SCOREBUILDERS

SPOTLIGHT *Series*

Geriatrics Review for the NPTE

Presented by
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About Me

- Specializations
- Experience
- Education
- Teaching
- Research

Purpose

1. Identify areas of focus for your study plan.
2. Draw parallels between other content areas and geriatrics.
3. Prepare you for geriatrics content that could be encountered on NPTE.

NOT

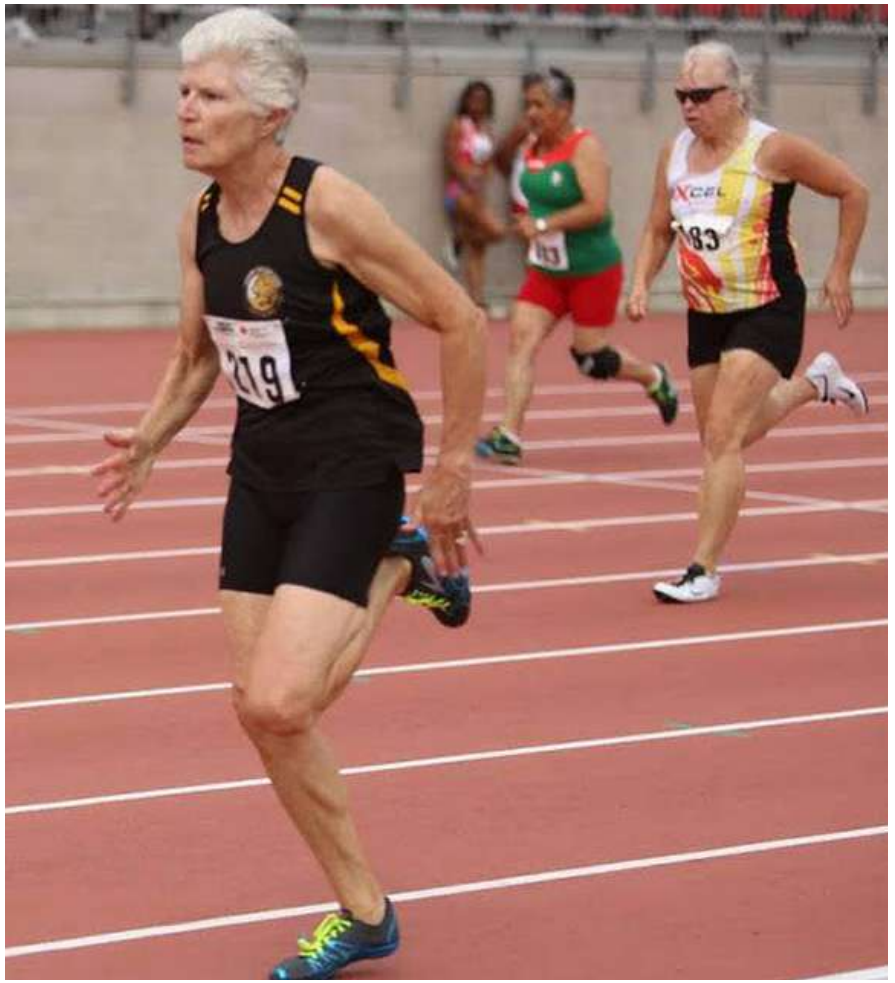
1. Comprehensive course on geriatrics (but covers a lot!).
2. Rehash of Scorebuilders book.

Prominent Domains

Major Areas of Focus

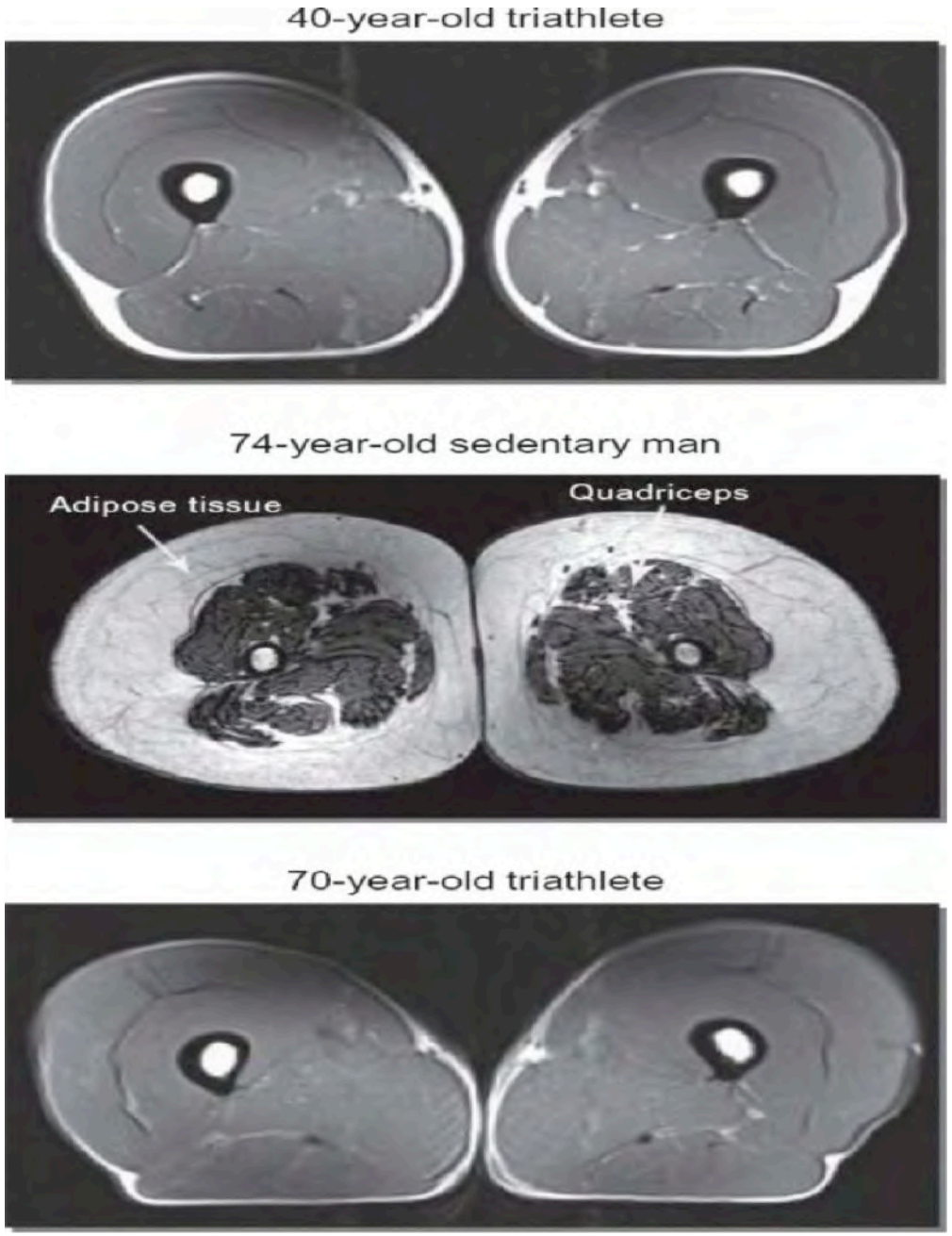
- Normal vs abnormal aging
- Geriatric-specific conditions
- Falls
- Pharmacology

Normal vs Abnormal vs Optimal vs Successful Aging



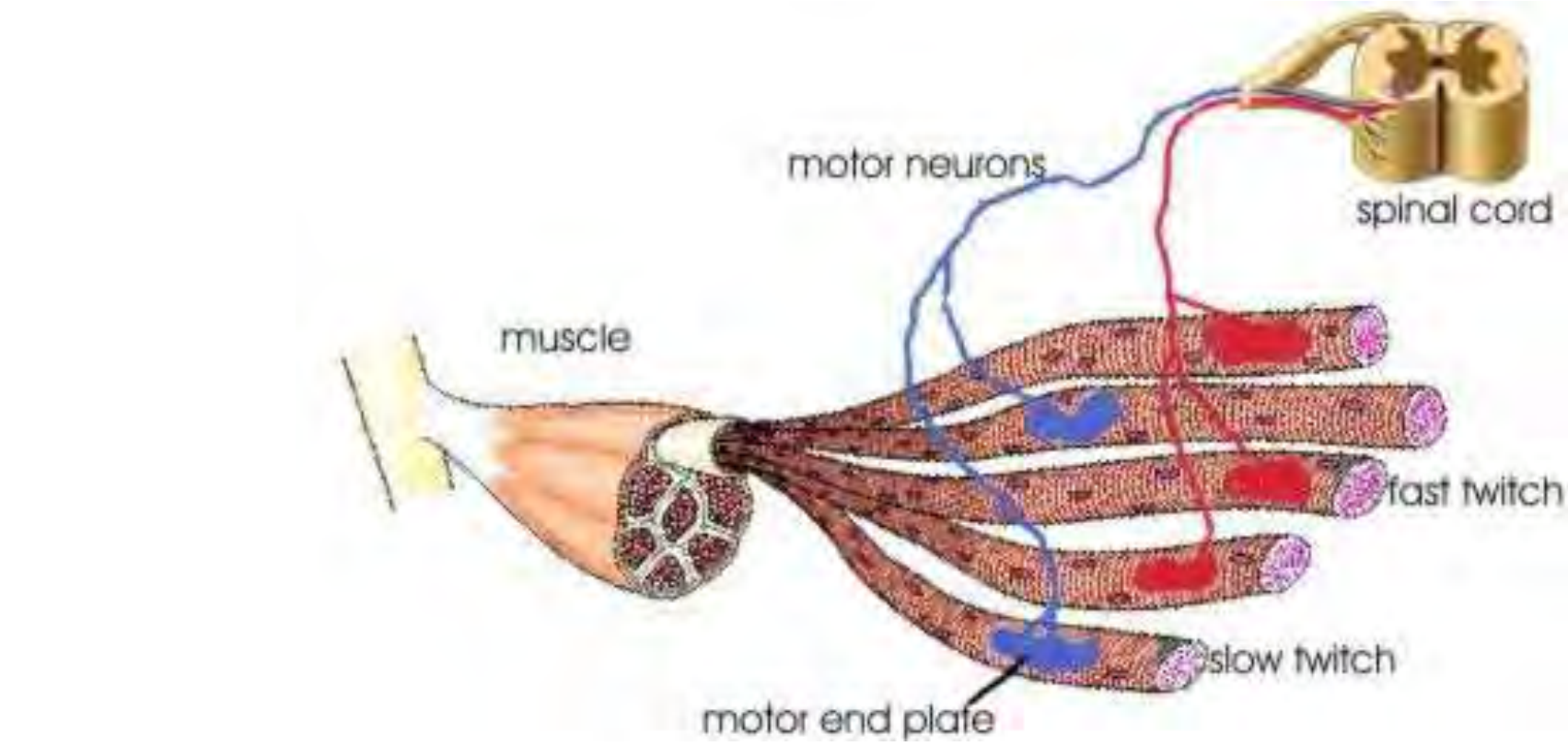
Skeletal Muscle

- Sarcopenia: .5-1% loss per year of muscle mass after the age of 50
  - Not a disease, Not pathologic
  - Can be mitigated



