptyline (Vivactil®) Trimipramine (Surmontil®)		Antidepressant Fluoxetine (Prozac®) Paroxetine (Paxil®) Sertraline (Zoloft®) Fluvoxamine (Luvox®) Phenelzine (Nardil®)
Antihistamine Bropheniramine Carbinoxamine Chlorpheniramine Clemastine (Tavist®) Diphenhydramine (Benadryl®) Hydroxazine (Atarax®, Vistaril®) Promethazine (Phenergan®)	Antihistamine Cyproheptadine (Periactin®)	Antibiotics/Antivirals Amantadine (Symmetrel®) Ampicillin Clindamycin Gentamicin Vancomycin
	Cardiovascular Disopyramide (Norpace®)	Cardiovascular Captopril (Captoten®) Chlorthalidone (Hygroton®) Digoxin (Lanoxin®) Diltiazem (Cardizem®) Dipyridamole (Persantine®) Furosemide (Lasix®) Hydralazine (Apresoline) Isosorbide (Isordil®, Imdur®) Nifedipine (Procardia®) Triamterene (Dyazide®) Warfarin
Muscle Relaxants Orphenidrine (Norflex®)	Muscle Relaxants Cyclobenzaprine (Flexeril®)	Analgesics Codeine Fentanyl Morphine Oxycodone Tramadol (Ultram®)
Vertigo Dimenhydrinate (Dramamine®) Meclizine (Antivert®) Scopolamine (TransDerm Scop®)		Corticosteroids Dexamethasone Methylprednisolone (Medrol®) Prednisone Triamcinolone
GI Antispasmodics Dicyclomine (Bentyl®) Hyoscyamine (Levsin®) Propantheline	H2 Antagonist Cimetidine (Tagamet®) Ranitidine (Zantac®)	H2 Antagonist Famotidine (Pepcid®) Nizatidine (Axid®)
Parkinson Disease Procyclidine (Kemadrin®) Benztropine (Cogentin®) Trihexphenidyl (Artane®)	Anticonvulsants Carbamazepine (Tegretol®) Oxcarbazepine (Trileptal®)	Anticonvulsants Divalproex (Depakote®) Valproic acid (Depakene®)
Urinary Antispasmodics Oxybutynin (Ditropan®) Tolterodine (Detrol®) Flavoxate (Urispas®)		

How can one sort through this daunting list of medications?



- Look for a time-based relationship
 - Falls or confusion worsened after starting this medication (or increasing the dose).
- Ask Pharmacist to review drugs that may be contributing to falls and/or impairing cognition (theoretical perspective) and then apply a practical lens based on personal knowledge of patient to develop a tailored personalized plan for medication adjustments (“strategic deprescribing”).



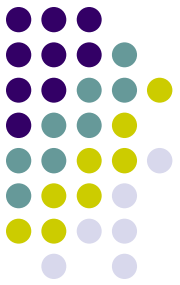


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Box 5 – 2b.

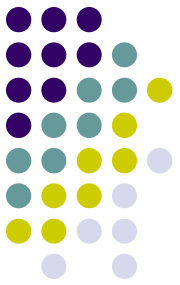
Postural Hypotension



- Lightheadedness 1-3 min after sitting or standing
 - Perspiration, nausea, weakness, dizziness
- Measure **BP and Pulse** after the person has been lying for at least 3-5 minutes and 1 - 3 minutes after standing
- A decline of >20 mm Hg in systolic BP and/or >10 mm Hg in diastolic BP on the assumption of an upright posture with or without an increase in PR
 - American Academy of Neurology
- High incidence (as high as 30%) among older people (due to age-related changes in the CV & nervous systems & medication use)

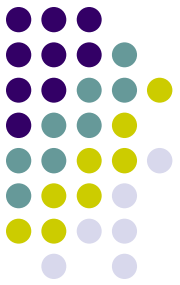
Box 5 – 2b.

Postural Hypotension



4D-AID acronym

- Causes associated with a **compensatory tachycardia** – 4Ds
 - Deconditioning
 - Dysfunctional Heart
 - Myocardium (very low Left Ventricular Ejection Fraction)
 - Aortic Stenosis
 - Dehydration
 - Disease
 - Dialysis (post dialysis dry weight too low)
 - Drugs
 - Diuretics
 - Anorexic Drugs – narcotics, digoxin, antibiotics, cholinesterase inhibitors
 - Drugs – 6 ANTIs
 - Anti-hypertensives
 - Anti-anginals
 - Anti-parkinsonian medications (e.g. sinemet)
 - Anti-depressants (e.g., Anti-cholinergic tricyclics)
 - Anti-psychotics (Anti-cholinergic effect)
 - Anti-BPH (e.g. Hytrin, Flomax)
- Causes that present with ***lack*** of compensatory tachycardia - AID
 - Autonomic Dysfunction
 - Diabetic autonomic neuropathy (consider if patient has peripheral neuropathy)
 - Low B12
 - Hypothyroidism
 - ETOH abuse
 - Parkinsonism (Parkinson's disease, Progressive Supranuclear Palsy, Multisystem Atrophy (e.g. Shy Drager))
 - Idiopathic (Bradbury-Eggleston)
 - Depletion of Norepinephrine from sympathetic nerve terminals
 - Drugs
 - Beta-Blockers

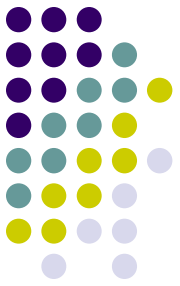


Box 5 (section 2): Assessment

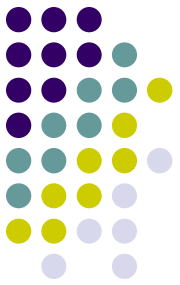
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Box 5 – 2c.

Gait, balance, mobility and muscle strength



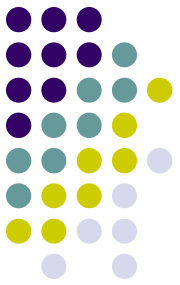
- Romberg
- Get Up and Go
- Timed Up and Go
- 30 second Chair Stand Test
- Question?
 - Which, if any, of these do you feel are useful in clinical practice?



Romberg's Test

is NOT a test of cerebellar function

- It is a test of the proprioception receptors and pathways function.



Romberg's Test

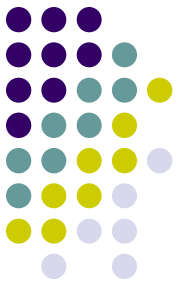
- **What is Being Tested in the Romberg Test?**

With the eyes open, **three** sensory systems provide input to the cerebellum to maintain truncal stability.

These are vision, proprioception, and vestibular sense.

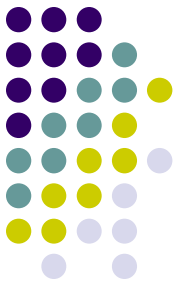
Proprioception-The brain's awareness of a joint's or limb's position in relation to the rest of the body

Vestibular Sense- Equilibrium



- *When you do the Romberg maneuver, you need to stand close to the patient and be ready to catch them in case they fall*

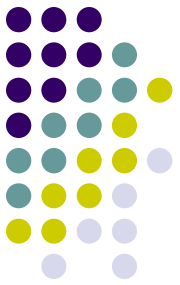
Romberg Test



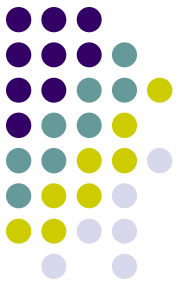
Instructions:

- Stand with feet together, arms to the side, and eyes open.
- Observe for substantial postural sway or break in position
- Instruct to: close eyes and maintain that position with closed eyes

Romberg Test Scoring



- Romberg Sign- **Present** or **Absent**
- **Present**- if the sway is considerable and/or the patient breaks position.
- (note- patients unable to stand with feet together while eyes are open are **untestable**)
- **Absent**- perform task with no sway or minimal sway without breaking position

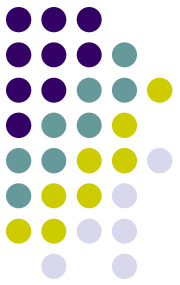


Get Up and Go Test

The "Get Up and Go" test was developed by Mathias, Nayak, and Issacs in 1986.

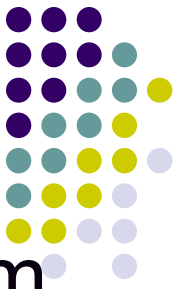
- A general physical performance test used to assess mobility, balance and locomotor performance in elderly people with balance disturbances. More specifically, it assesses the ability to perform sequential motor tasks relative to walking and turning

GET UP AND GO TEST



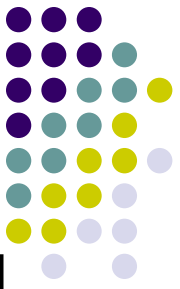
- A simple & practical performance measure of gait & balance
- Standardizes most of the “basic mobility” tasks
- Subject is observed while he rises from a chair, walks 3 meters & returns to the chair

PROCEDURE



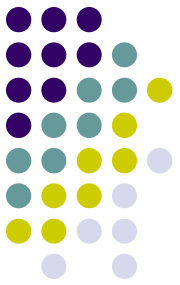
- Place a straight-back chair 3 meters from and facing the wall (preferably one that does not have a seat which slants back)
1. Ask senior to rise from chair, without using arms for support & stand still for a moment
 2. Walk towards the wall
 3. Turn without touching the wall & walk back to the chair & sit down

Get Up and Go



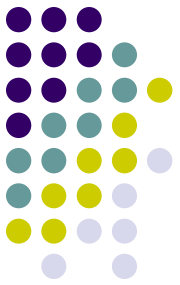
Observe rising from chair-watch the speed of rising, do they need assistance or a boost, watch their shoulders to see if they lean forward on rising. Are you worried they might fall.?

Get Up and Go



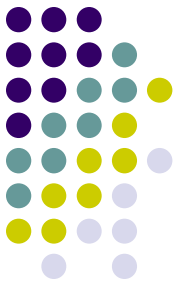
- **Standing**- what is their stance?, do they lean to one side?, do they sway?, do they have any balance problems?, are you worried they might fall?
- Check for postural abnormalities
- Do they complain of pain standing still?

Get Up and Go



- **Walking**-watch the height and width of their steps, are their steps irregular?, can they maintain their balance while walking?, are you worried they might fall? Look for asymmetric arm swing, abnormal arm and hand postures, and instability of the trunk. Hesitancy might suggest Parkinson's.
- **Turning**-watch the speed of turning steadiness and number of foot placements needed to complete the turn.

Get Up and Go



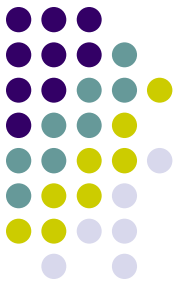
- **Sitting Down-** watch if descent is smooth, is the speed of descent normal, do they lean forward to sit?, do they need to hold onto the chair?, are you worried they may fall?

Get Up and Go Check List



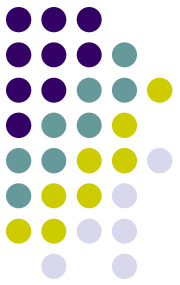
Maneuver	Normal	Mild Abnormalities	Mod/Severely Abnormal
Rising from chair	No slowness (< 4sec) or hesitancy	Uses assist to begin rising	Uses assist throughout rising, leans forward
Standing	No signs of instability	Wide stance, irregular posture	Severe trunk sway (5-10 degrees), reaches out hand to balance, staggers
Turning	No hesitation, takes 2-3 foot placements to turn	Slowness, hesitation, 4-5 foot placements to turn	More than 6 foot placements to turn or cannot safely execute turn, staggers
Sitting down	Smooth decent, does not use chair for support	Slow descent, hesitates or pauses during descent	Uses chair to sit, does not control descent, nearly misses chair

Scoring of Get up and Go



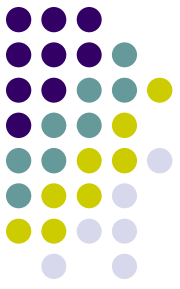
- It can be scored qualitatively
- Normal or Abnormal
- Or on a scale from 1- 5
 - 1 (normal)
 - 2 (slightly abnormal)
 - 3 (mildly abnormal)
 - 4 (moderately abnormal)
 - 5 (severely abnormal)

TUG Timed Up and Go Test



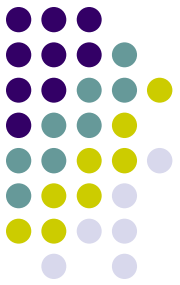
- The TUG was published by Podsiadlo and Richardson in 1991 to address the issues of poor inter-rater reliability observed with intermediate scores in the "Get Up and Go". The TUG incorporates time as the measuring component to assess general balance and function.

TUG Timed Up and GO Test



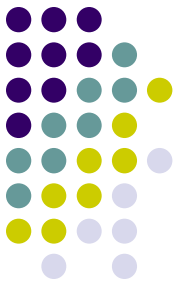
- Uses standard chair with armrests (46 cm seat height and 63-65 cm armrest height)
- Tape Measure and marker for distance
- 3 m path free of obstruction
- Stop watch
- One practice trial is permitted
- Senior wears their regular footwear and uses their regular walking aids. No physical assistance is given.

TUG Directions



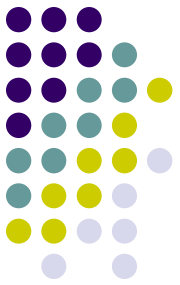
- Begin with subject sitting correctly in the chair, back resting against the back of the chair.
- “On the word GO you will stand up, walk to the line on the floor, turn around and walk back to the chair. Walk at your regular pace”

Time



- **There is no time limit- may stop and rest
but not sit down**
- Healthy elderly usually complete the task in 10 seconds or less
- Very frail or weak elderly with poor mobility may take 2 minutes or more

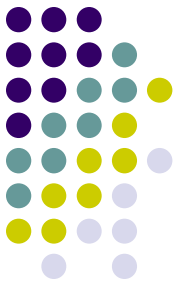
TUG scoring



Steffen, Hacker and Mollinger (2002) reported that on average, healthy individuals between the ages of 60-80 years complete the TUG in 10 seconds or less.

Standardized cut-off scores to predict risk of falling -In one study, a cut-off score of ≥ 13.5 seconds was shown to predict falling in community-dwelling frail elders (Shumway-Cook et al., 2000).

The 30-second Chair Stand Test



- **Purpose:** To assess leg strength and endurance.
- **Equipment:**
 - A chair with a straight back without arm rests (seat 17" high)
 - A stopwatch
- **Instructions to the patient:**
 - 1. Sit in the middle of the chair.
 - 2. Place your hands on the opposite shoulder crossed at the wrists.
 - 3. Keep your feet flat on the floor.
 - 4. Keep your back straight.
 - 5. On “**Go**”, rise to a full standing position and then sit back down again.
 - 6. Repeat this for 30 seconds.
- On “**Go**”, begin timing.
- Count the number of times the patient comes to a full standing position in 30 seconds.
- If the patient is over halfway to a standing position when 30 seconds have elapsed, count it as a stand.
- Record the number of times the patient stands in 30 seconds.
- A below average rating indicates a high risk for falls.
 - See Algorithm sheet for interpretation

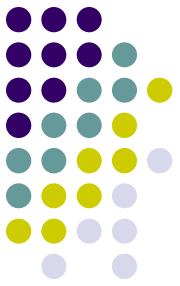


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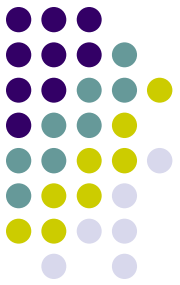
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Box 5 – 2d.

Visual Acuity



- Sudden vision changes with inadequate time to compensate
- Cognitive problems interfering with inability to compensate for poor vision.
- Severe vision problems beyond ability to compensate
- DDX:
 1. Glaucoma (lose peripheral vision – tunnel vision)
 2. Cataracts
 3. **Age Related Macular Degeneration (ARMD)**
 - lose central color vision
 - Sudden change in vision in patient with ARMD is an ophthalmologic emergency – call ophthalmologist ASAP to have them determine if patient has a growing retinal tear and needs laser treatment on an urgent basis.

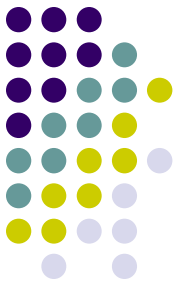


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- e. **Other Neurological Impairments**
- f. Heart rate and rhythm
- g. Bone Health; nutritional review
- h. Feet and Footwear
- i. Environmental Hazards
- j. Depression

Box 5 – 2e.

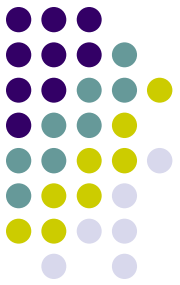
Other Neurological Impairments



- 3Ds - Dementia, Delirium, Depression
 - Apraxia, decreased compensation, slow mentation
- Stroke, subdural hematoma, subarachnoid bleed, cerebellar disease, NPH
- Spinal stenosis, Myasthenia Gravis, ALS
- Peripheral or Autonomic neuropathy
 - ETOH, DM, B12 ...
- Parkinsonism (next slide)

Box 5 – 2e.