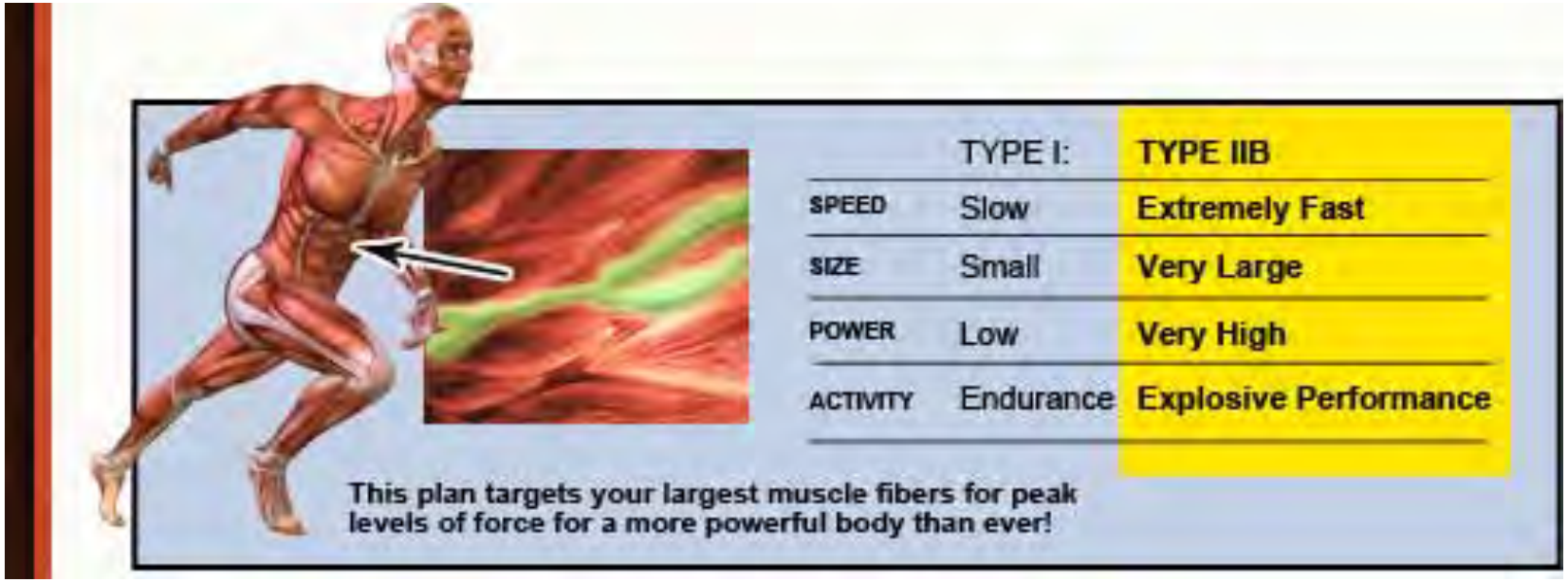
Motor Units:

- Selective denervation of muscle fibers
  - Specifically type IIb fibers
- Results in less units
  - Remaining units have larger size to accommodate



Muscle Strength

- ~8% per decade after 30 years old (Schiller 2000)
- Increased fat infiltration
- Decrease in IIB fibers (conversion to type I)

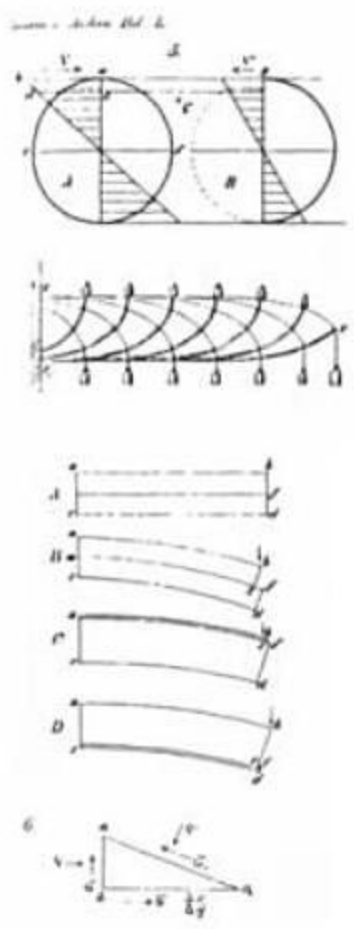


Speed, Power, Endurance, Mass

- Since decreased IIB→ decreased explosive power
  - Think about if you stepped into a pothole and had to quickly regain your balance
- Muscles require 50% longer to relax properly
  - Decreases rapid alternating movement capability
- Endurance
  - Remains unproven if changes exist
  - So why do we think of older adults as having poor endurance?
- Mass
  - Lower Muscle Mass= Lower Physical Function (Melton 2000)
  - Reduction of II fibers + dec cross sectional area= reduced mm mass
  - Higher Fat infiltration = Lower function

Skeletal System

- Age 40
  - Cortical bone dec .5%/yr
    - Accelerated in woman post menopause
      - 5-6%/yr for 10 years
- Mechanical stress causes bone to adapt (Wolff's law)



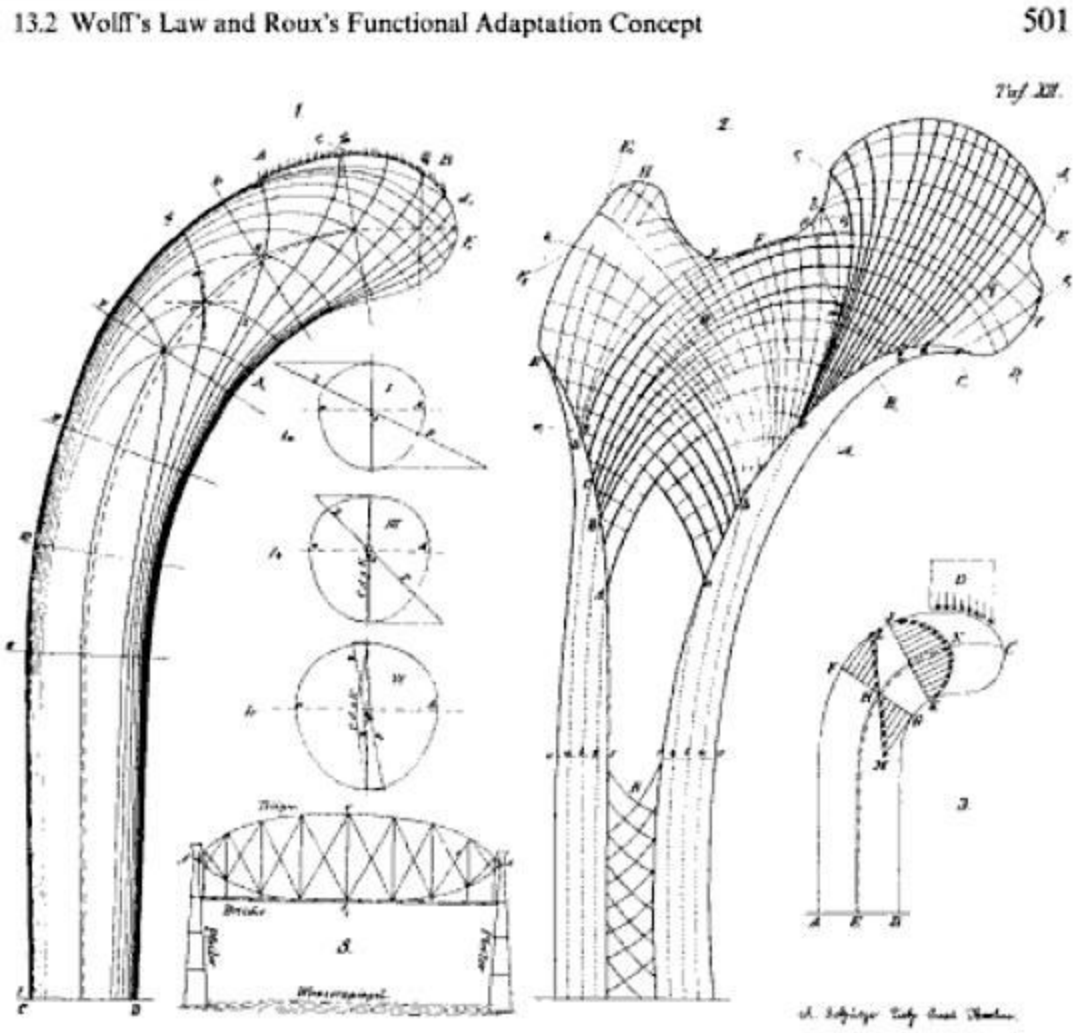


FIGURE 13.2:1 Culmann's crane presented by Wolff in his 1870 paper in Virchow's Archiv.

Joint mobility

Table 4.1 Range of motion for selected joints

	Age	
Motion (in degrees, mean ± SD)	<40	75+
Shoulder abduction	184 ± 7[a]	118 ± 20[b]
Hip flexion	122 ± 12[c]	105 ± 10[d]
Hip extension	22 ± 8[c]	17 ± 8[e]
Knee flexion	134 ± 9[c]	100 ± 20[d]
Ankle dorsiflexion	25 ± 6[f]	8 ± 8[d]
Ankle plantar flexion	56 ± 6[a]	35 ± 15[d]
Cervical flexion	50 ± 9[g]	38 ± 9[g]
Cervical extension	82 ± 15[g]	50 ± 15[g]
Lumbar flexion	47 ± 7[h]	25 ± 10[h]
Lumbar extension	18 ± 10[h]	10 ± 6[h]

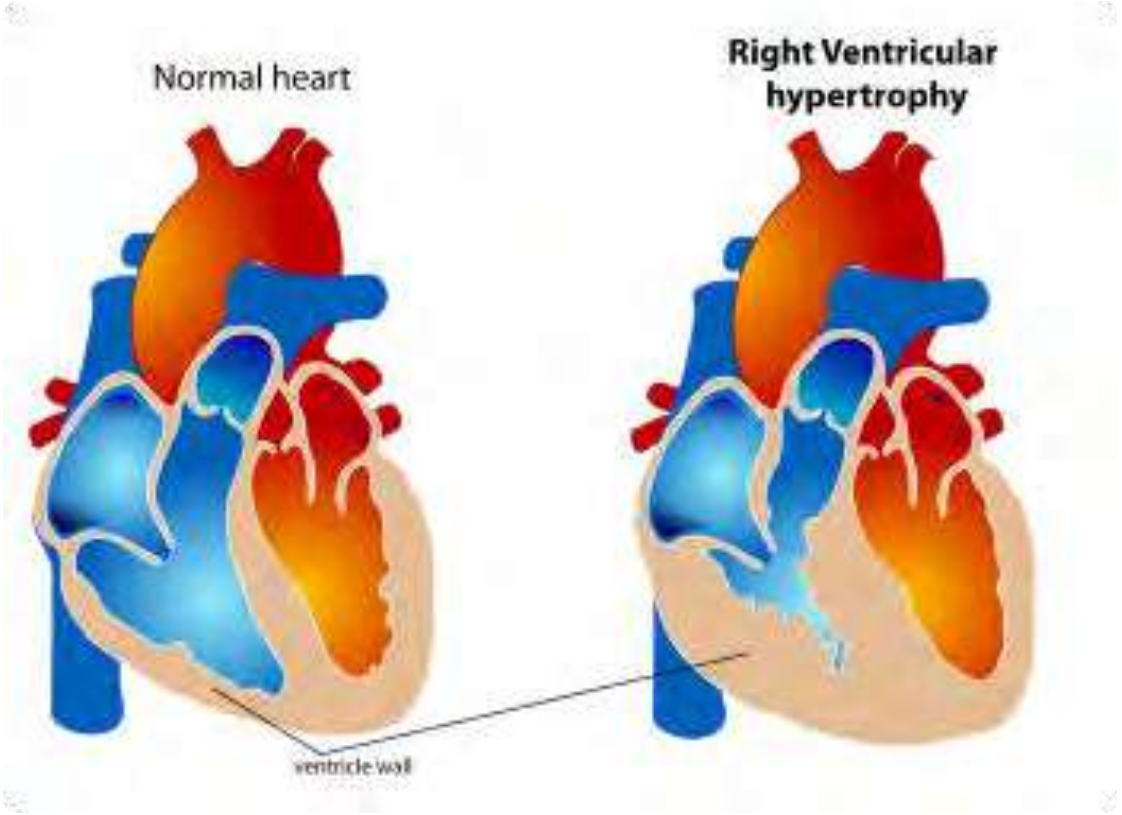
Q1

- A 85 year old female patient reports to physical therapy status post a fall. The patient reports walking at her normal speed (.8 m/s) when she stepped on the edge of the sidewalk and was unable to correct her balance. What physiological change is **MOST** likely responsible for her lack of righting reaction?

- 1- decrease in motor end plates
- 2- decrease in type IIb muscle fibers
- 3- decrease in type I muscle fibers
- 4- increase in intramuscular adipose deposits

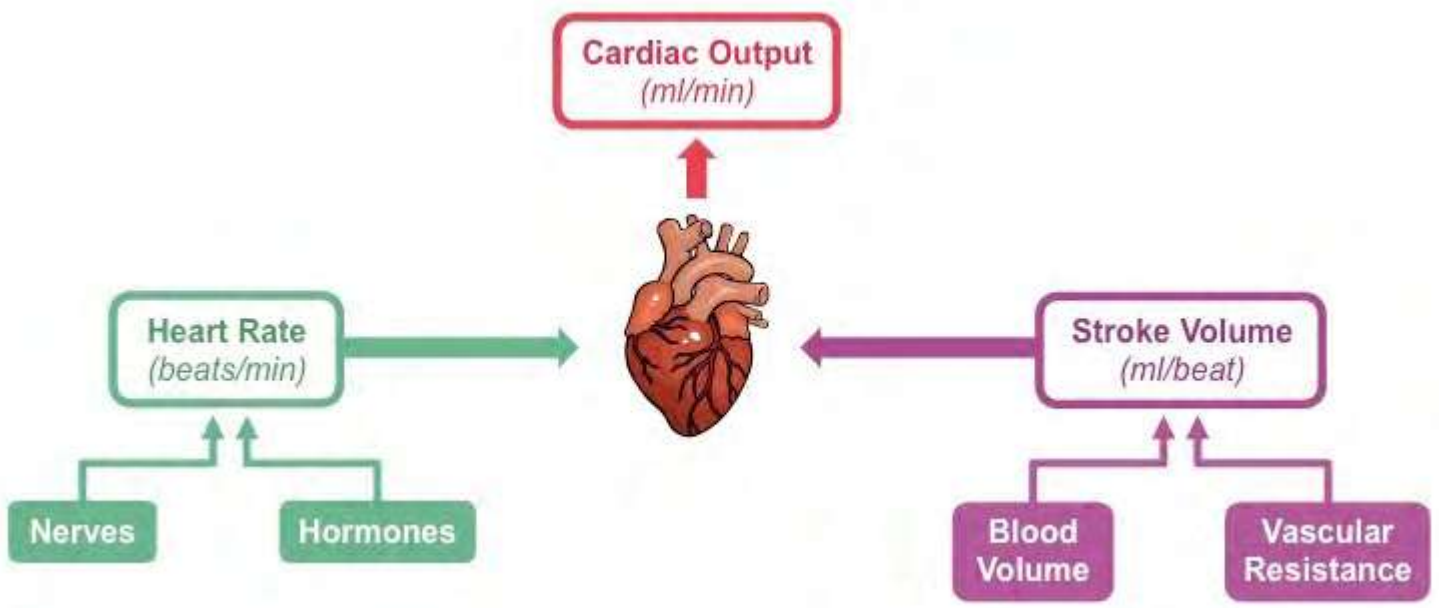
Cardiac Considerations

- Similar to that of skeletal muscle
  - Hypertrophy of remaining fibers
    - To overcome vascular resistance
  - Inc fat
  - Dec elasticity
  - Inc fibrosis of conduction pathways
    - Inc arrhythmias
  - Stiffer vasculature=higher resistance
  - Decreased vasodilatory capability



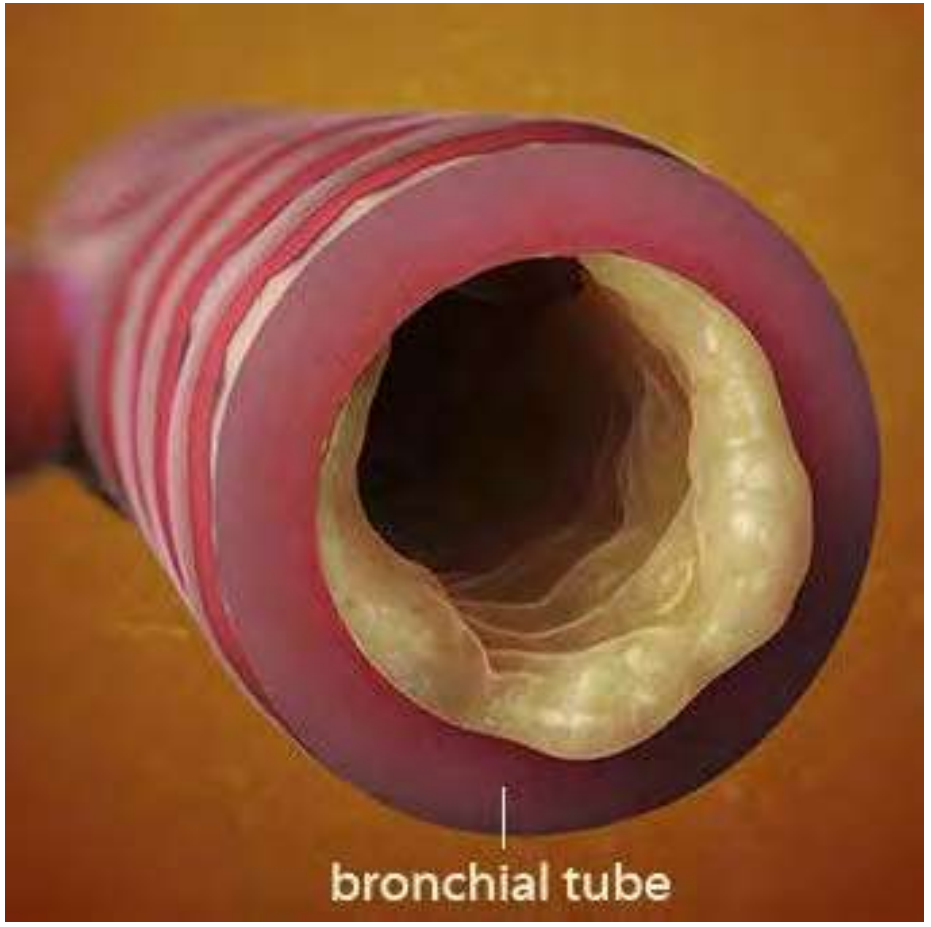
Cardiac Changes

- Decrease response to stress
  - Inc warming up/cooling down
- Inc systolic BP
  - PVR inc
- Dec Max HR
  - Lowers CO

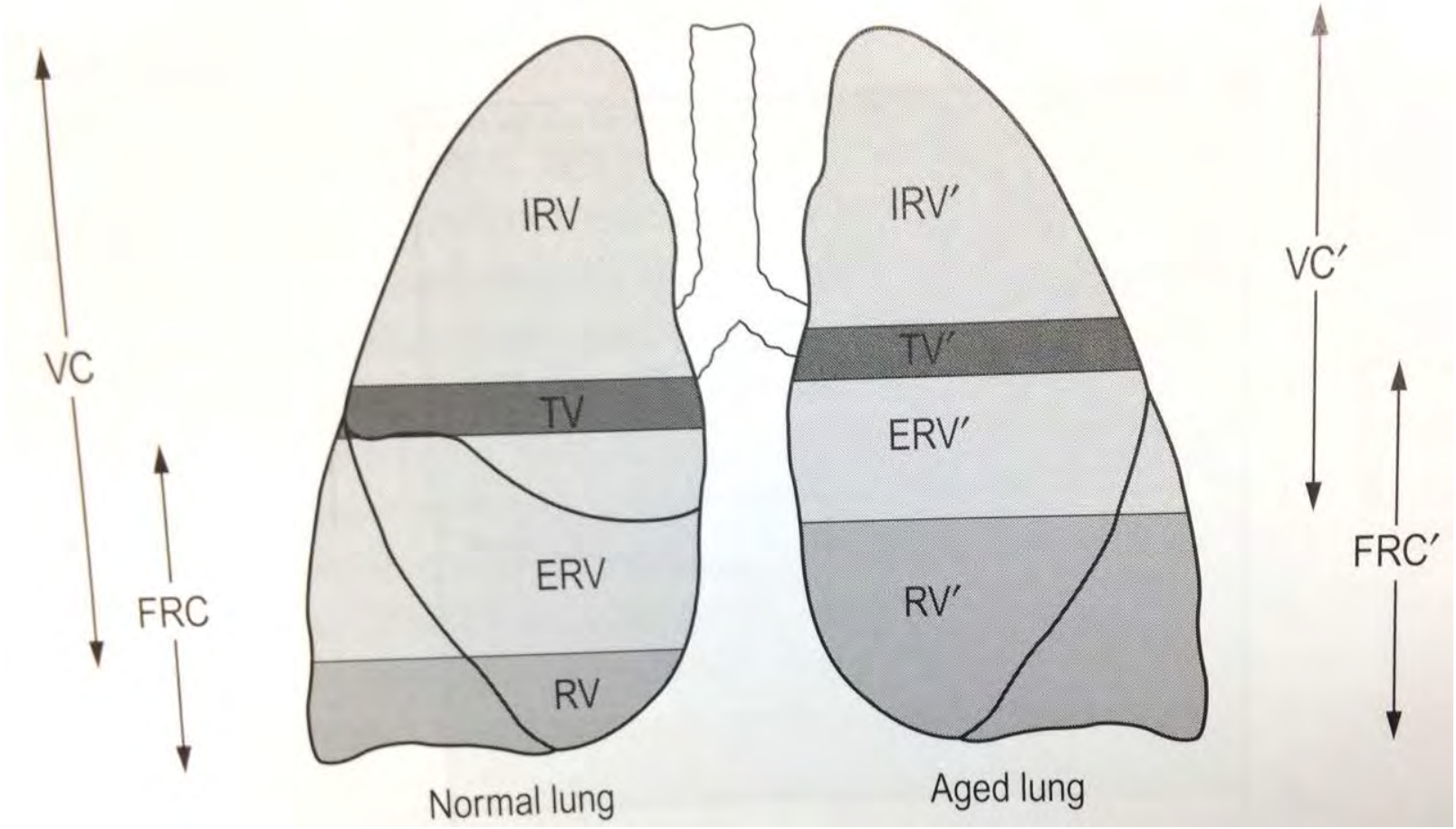


Pulmonary Considerations

- Airways
  - Inc rigidity: dec elasticity
  - Dec cilia
- Lungs
  - Thickening of mucous
- Respiratory Muscles
  - Inc contraction/relaxation times
  - Dec efficiency
- Skeleton
  - Dec disk space
  - Dec rib motion
  - Inc kyphosis



Comparison of lungs



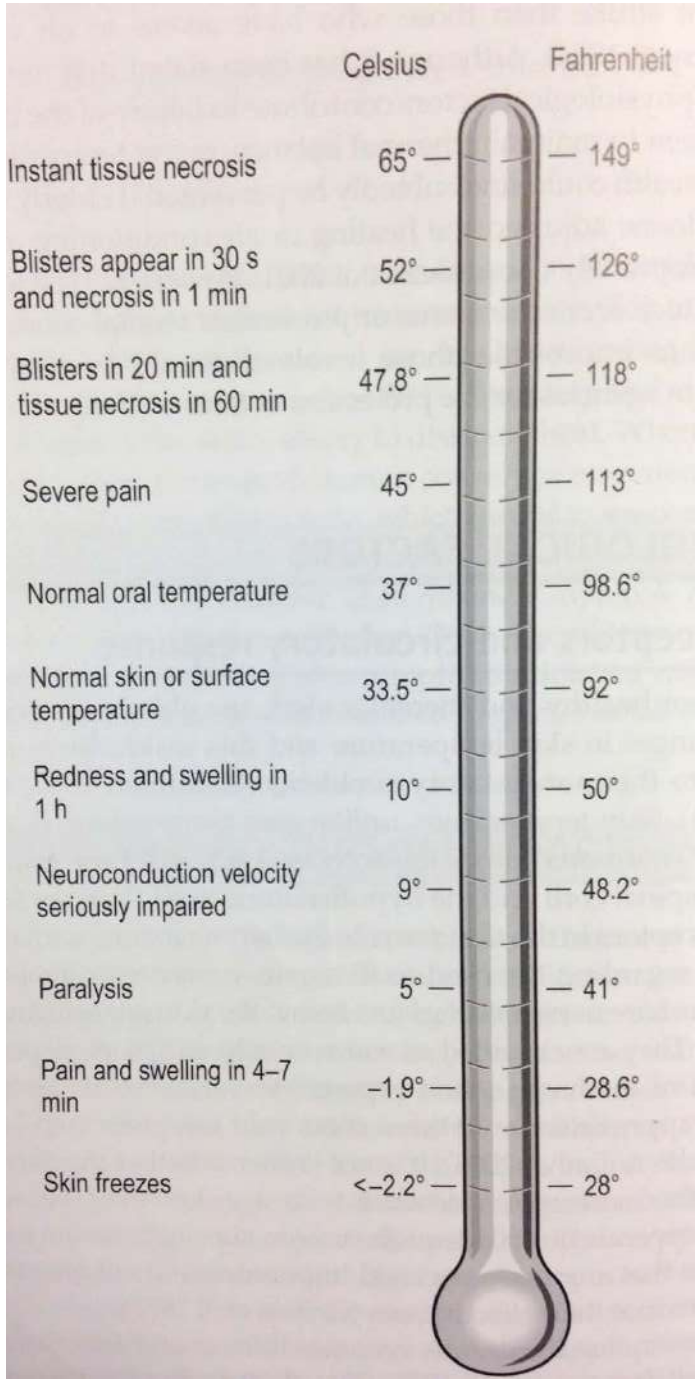
Q2: Cardiopulmonary

- A 80-year old woman complains of shortness of breath during brisk walking (1 m/s). Her FEV1 is 80%, her bone density is -1 T-score, and she has a reduced rib-pelvic distance. Which intervention would **MOST** likely improve pulmonary function?