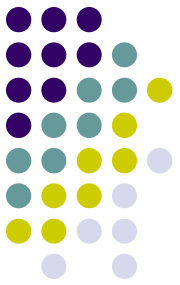
Other Neurological Impairments



- DDX of Parkinsonism (Parkinson's Plus)
 1. Parkinson's Disease (idiopathic parkinsonism)
 - **TRAP**: Resting **T**remor, Cogwheel **R**igidity, **A**kinesia / bradikinesia (slowness), **P**ostural Instability (decreased balance, falls)
 2. Vascular parkinsonism
 - TRAP, no response to Parkinson's meds, basal ganglia strokes
 3. Drugs (antipsychotics, GI drugs [stemetil, maxeran])
 4. Lewy Body disease
 - Dementia, Longstanding Hallucinations, Longstanding Fluctuation
 5. Progressive Supranuclear Palsy (PSP)
 - Loss of downward gaze and then all eye movements, depression, anxiety, psychosis, dementia
 6. Late Alzheimer's
 7. Multisystem atrophies (MSA – multiple neurologic symptoms)
 1. Shy-dragger, OPCD, SND etc

Box 5 – 2e.

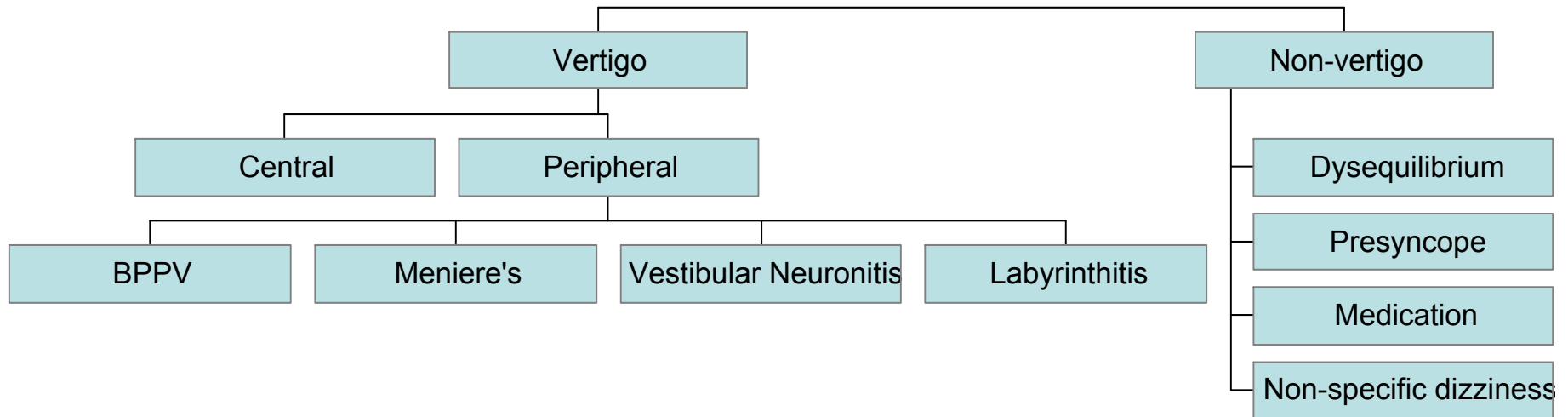
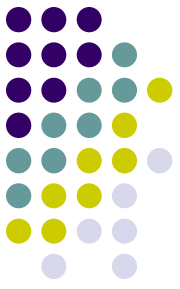
Other Neurological Impairments



Vertebrobasilar Insufficiency

- Provoked by head or neck movement
- Seconds to minutes
- Other brainstem symptoms
 - Diplopia
 - Dysarthria
 - Facial numbness
 - Ataxia
- Reduced vertebral artery flow on doppler or angiography
- Treatment:
 - Behaviour modification

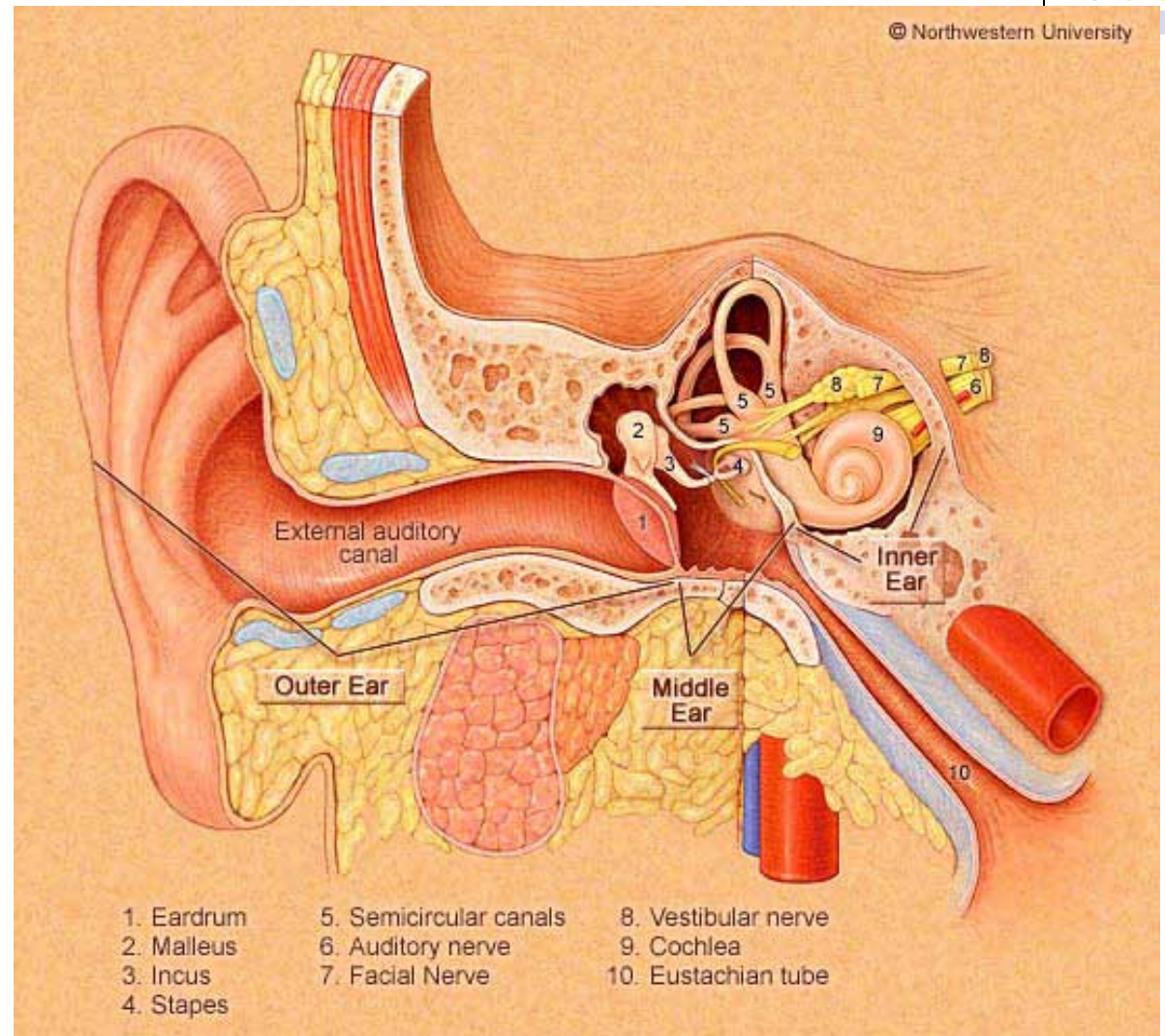
VERTIGO; to discuss at end if time permits



Vertigo



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- Feeling of movement when one is stationary (does not need to be spinning)
- Central – Cranial Nerve 8 (Vestibular Nerve) within Central Nervous System (Brain)
- Peripheral – Ear ... areas 5, 8 in this picture



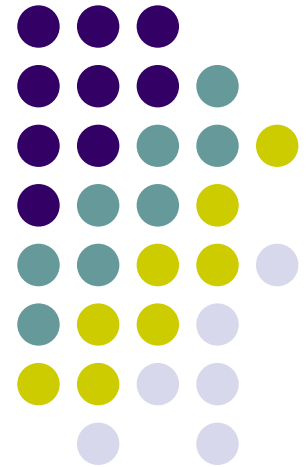
Central Vertigo

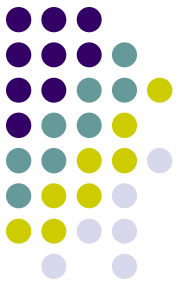
Central = Central Nervous System

- DDX Migraines, MS, trauma, strokes, tumor etc.
- Need neuroimaging +/- ENT special studies (refer to ENT or neurology)

● Look for Neurological signs suggesting brain or brainstem pathology:

- Gait and limb ataxia
- Cranial nerve findings
 - Slurred speech, diplopia
- Focal weakness/numbness
- Incontinence





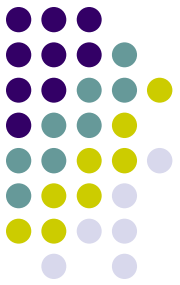
Peripheral Vertigo

Peripheral = inner ear or vestibular system

- no CNS neurological signs except vertigo, nausea and decreased hearing (all explained by inner ear or vestibular system dysfunction)
- refer to ENT if does not resolve over time

Common Causes (hard to differentiate):

1. Benign Paroxysmal Positional Vertigo (BPPV)
2. Meniere's Disease
3. Vestibular Neuronitis
4. Labyrinthitis
5. Motion Sickness (not reviewed)



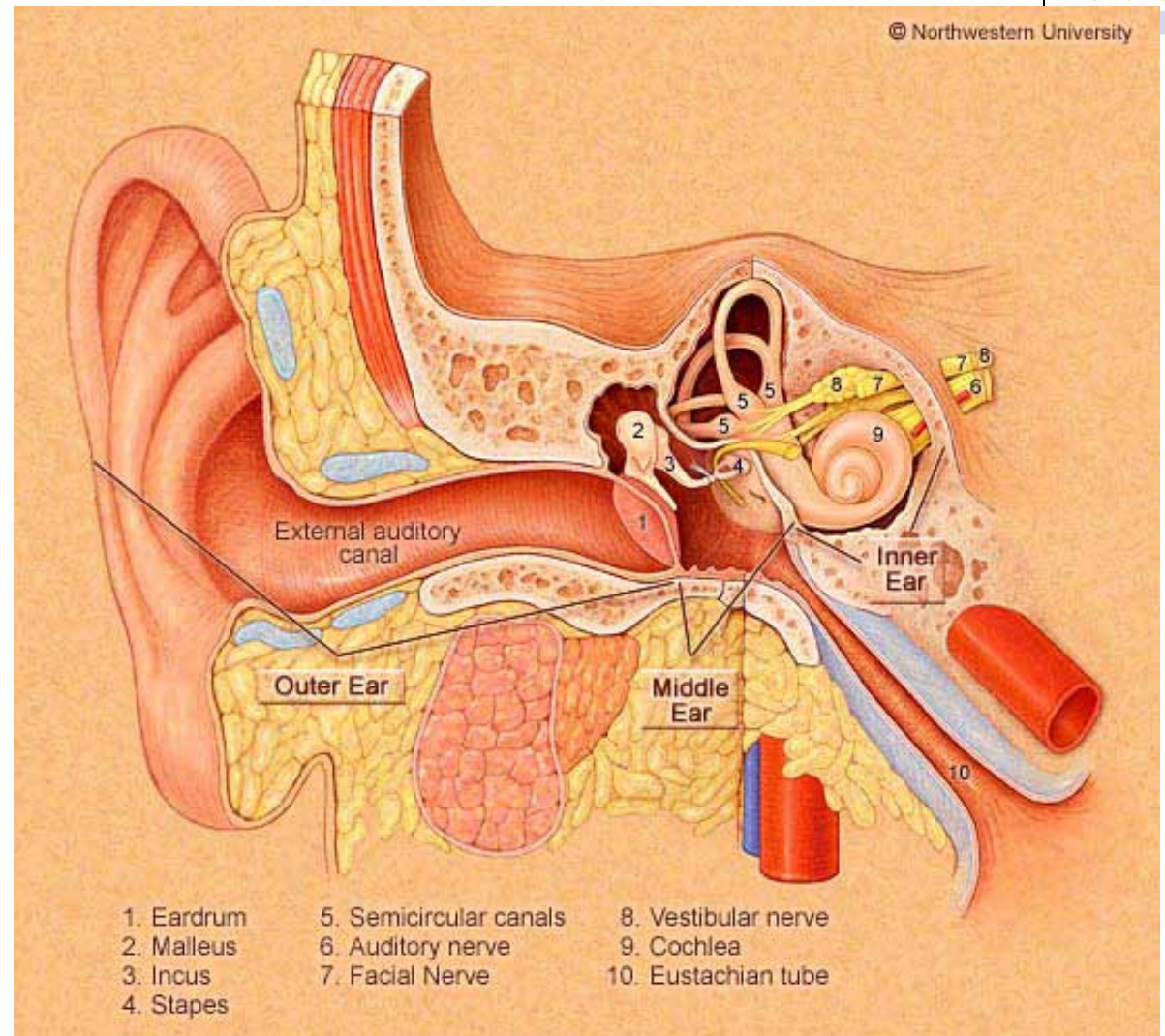
1. BPPV or BPV: BENIGN (Paroxysmal) POSITIONAL VERTIGO

- Commonest Cause of Chronic Vertigo in the Elderly. Sometimes associate with trauma.
- Cause: Calcium crystals dislodged and move to semi-circular canals
- Symptoms and signs:
 - Sudden onset vertigo lasting seconds to minutes, episodic, brought on by changes in head position (rolling over, bending, looking upward)
 - Nausea
 - Rotatory (torsional) Nystagmus where top of eye rotates toward the affected ear in twitching fashion

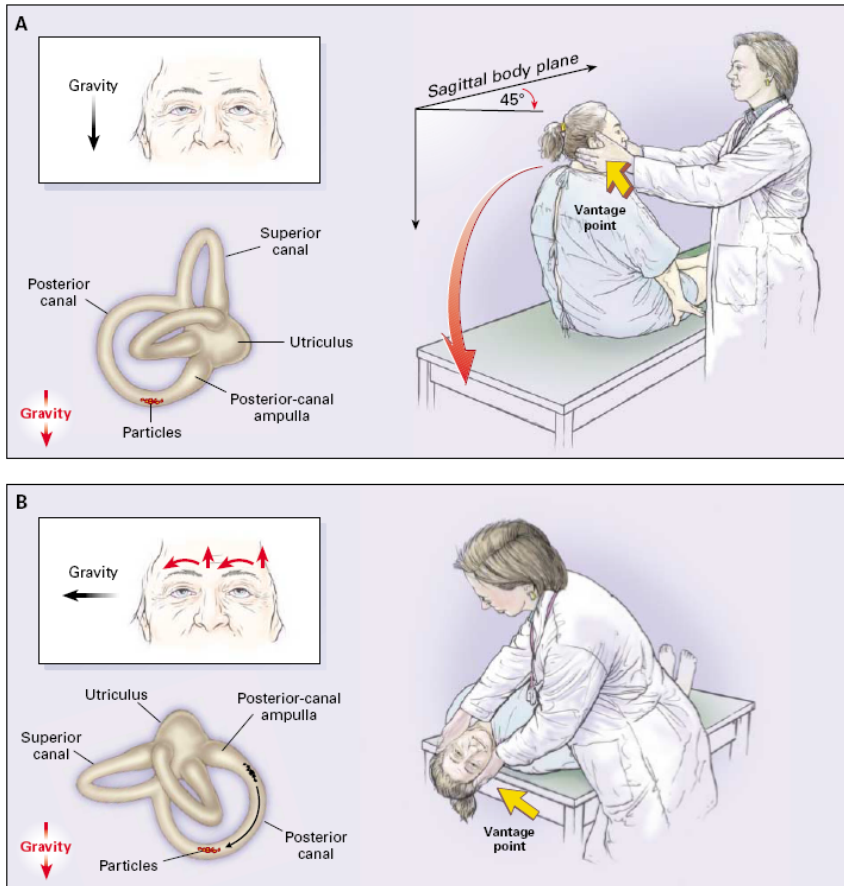
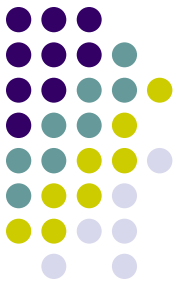


BPPV

- Calcium crystals (Canaliths) in semi-circular canals (area 5)