- 1- Use of weekly nebulizer treatments
- 2- Incentive spirometer training
- 3- education on pursed lip breathing
- 4- PA mobilization of t-spine

Temp Vs Skin

- Older adults at much higher risk
  - Thinner skin
  - Less sub-dermal adipose
  - Dec sympathetic regulation
  - Dec vascular compliance
  - Dec muscular pump



Cold-related Conditons

Table 10.2 Cold-related emergencies

Condition	Signs and symptoms	Treatment
Chilblains	Skin lesions that occur after prolonged exposure of the skin to temperatures below 15.4°C (60°F)	Protect the injured area and prevent re-exposure
Trench foot	Swollen body part (usually foot); waxy, mottled appearance of skin; complaints of numbness; caused by prolonged exposure to cool water	Remove wet shoes and socks. Gently rewarm. Cover any blisters with sterile dressings
Frostnip	Reddened skin that becomes blanched; numbness or tingling; ears, nose, lips, fingers and toes most commonly affected	Gently warm the involved area. If the condition does not resolve itself, treat the individual for frostbite
Frostbite	Waxy appearance of skin; may turn mottled	Gently warm but do not rub or squeeze the injured part. Transport patient immediately for advanced medical treatment
Hypothermia	Shivering in early stages; drowsiness and lethargy; slow breathing and bradycardia; possible loss of consciousness	Gently rewarm the individual in mild cases. Immediately transport for advanced medical care in moderate to severe cases
Cold allergy	Urticaria, erythema, itching and edema; systemic reactions, including hypotension, tachycardia, syncope and gastrointestinal dysfunction	Gently warm and acclimatize the individual

From Judd RL, Dinep MM 1986 Environmental emergencies. In: Judd RL, Warner CG, Shaffer MA (eds) Geriatric Emergencies. Aspen Publishers, Rockville, MD, p 255.

Heat-related Conditions

Table 10.1 Heat-related emergencies

Condition	Signs and symptoms	Treatment
Heat edema	Swollen feet and ankles	Elevate the lower extremities and wear support stockings. If symptoms are a consequence of a cardiovascular condition, drug therapy may be required
Heat cramps	Severe muscle spasm, particularly in the lower extremities	Allow patient to rest in a cool place, cool with moist towels and drink electrolyte replacement fluids
Heat syncope	Pooling of blood in veins resulting in decreased cardiac output; symptoms ranging from lightheadedness to loss of consciousness; typically cool and wet skin	Allow patient to lie down, rest and drink electrolyte fluids. This condition is caused by physical exertion in a warm environment by an individual not acclimatized to that environment
Heat exhaustion	Loss of volume in the circulatory system as a result of excessive sweating; cool and clammy skin; nausea, headache, confusion, weakness and low blood pressure	Rest and fluid replacement; fluids with electrolytes may be necessary. Unconsciousness occurs rarely
Heat stroke	High skin and core body temperature; loss of consciousness; possible convulsions; dry skin, indicating loss of the sweating mechanism for cooling	This is the most severe heat-related condition. Cool the body as rapidly as possible. Seek immediate medical care

From Judd RL, Dinep MM 1986 Environmental emergencies. In: Judd RL, Warner CG, Shaffer MA (eds) Geriatric Emergencies. Aspen Publishers, Rockville, MD, p 255.

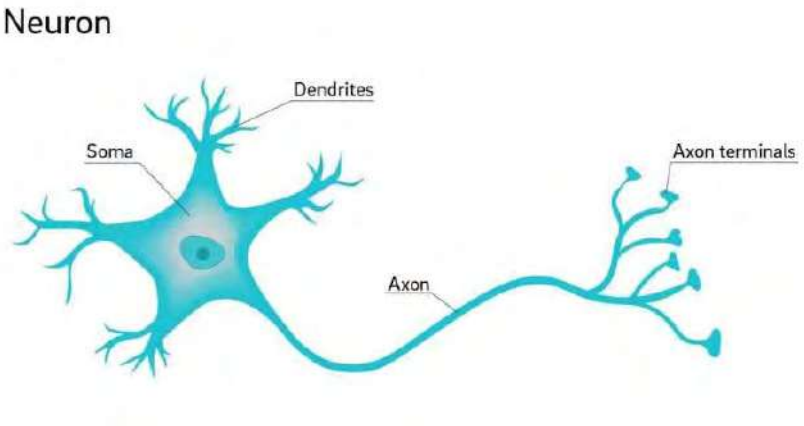
Q3: Thermal issues

- A 88- year old male patient as found unresponsive in their home upon entering for a home care visit. The temperature inside the home was 110* F. What is the **MOST** appropriate immediate intervention to perform?

- 1- call for emergency medical services
- 2- cool the patient with cold, wet towels
- 3- initiate CPR
- 4- remove excess clothing

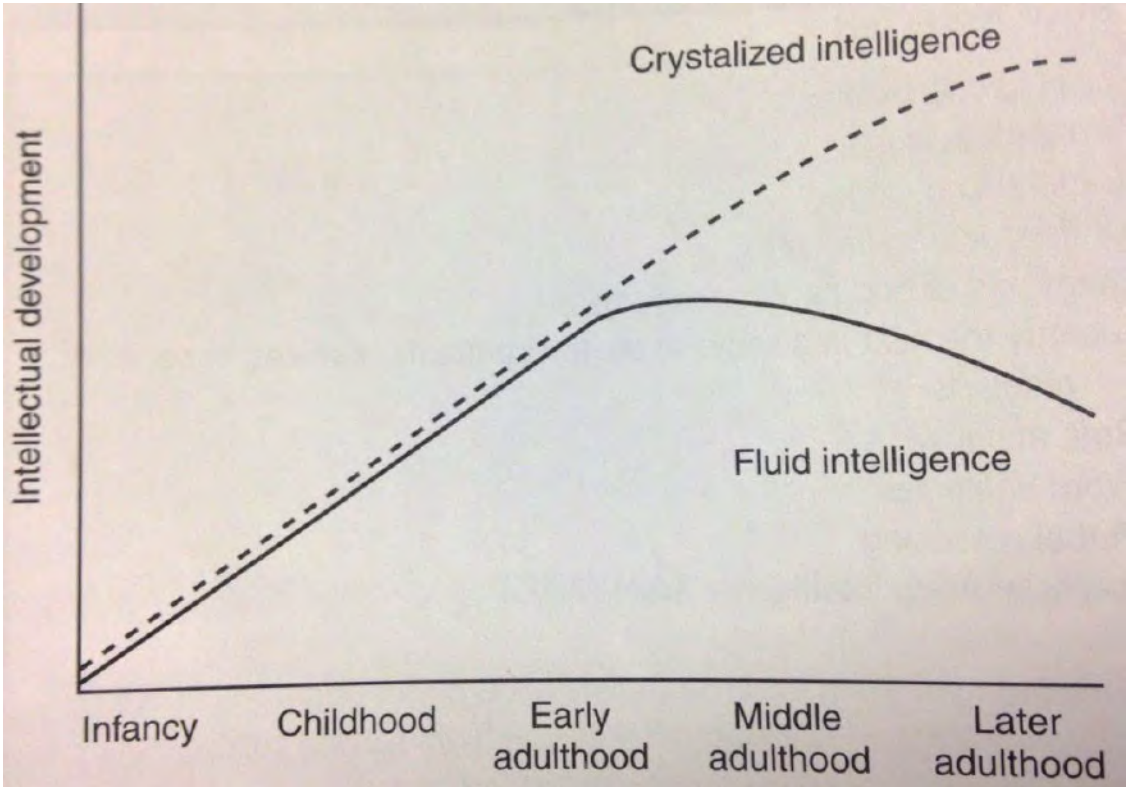
Cognitive Changes

- Born with all the neurons you will ever have
  - They collaterize with learning
  - They de-collaterize with lack of stimulus
- Memory impairment
  - Pathologic if disease process is occurring → Dementi
  - Working Memory: Where am I going?
  - Episodic Memory: Where is my car?
  - Semantic Memory: fact based memory
  - Remote: Past events



Intelligence

- Fluid Vs Crystallized
  - Fluid: peaks during adolescence
    - Speed, short term memory storage
  - Crystallized: increase gradually throughout lifespan
    - Occupational knowledge, acquired knowledge, long term memory



Intelligence

- IQ scores should do not decline with age
  - Speed at which you can complete the test however…
- MMSE scores should not decline significantly with age
- Executive function
  - Combination of memory, intellect, cognitive planning
  - Mild decline with age as working memory decreases
    - Can contribute to fall risk as executive function inhibits jeopardizing behavior
- Brain remains plastic
  - Must be challenged to collateralize and grow

Q4: Cognition

- An 89-year old male presents for physical therapy. They provide a cogent past medical history, scores high on the MMSE, and describes his prior treatments that occurred 20 years prior. However, before leaving the session he forgets where he placed his keys. What interpretation of the provided information is the **MOST** appropriate?

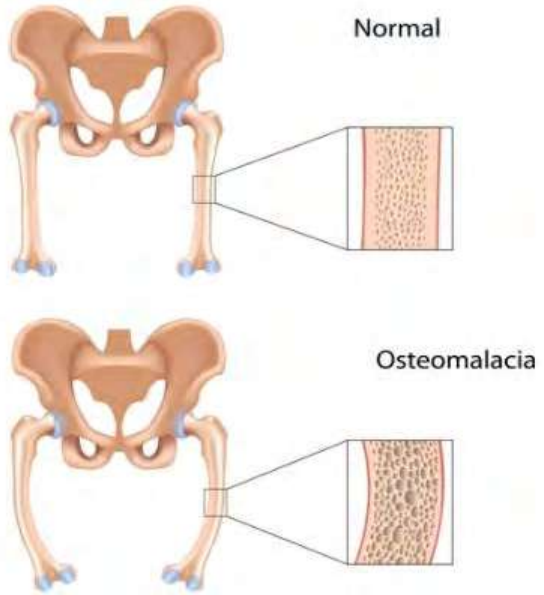
- 1- patient demonstrates normal cognition
- 2- patient demonstrates dementia
- 3- patient demonstrates a decrease in remote memory
- 4- patient demonstrates a decrease in crystalized intelligence

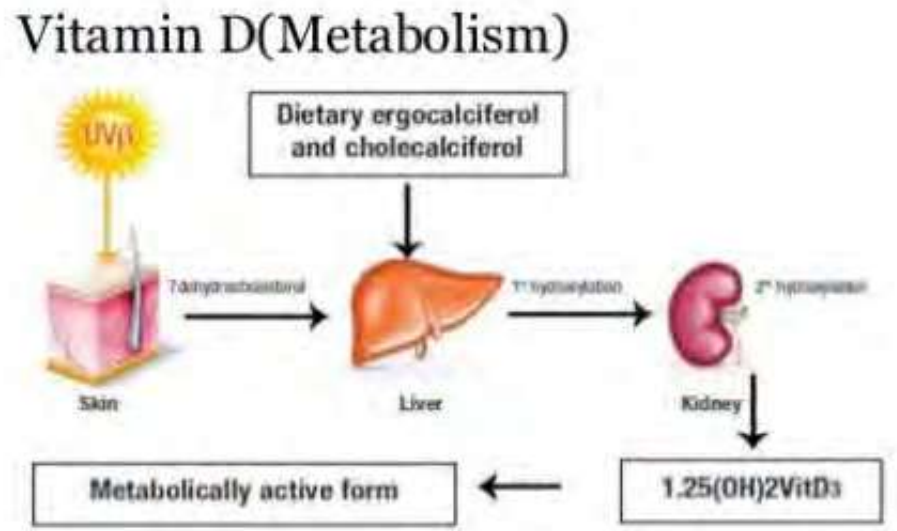
Summary of Changes

- Everything becomes:
  - Stiffer
  - Slower
  - Less compliant
  - Less acute
- Nothing becomes
  - Dysfunctional
  - Non-functional
  - Weaker
  - Dimmer

Medical Conditions

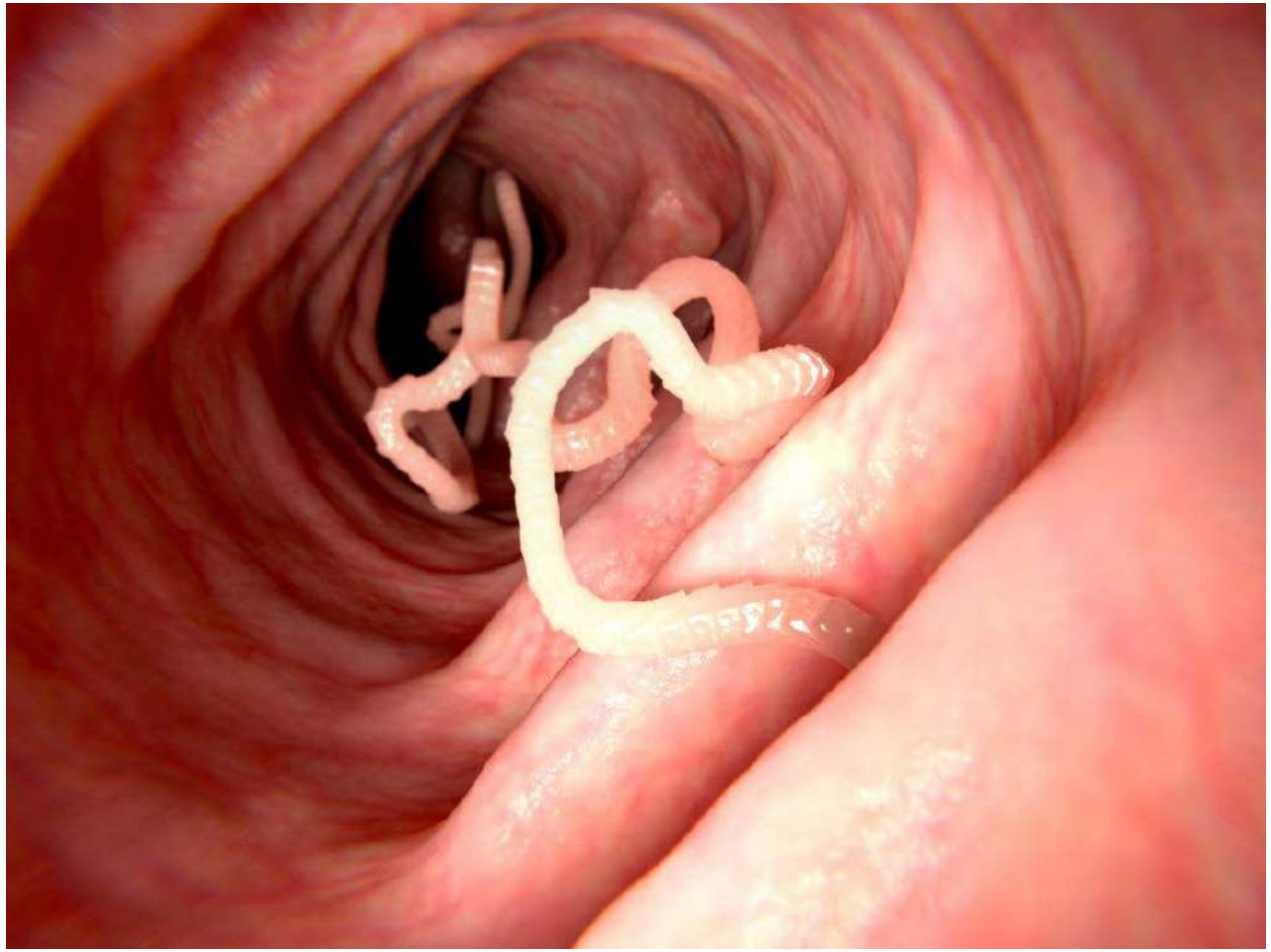
Osteomalacia





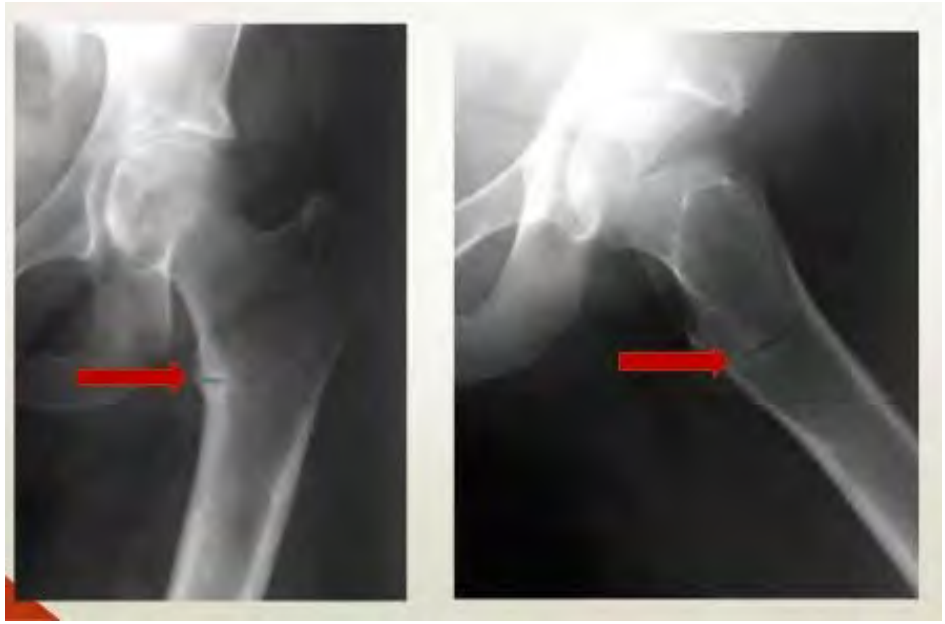
Contributing factors

- Poor diet
- Reduced sun exposure
- Kidney and renal disease
- GI malabsorption issues
- Seizure disorders



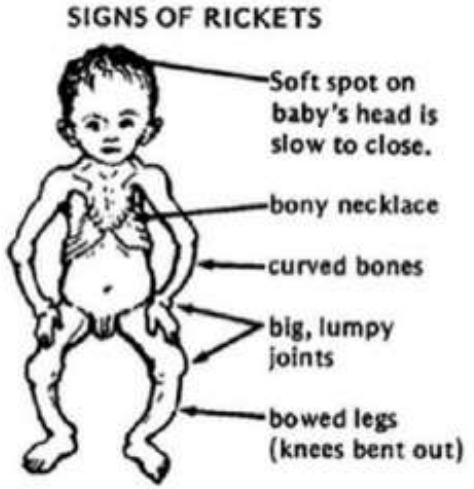
Diagnosis

- Low Vit D levels
- Low calcium levels
- Deficiency of phosphate
- X-ray of pelvis, spine, and long bones
- Clinical presentation



Presentation-Rickets (pediatric)

- Bowing of long bones
- Genu varum (usually)
- Swollen wrists
  - Champagne glass
- Irritable
- Delayed motor milestones



Presentation- Adults

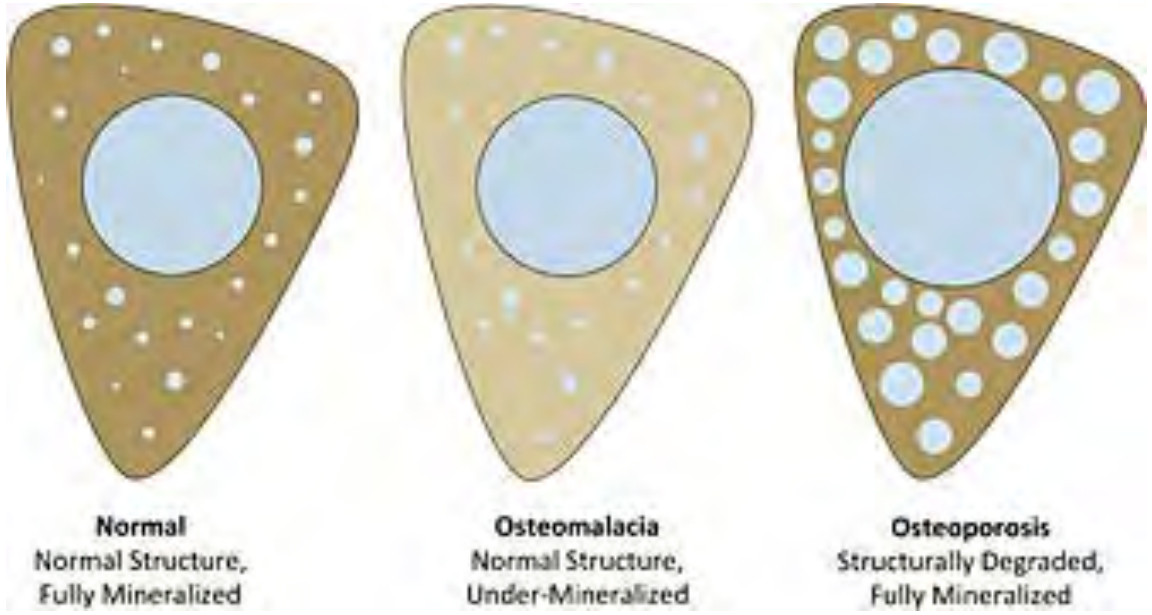
- Diffuse body aches
  - Especially low back and hips
- Proximal mm weakness
- Changes in gait
- Looser zones
- Codfish vertabrae

Treatment

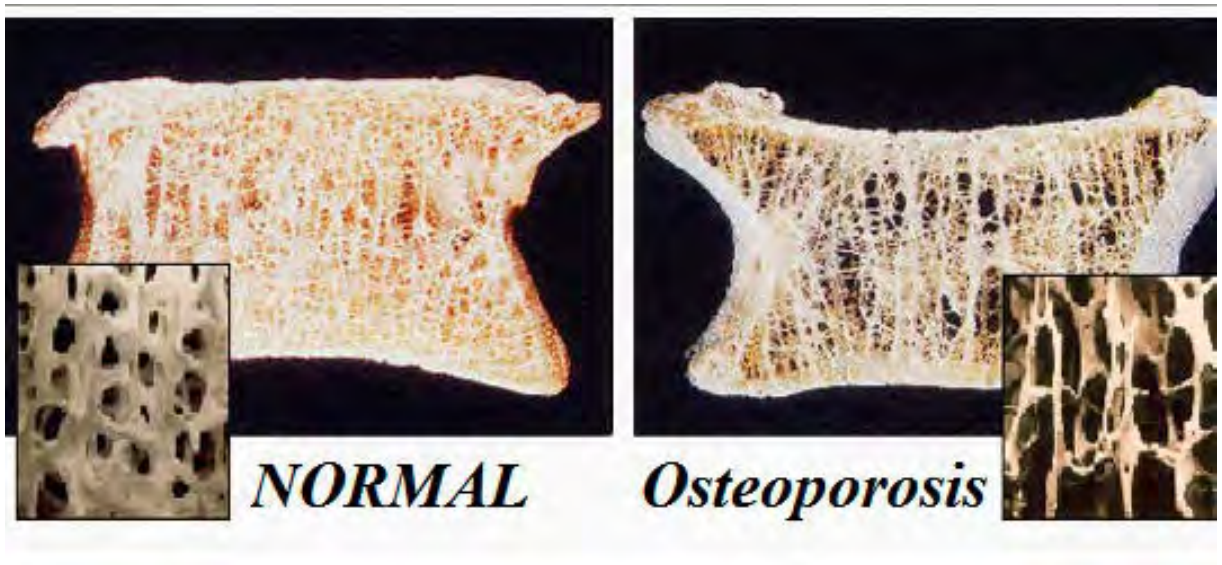
- Increase Vit D + calcium intake
- Increase sun exposure if limited
- Treat underlying malabsorption issue (GI)
- Treat underlying kidney ds
- Modify medication intake