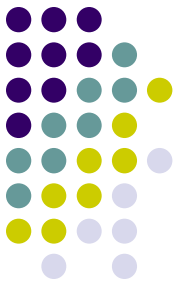


BPPV diagnosis: Dix-Hallpike or Nysten Barany Test

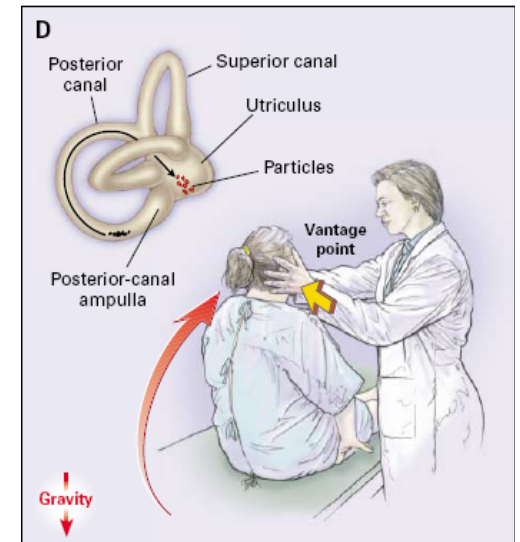
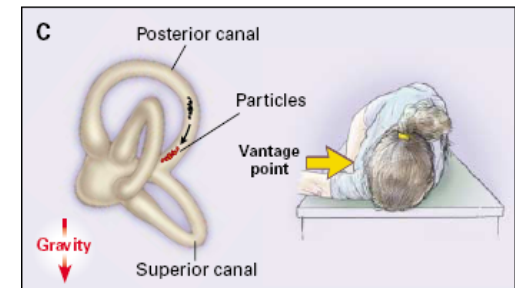
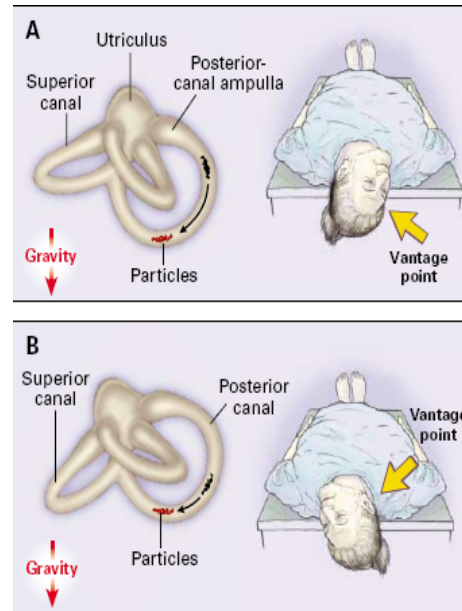


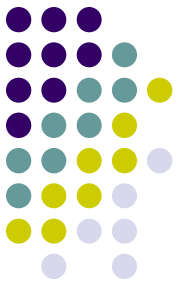
- Rotatory Nystagmus starts 5 – 10 seconds after positioning
- Nystagmus lasts 5 – 120 seconds
- Visual fixation does not suppress Nystagmus
- Nystagmus suppressed / fatigued by repeated manoeuvre

BPPV treatment : Canalith Repositioning Procedure = EPLEY's Maneuver



- Exercises that provoke vertigo used to reposition crystalline debris (the dislodged Calcium Crystals)
- 5 minutes in each position, repeat 3 times





2. Meniere's Disease

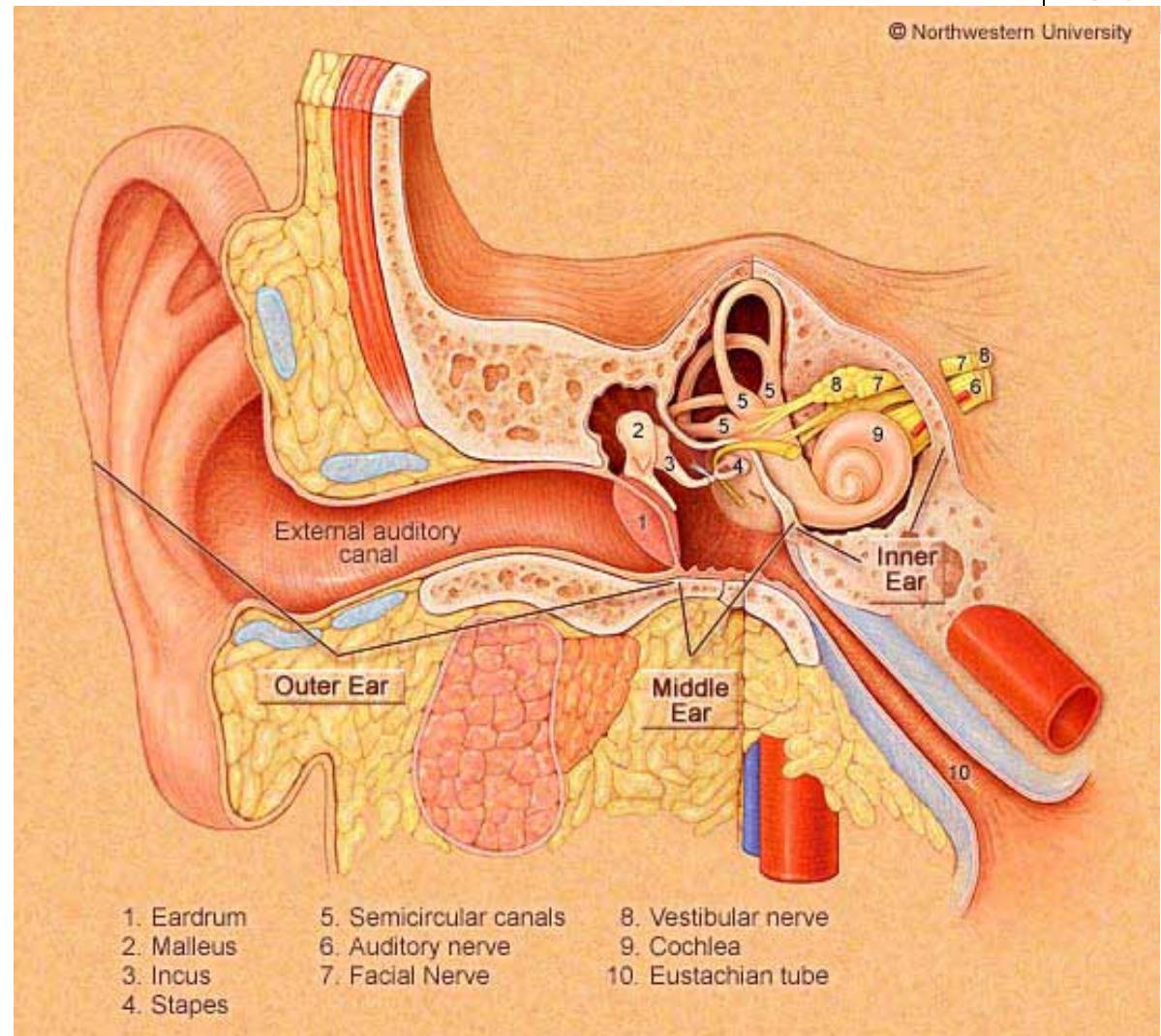
- Cause: Excess fluid in inner ear
- Symptoms and Signs:
 - Attacks of Vertigo lasting minutes to hours (max 24 hours) – unexpected, not triggered by position
 - Fluctuating progressive hearing loss (one or both ears)
 - Unilateral or bilateral tinnitus
 - Sensation of fullness or pressure in ear.
 - Nausea, vomiting, sweating
 - Horizontal Nystagmus

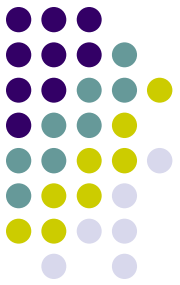


Meniere's Disease

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- Increased endolymphatic fluid in semicircular canals (area 5)





3. Vestibular Neuronitis

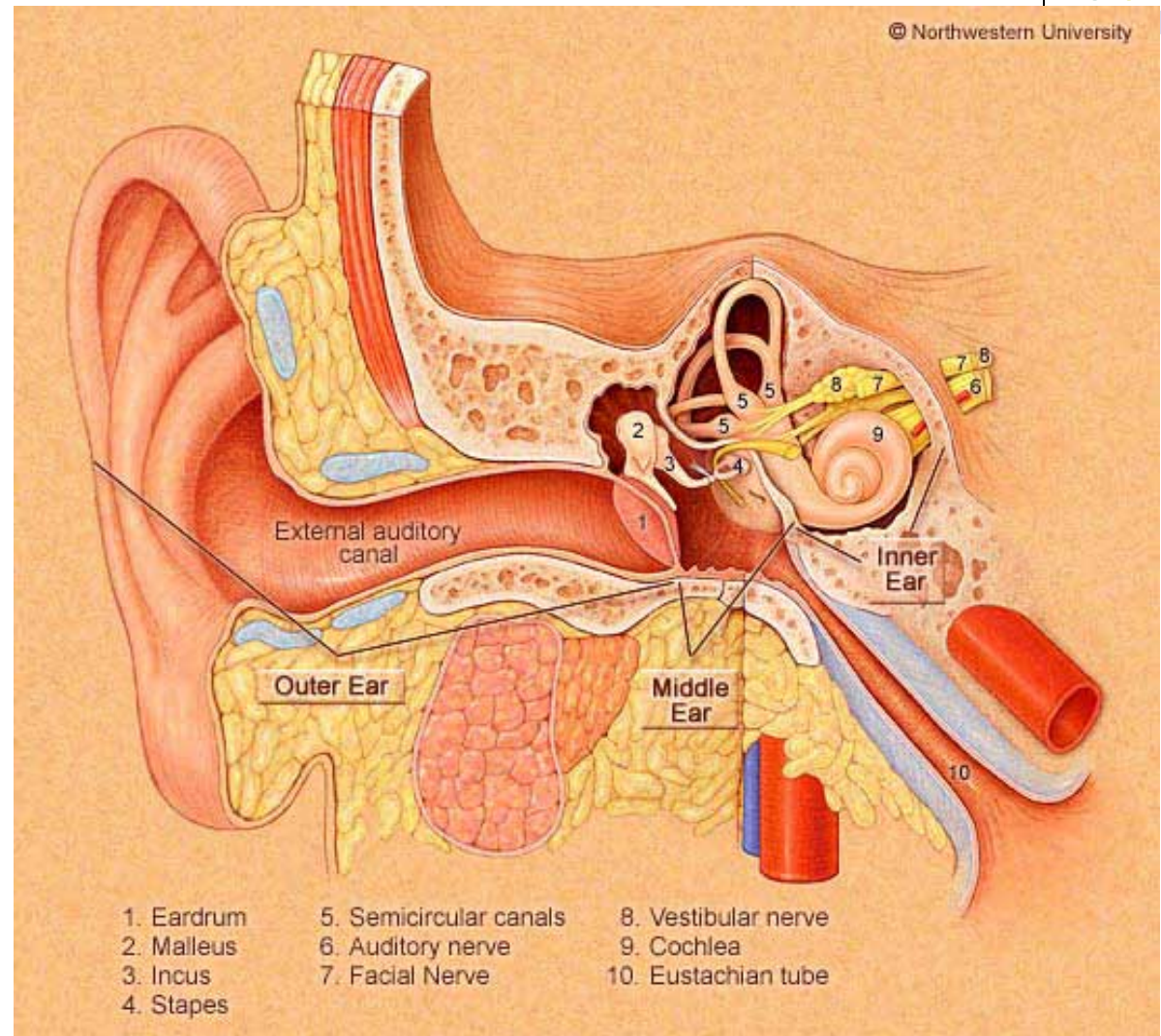
- Vestibular Neuronitis = inflammation of vestibular nerve
- Symptoms and Signs;
 - Vertigo + Nausea and Vomiting
 - unexpected, not triggered by position
 - +/- Nystagmus
 - Unlike labyrinthitis (next topic) is **NOT** associated with auditory symptoms (no tinnitus or decreased hearing)
- May be associated with prior viral upper respiratory tract infection