Differentiate

- Osteopenia/porosis
- Paget's Ds

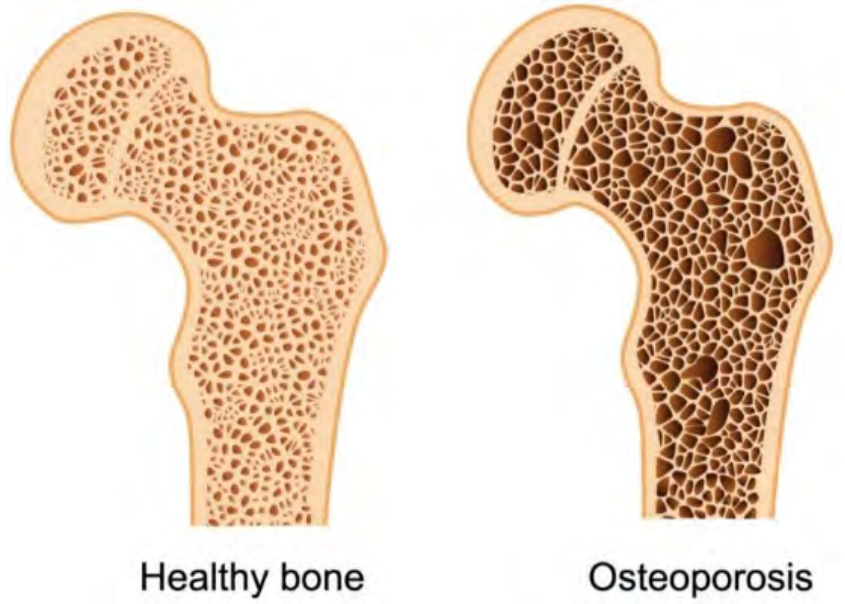


Osteoporosis



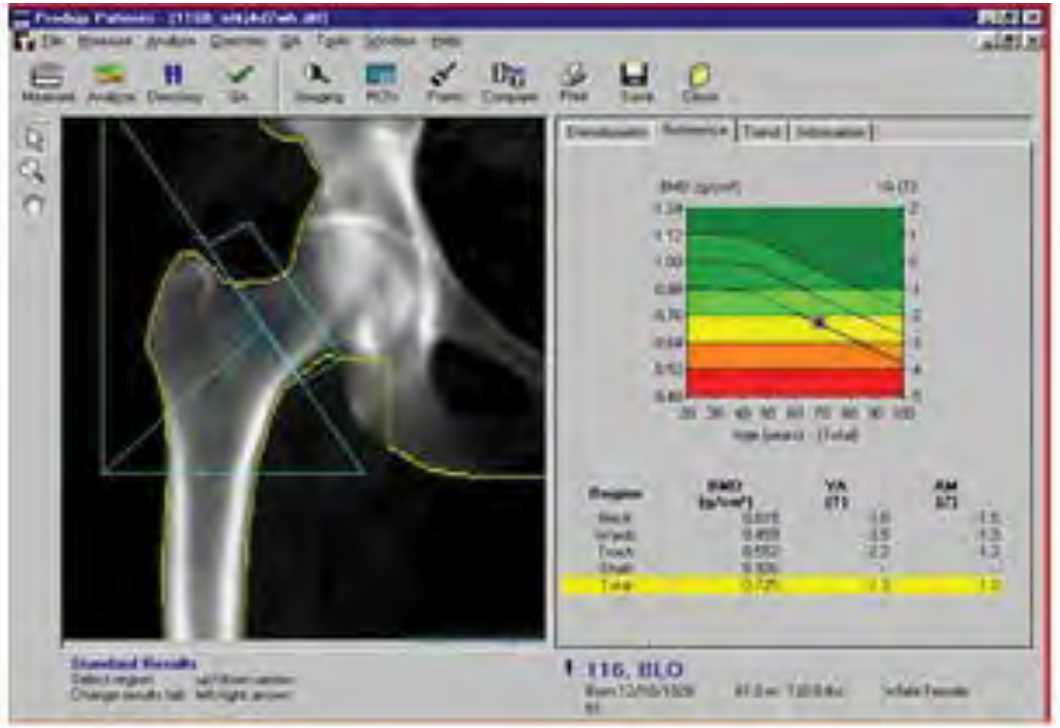
Definition

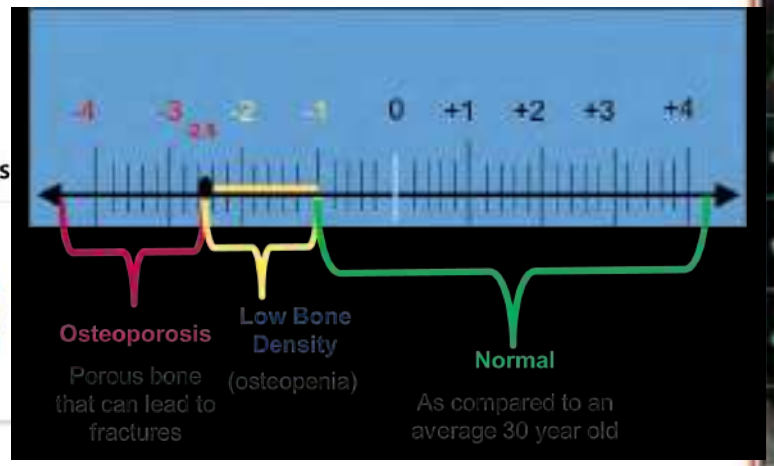
- Reduced bone mass systemically
- Systematic disease of bone that can lead to fracture
- Leads to “fragility fx’s”
- Chicken or egg fx’s
- Commonly experienced in spine, wrist, femur.
- Mostly due to hormonal reasons

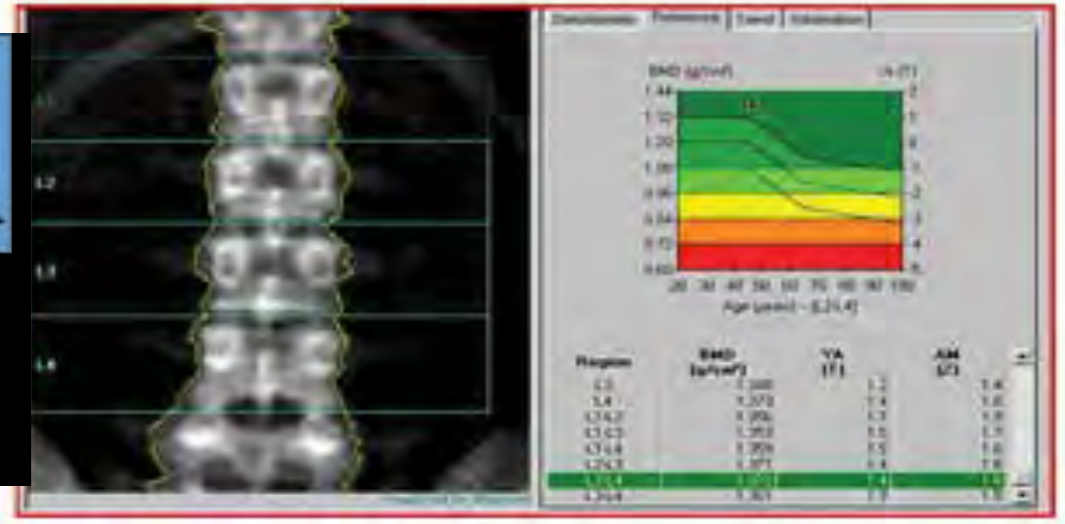


Diagnosis

- Loss of bone density on DEXA scan
  - Neck of femur
  - Neck of humerus
  - Distal radius
  - Vertebral bodies

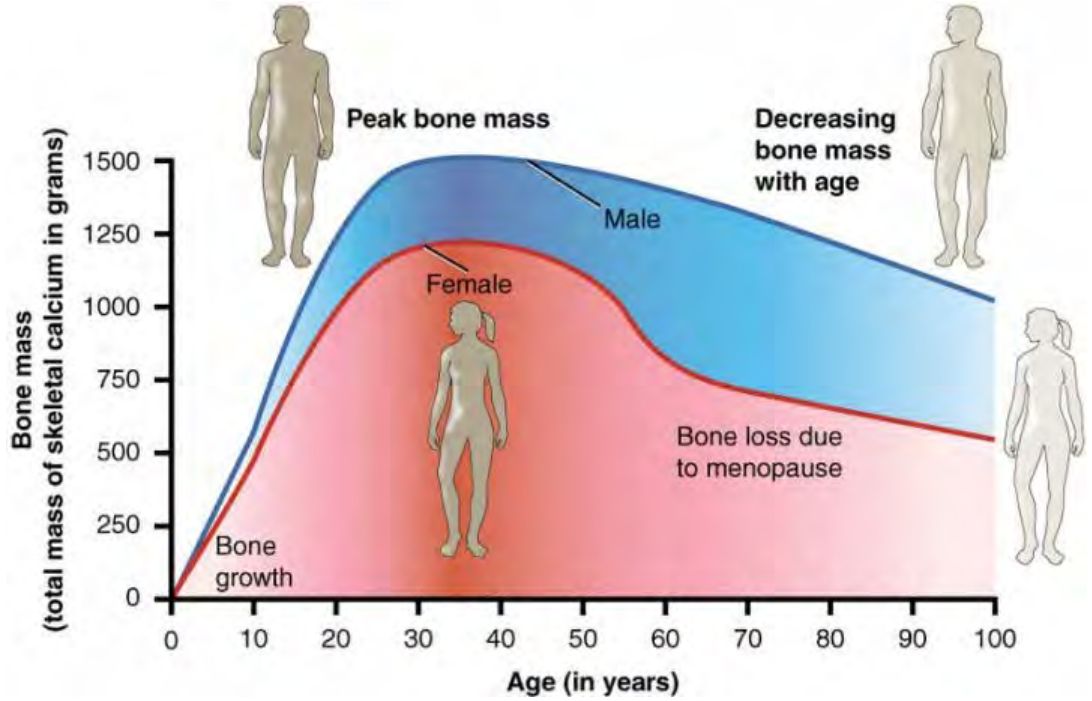






Types

- Hormonal/endocrine
- Disuse
  - Astronauts
- Postmenopausal/senile



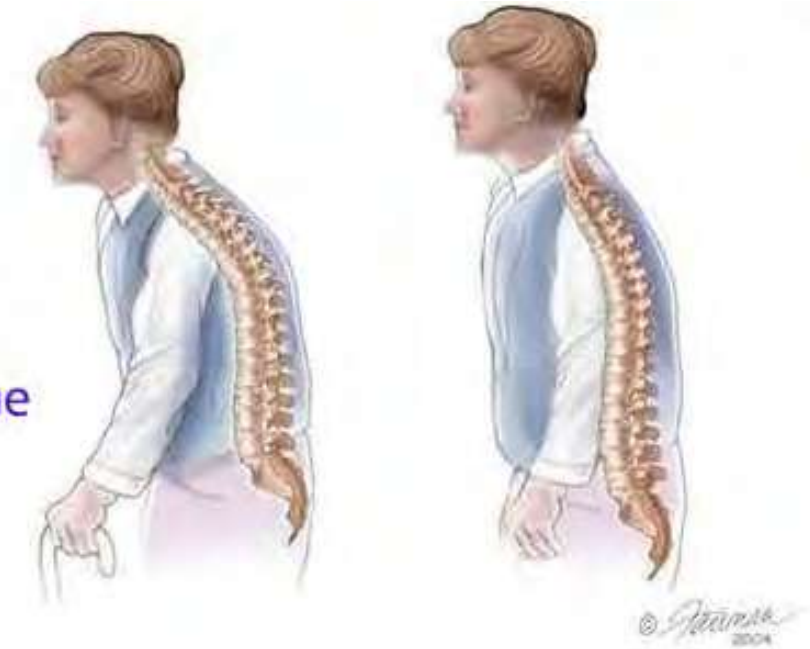
Bone pain or tenderness

Fractures with little or no trauma

Loss of height over time

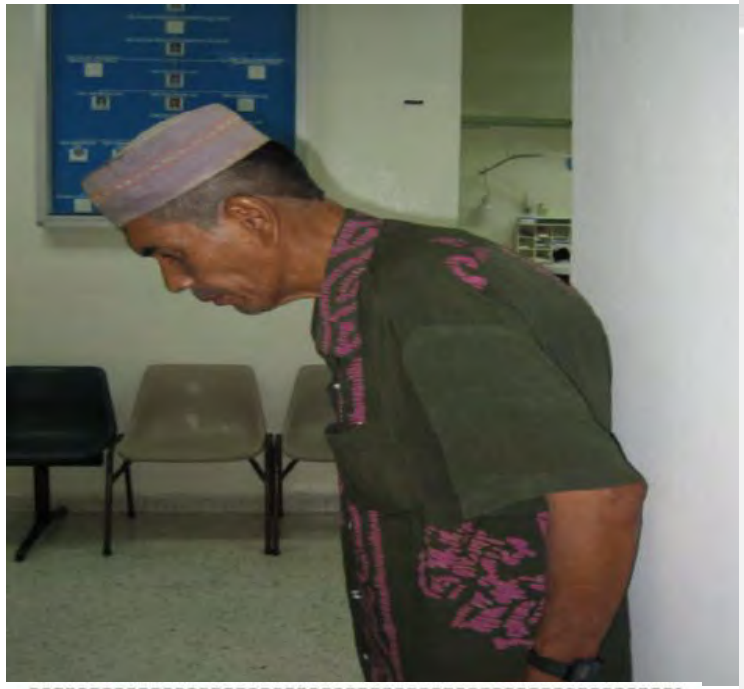
Neck or lower back pain due to fractures

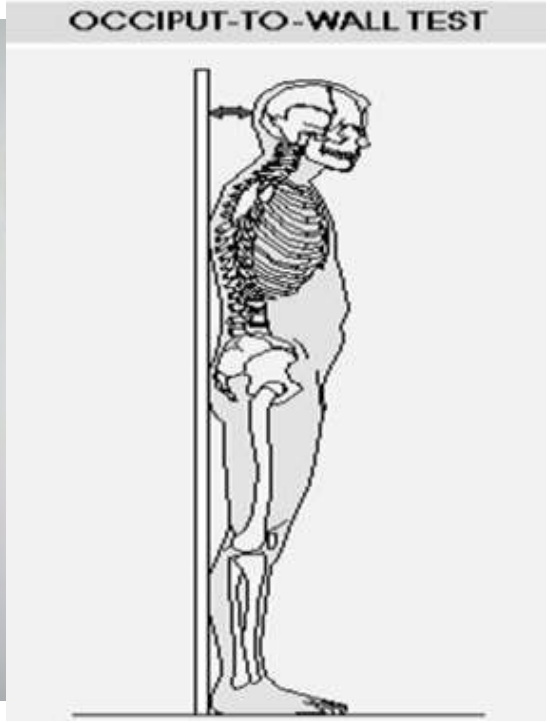
Stooped posture

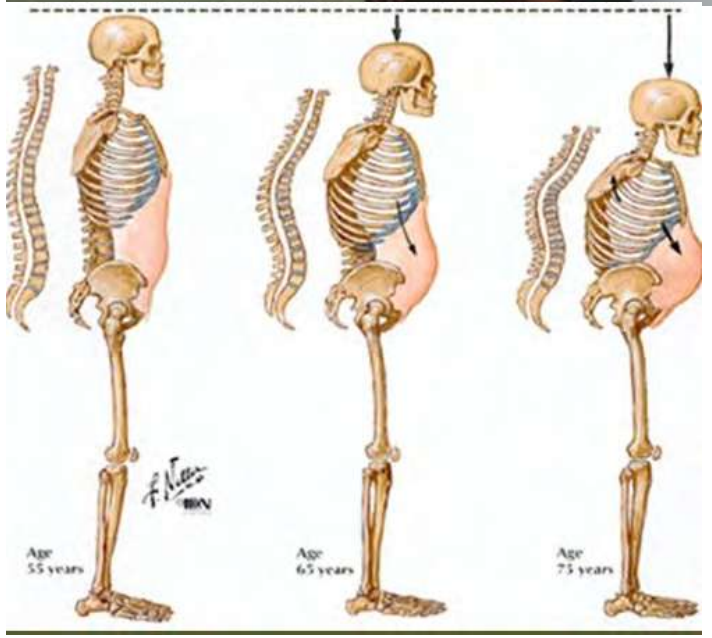


Ratio

- Compare TW (thoracic width) to LW (lumbar width : TW/LW
  - Comparison of the two curves
- Determine Kyphosis Index(KI)
  - 100 * TW/TL
    - Gives an objective measure of the angulation
    - Can be tracked over time
- No hard values

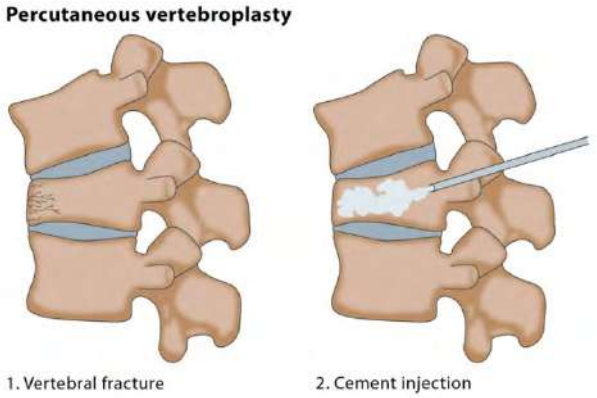


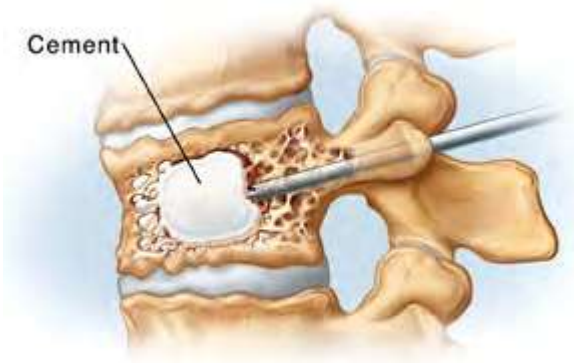




Treatment

- Medicine
  - 40-60% fx reduction with pharmacology
  - Gold standard was hormone therapy.
  - Now standard is a 4 prong approach.
- Surgery
- Bracing





Paget’s Disease (Osteitis deformans)

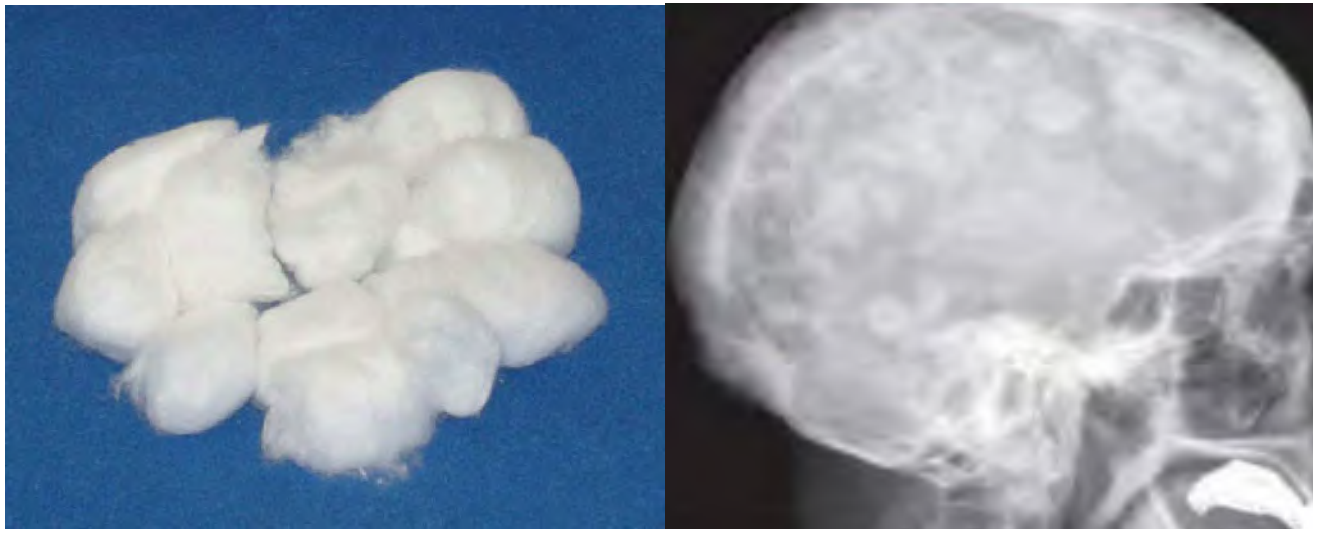
net/home-remedies/treat-pagets-disease-of-bone-naturally/