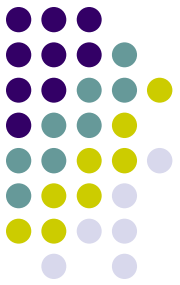
Vestibular Neuronitis



© Northwestern University

- Inflammation of vestibular nerve (area 8)





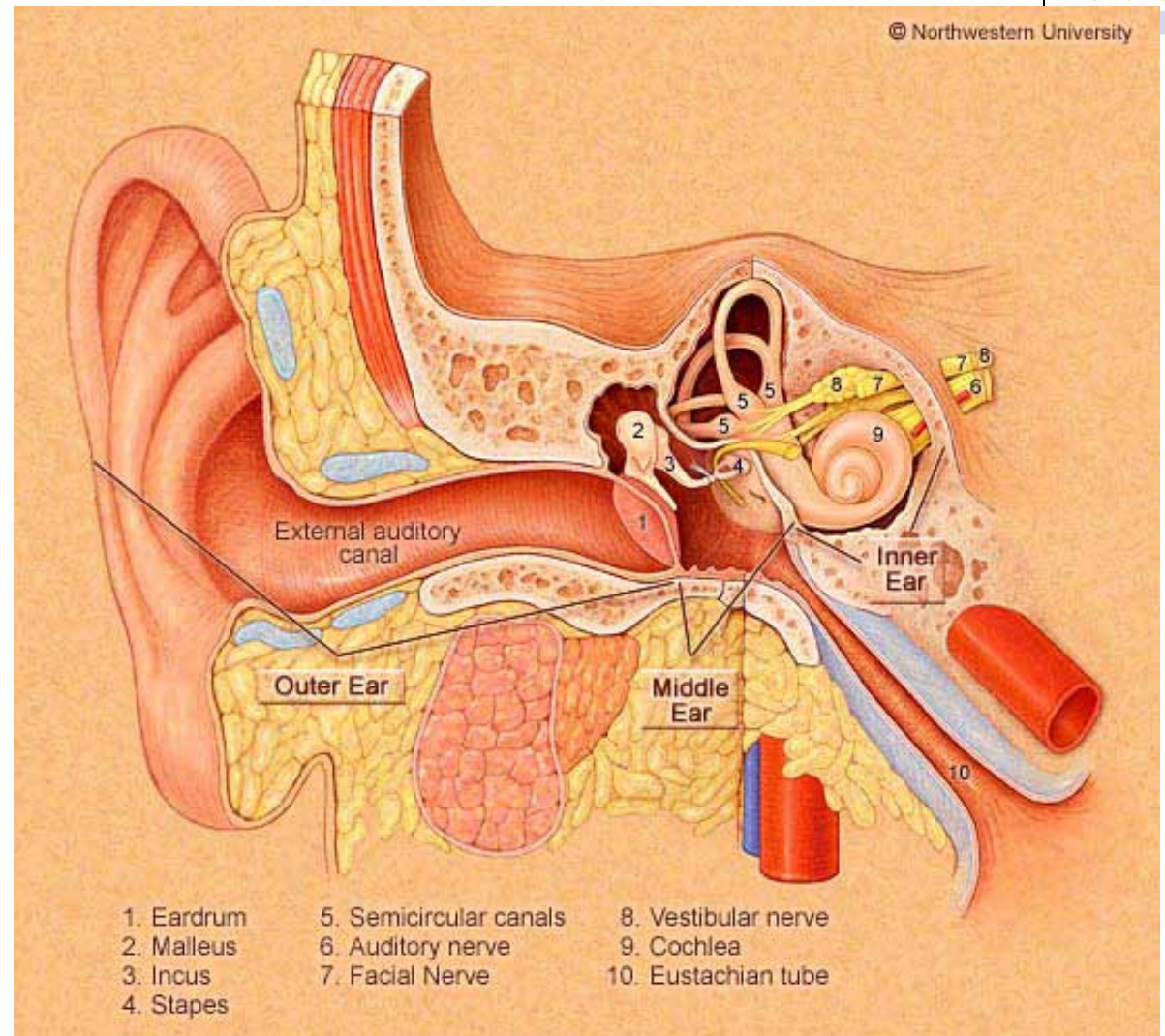
4. Labyrinthitis

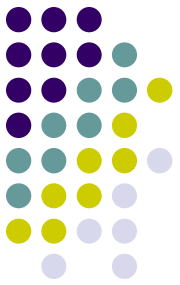
- Labyrinthitis – inflammation of inner ear.
- Symptoms and Signs:
 - Acute onset of non-position dependent vertigo (often severe)
 - +/- nausea and vomiting
 - +/- hearing loss and tinnitus
- May occur after viral or bacteria infection (especially upper respiratory tract infection), or head injury
- Lasts 1 – 6 weeks but can have residual symptoms for months or years



Labyrinthitis

- Inflammation of inner ear (areas 5 and 9)



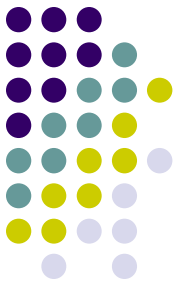


Box 5 (section 2): Assessment

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Box 5 – 2f.

Heart rate / rhythm + blood flow

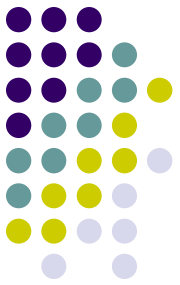


Decreased Cardiac Output

1. **Blockage of blood flow**
 1. **Valvular**
 1. aortic or mitral stenosis
 2. **Subaortic stenosis**
 3. **Aortic dissection**
 2. **Pulmonary Embolus**
2. **Arrhythmia**
 - Tachycardia (inadequate time in diastole for heart to fill): VT, SVT, WPW, VF, AFIB ...
 - Bradycardia; SSS, conduction blocks (complete heart block)
 - Can be precipitated by digoxin, beta-blocker (including Timoptic /Timolol eye drops), Alzheimer medications (Cholinesterase Inhibitors), Ca Channel Blockers
 - Carotid Sinus Hypersensitivity
3. **Very low Left Ventricular Ejection Fraction**

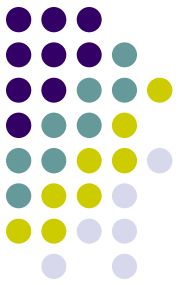
Box 5 – 2f.

Heart rate / rhythm + blood flow



VASOVAGAL - Syncope Triggered by:

- [Stress](#)
- Any painful or unpleasant stimuli, such as:
 - [Venepuncture](#)
 - Hitting your [funny bone](#)
 - Experiencing medical procedures with local anesthesia
 - Post-surgical pain when standing up or moving too abruptly after the procedure
 - Giving or receiving a needle immunization
 - Watching someone give blood
 - Watching someone experience pain
 - Watching or experiencing medical procedures
 - Sight of blood
 - Occasions of slight discomfort, such as dental and eye examinations
- Sudden onset of extreme emotions
- Nausea or vomiting
- [Urination](#) ('[micturition syncope](#)') or [defecation](#), having a bowel movement ('defecation syncope')
- Abdominal straining or 'bearing down'
- Swallowing ('swallowing syncope') or coughing ('cough syncope')
- Pressing upon certain places on the throat, sinuses, and eyes, also known as vagal reflex stimulation when performed clinically
- etc

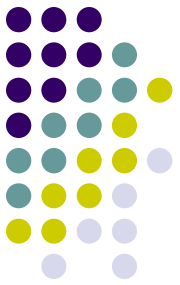


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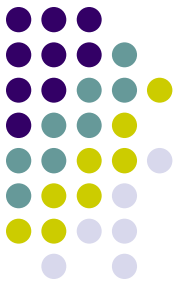
Box 5 – 2g.

Bone Health; nutritional review



- Currently, Ottawa Public Health recommends daily for adults 51 yrs and older:
 - 3 or more servings of Milk and Alternatives
 - Adequate amounts of calcium and vitamin D rich foods
 - A vitamin D supplement of 400 IU
- RCTs and meta-analyses have demonstrated a beneficial effect of Vitamin D in fall prevention distinct from its effect on bone health
 - Possibly through muscle strength and neuromuscular function.

Ottawa Public Health



Calcium - from food and
\or supplement:

- Women

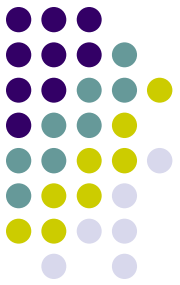
- 51-70 yrs : **1200 mg**
- 71yrs + : **1200 mg**

- Men

- 51-70 yrs : **1000 mg**
- 71yrs+ : **1200 mg**

Vitamin D - from food and
supplement, (♀ and ♂)

- 51-70 yrs : 600 IU
- 71yrs + : 800 IU
- Recommendations
include a **supplement**
for all adults 50 yrs +
of 400 IU
- Upper maximum intake:
4000 IU

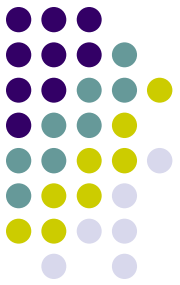


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- h. **Feet and Footwear**
- i. Environmental Hazards
- j. Depression

Box 5 – 2h.

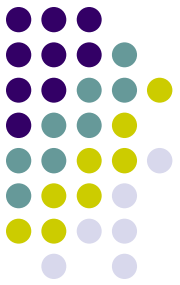
Feet and Footwear



- Don't forget to take off the socks and shoes to assess the feet. The feet reveal a great deal about a person. Neglected feet can be a marker of many things including inability to reach feet to care for them, depression, neglect, cognitive impairment...
- Examine for
 - Moderate or severe bunions
 - Toe / nail deformities
 - Ulcers
 - Loss of position sense (proprioception)
 - Filament test, vibration sensation may be more sensitive but less specific

Box 5 – 2h.

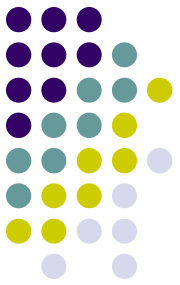
Feet and Footwear



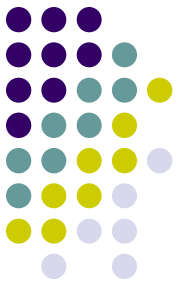
- Muscular:
 - Myopathy / Myositis
- Skeletal:
 - Arthritis (foot, ankle, knee, hip, back)
 - Deformity altering biomechanics
 - Poor pain control
 - start Tylenol Arthritis 650-1300mg TID straight
 - If still in pain and no CHF or renal dysfunction then consider NSAID
 - Later narcotics (watch for anorexia and weight loss, constipation, delirium)
- CHF – pedal edema leading to loss of position sense and change in foot mechanics

Box 5 – 2h.

Feet and Footwear



- Footwear
 - Ask to see shoes they were wearing when they fell (if possible) or at least get a description of the shoes. Look for:
 - Poor fit (foot moving in shoe)
 - Lack of support (not laced or buckled)
 - High heels
 - Note: some women develop Achilles tendon shortening with chronic high heel use and have difficulty transitioning to lower shoes
 - Small surface area contact with floor
 - Smooth slippery sole (lack of functional anti-slip surface by design or if worn out)

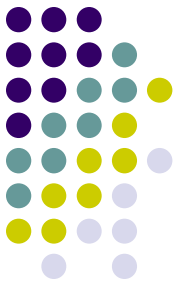


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- i. **Environmental Hazards**
- j. Depression

Box 5 – 2i.

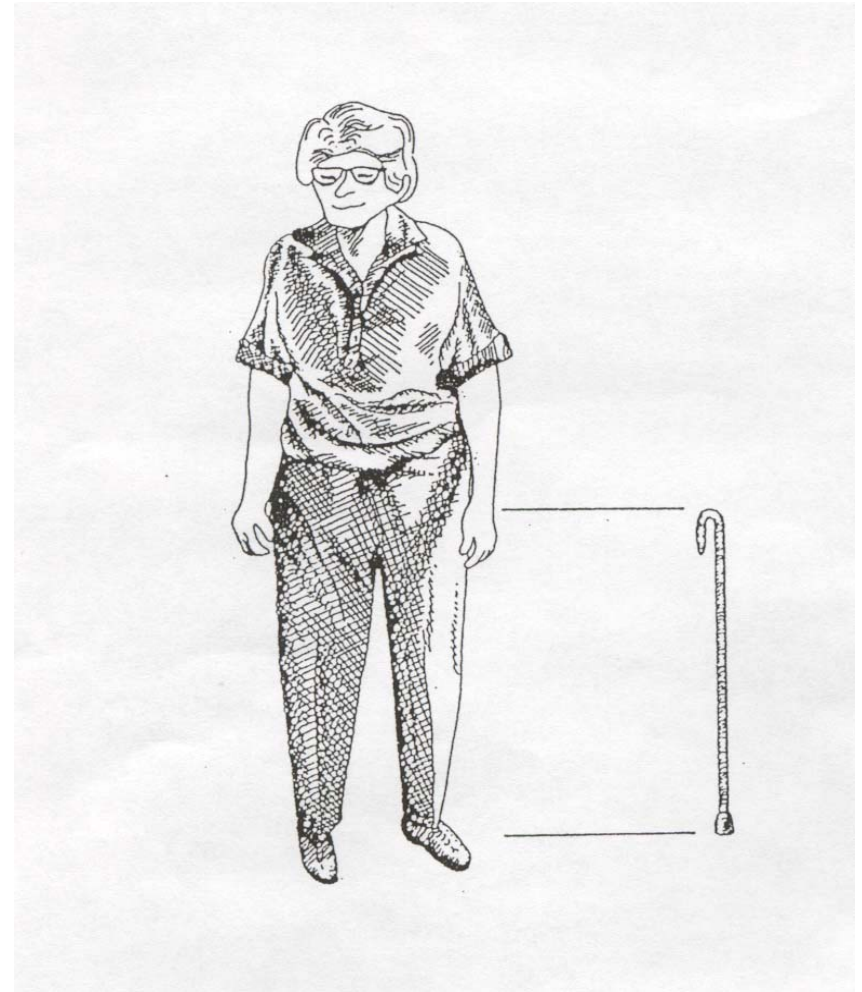
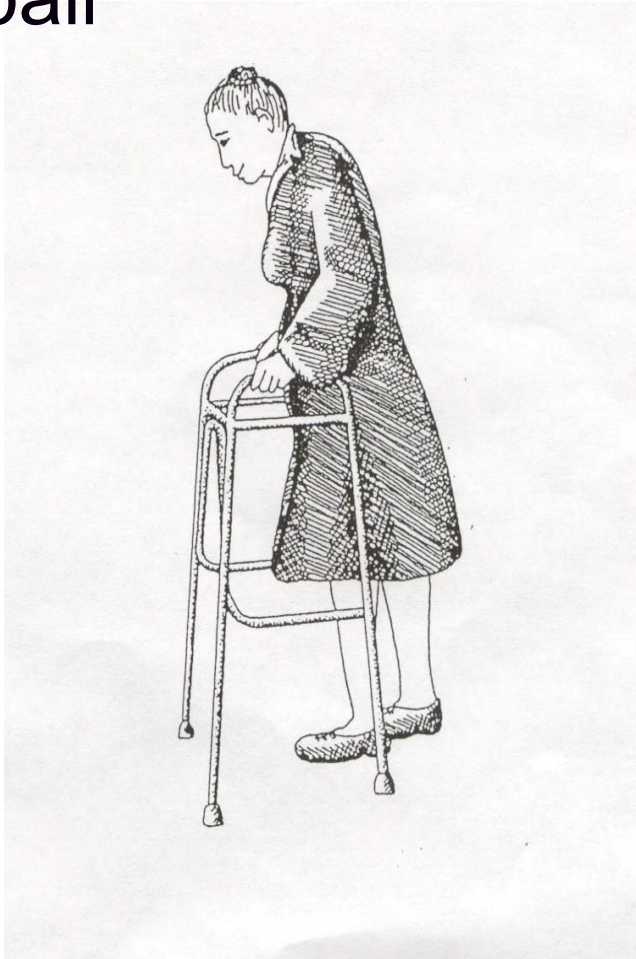
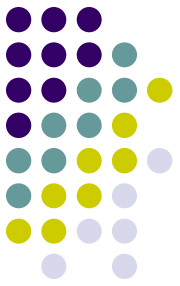
Environmental hazards



- Home hazards
 - (kitchen, bathroom, bedroom)
 - Poorly lit stairs, ramps or doorways
 - Stairs with irregular step width or height
 - Stairs without handrails or marking on the edges
 - Slippery floors, throw rugs, loose carpets
 - Raised sills in door jams
 - Clutter
 - Low toilet seats
 - Lack of grab bars in bathrooms
 - Poorly maintained or improperly used mobility aids and equipment

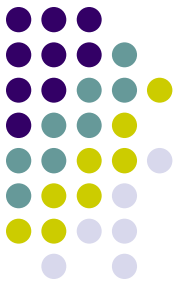
MOBILITY AIDS

- Correct height, correct use, & in good repair



Box 5 – 2i.

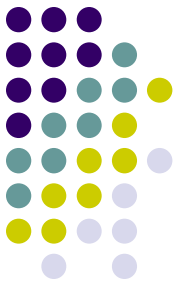
Environmental hazards



- Outdoor hazards
 - Public/community hazards
 - Use of Assistive devices
 - Uneven sidewalks or cracks in sidewalks
 - Stairs without handrails or marking on the edges
 - Poor lighting
 - Objects on sidewalks or walkways such as garbage cans
 - Snow or ice on stairs or walkways
 - Unmarked curbs or corners without curb ramps
 - Long crosswalks without pedestrian islands

Box 5 – 2i.

Environmental hazards

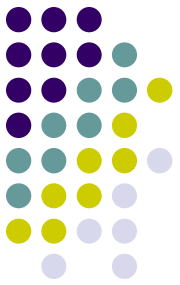


- Ask patient and family about;
 - Difficulty getting out of low bed or off low chair / couch
 - Tripping over rugs, thresholds
 - Lighting
 - Stairs
- Gives clues to risk reduction strategies

Falls



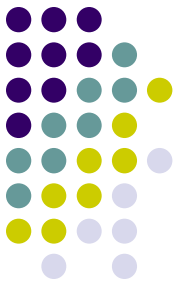
- Are all normally used **walkways** free of trip hazards?
 - Objects, low level furniture, pets, scatter rugs not properly secured, cords – encourage cordless phones,
- How hazardous are the **Floors**?
 - Throw rugs not properly secured, slippery surfaces, thresholds
- How hazardous are the **Stairwells**?
 - Two railings?, steep steps, steps in good repair, poor lighting
- How hazardous are **Transfers**?
 - On/off of chairs (height, stability, arms), in/out of bathtub (any bathtub equipment or torn off the wall towel racks), on/off toilet (height), in/out of bed (height)
 - Is all equipment securely attached?
- **Other:**
 - Accessibility of **Phones** in commonly used areas, by bed, living room, kitchen, basement
 - **Commonly Used Items** at reachable height – avoiding use of step stools
 - **Proper Lighting** (overhead lights and night lights)
 - **Clothing** – Proper footwear, proper length of clothing.



Box 5 (section 2): Assessment

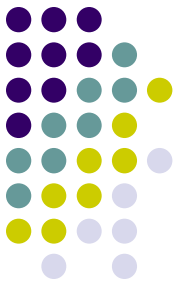
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- j. **Depression**

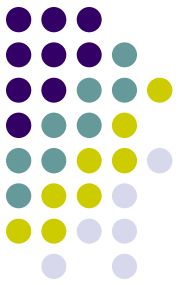
Box 5 – 2j. Depression



- MOOD
 - Anxiety/Panic disorders
 - Mood disorders (Depression)
 - ↑ with hyperventilation or emotional stress
 - Often associated with:
 - Somatic complaints
 - Insomnia/fatigue

TREATMENT & PREVENTION

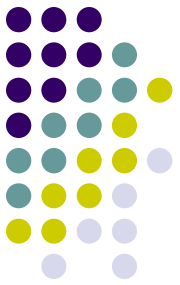




Treatment

- Goals of treatment
 - Prevent all falls (often unachievable ideal)
 - When that is not possible then decrease frequency, severity and sequelae of falls
 - One sequelae is fractures so order a **Bone Mineral Density** and consider aggressive treatment for osteoporosis in all fallers if you feel their life expectancy merits treatment

Comprehensive Falls Assessment and Prevention Programs



- Treatment
 - MD / RN
 - Adjust medications (+/- Pharmacist)
 - Optimize control of medical problems
 - Bone Density (prevent fractures if does fall)
 - OT
 - Compensatory Strategies
 - Assistive devices
 - PT
 - Balance and Strength training
 - Ambulation Aides
 - SW
 - Safe housing options + support services
 - Nutrition
 - Improve oral intake
 - ?



Regional Geriatric Program of Eastern Ontario Programme gériatrique régional de l'Est de l'Ontario

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The Regional Geriatric Program of Eastern Ontario

is a coordinated network of specialized geriatric services, from hospital to home. Our clinical services, teaching and research are committed to optimizing the health and independence of seniors in the Champlain region.



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- [Annual General Meetings](#)
- [Geriatric Refresher Days](#)

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- [Referrals to to RGPEO Outreach and referral forms](#)
- [SGS Wait Times](#)
- [Primary Care - Page under Construction](#)
- [Fall Prevention - Page under Construction](#)
- [Senior Friendly Hospitals](#)

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- [Resources for Patients and Families](#)
- [Finding a family doctor or nurse practitioner](#)
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Falls Prevention Program

The Regional Geriatric Program of Eastern Ontario, in partnership with the Champlain Local Health Integration Network and a broad group of community partners have lead the development of a Champlain Falls Prevention Strategy. This strategy builds on the extensive work developed by the Ministry of Health and Long Term Care which places a strong emphasis on the prevention of falls in the Ontario Integrated Falls Prevention Strategy and whose objective is to: "improve the quality of life for Ontario seniors aged 65 years and over and lessen the burden of falls on the health care system by reducing the number and impact of falls."

The Champlain Falls Prevention Strategy includes the development of assessment and intervention tools and resources to support primary care practitioners in identifying the root causes of falls amongst seniors and to put into place the appropriate interventions to reduce the number of falls and the injuries related to falls. The following pages provide a framework, tools, and resources to support a transfer of knowledge into everyday clinical practice and the key factors involved in falls prevention.

- 1 [Fall Risk Assessment and Intervention resources](#)
- 2 [Community Resources](#)
- 3 [Other Resources](#)



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Years of
Aging Successfully



Regional Geriatric Program of Eastern Ontario Programme gériatrique régional de l'Est de l'Ontario

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Falls Prevention Program

Fall Risk Assessment and
Intervention

Fall Risk Assessment and Intervention

1. Obtain relevant medical history, history of falls, physical examination, including cognitive and functional assessment to identify root cause.
2. Determine multifactorial falls risk by assessing.
 - a. Medications
 - b. Postural hypotension
 - c. Gait, balance and mobility and muscle strength (ie TUG or Chair Stand Test). Evaluate pain-related mobility
 - d. Visual acuity
 - e. Other neurological impairments
 - f. Heart rate and rhythm
 - g. Bone health: assess calcium intake and fracture risk; nutritional assessment
 - h. Feet and footwear
 - i. Environmental hazards
 - j. Depression



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Falls Prevention

The Champlain Falls Prevention Strategy aims to reduce the frequency, severity and impact of preventable falls among older adults living in the region. The strategy was developed by the Regional Falls Steering Committee, in collaboration with hospitals, primary care and community support services.

The following resources are intended to help physicians assess the risk of falls, while providing an updated list of physiotherapy, exercise and community programs related to falls prevention.

Specialized Geriatric Services

Geriatric services provide health care specifically related to aging, in particular the frail elderly who have multiple health problems or who have difficulty managing on their own.

- [When to Refer to Geriatrics](#)
- [View list of specialized geriatric services](#)
- [Link to RGPEO website Falls Prevention page \(for geriatric resources\)](#)

Falls Prevention Programs

These are evidence-based programs with a falls prevention focus, including assessments and/or interventions that may be accompanied by physiotherapy services and educational classes on falls prevention.