Osteolytic

- Flame sign/blade of grass

Intermediate

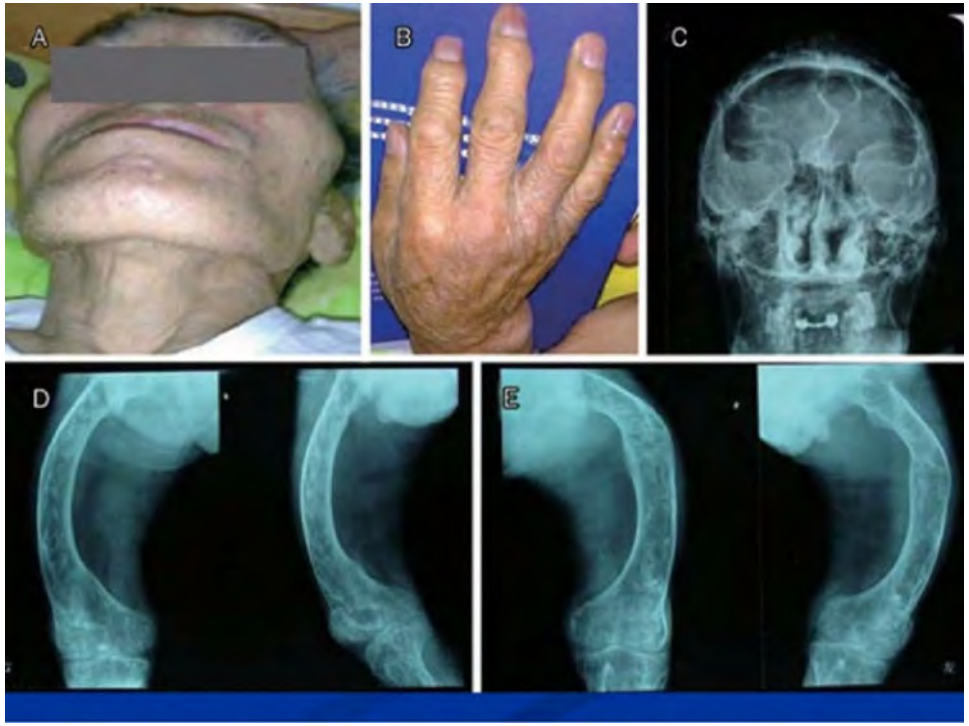
- Cotton ball skull



Sclerotic

Diagnosis

- X-RAY
  - Fractures
  - Previously discussed signs
  - Clinical presentation



Presentation

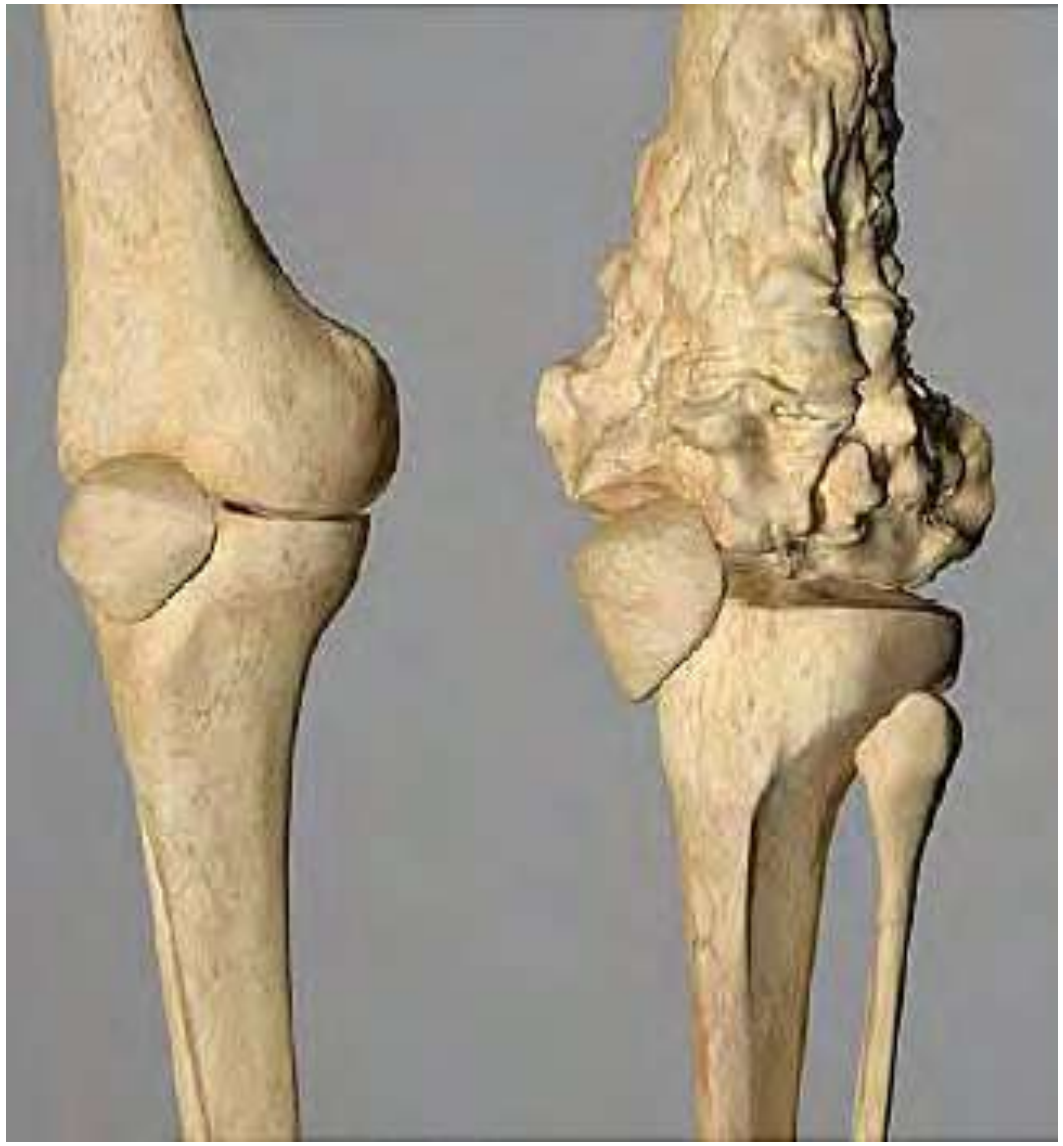
- May be asymptomatic
- Symptoms
  - Deafness
  - Dental problems
  - Bone deformity
  - Nn compresion
  - Bone pain
  - Warmth

Treatment

- Medicine
  - Anti-reabsorbatives
  - Calcium reducers
- Orthotics
  - Diminish further bony misalignment
  - Decreases aggravated arthritis symptoms

Differentiate

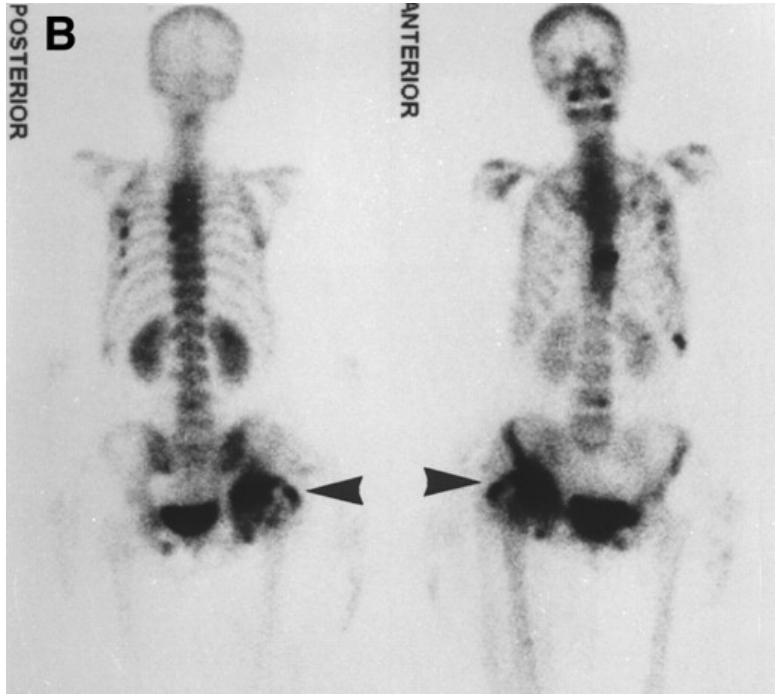
- Osteomalacia
- Osteosarcoma
- Osetoporosis
- Heterotopic ossification



Heterotopic Ossification/Myositis Ossificans

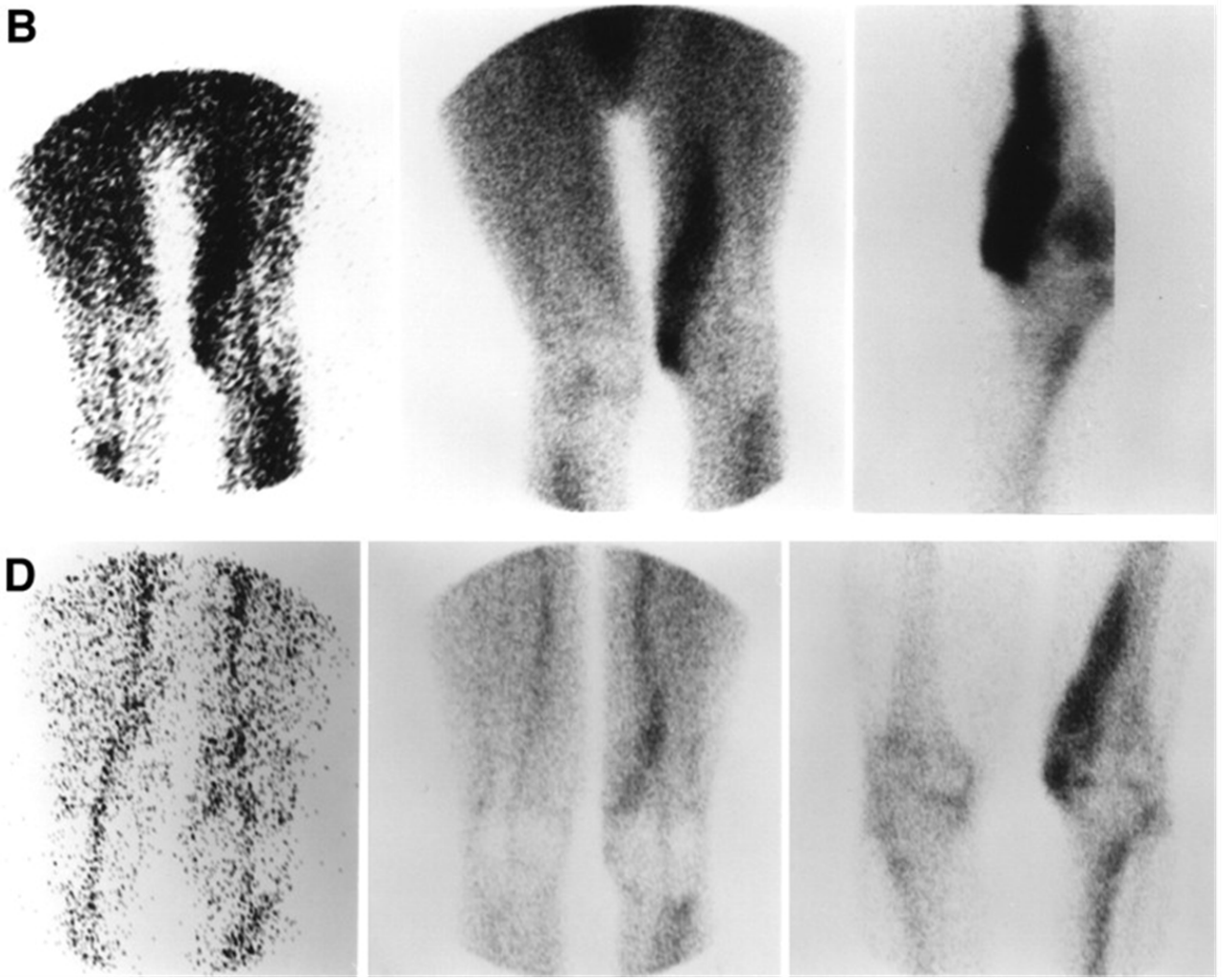
Diagnosis

- Radiography
  - Bone scans



Presentation

- Fever
- Swelling
- Erythema
- Pain
- Loss of mobility



Treatment

- Surgery
  - Can cause it to grow back
- Systemic steroids
- Passive ROM
- Radiation therapy

Differentiate

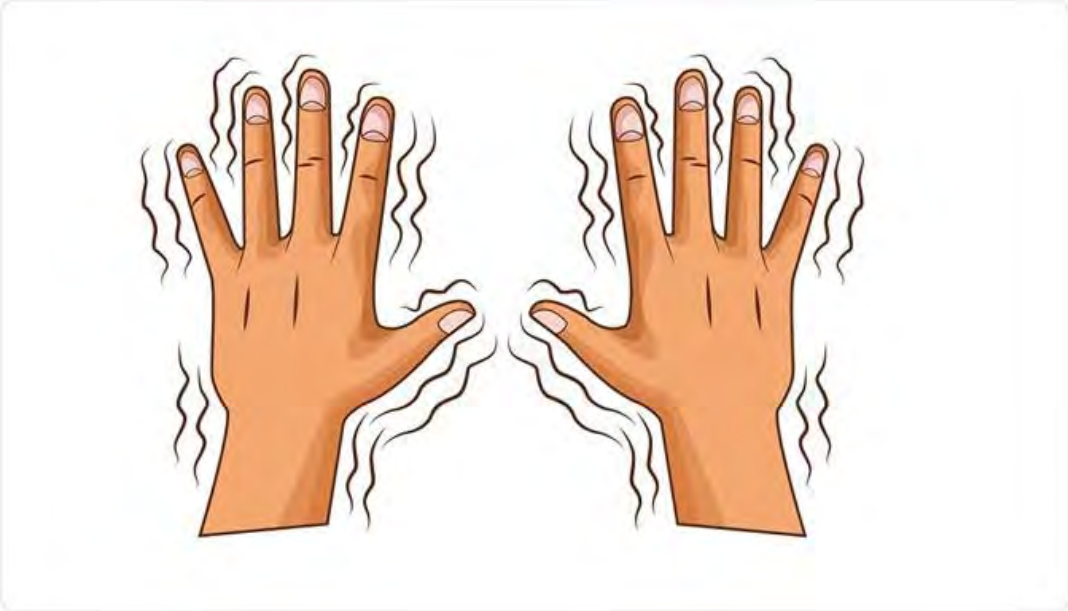
- Cellulitis
- Osteomyelitis
- Thrombophlebitis.
- Pagets
- Osteosarcoma

Q5: Bony Disease

- A 66-year old female presents with complaints of femoral pain. Her bone density scans indicate a T-score of -.5, her occiput wall distance is normal, and she has no diagnosed fractures. She reports being depressed and being mostly home-bound since her husband died three months ago. What condition would be **MOST** likely based on the information?

- 1- silent osteoporotic fracture
- 2- osteomalacia
- 3- osteopenia
- 4- Paget’s complication

Neurological-Tremors



- Pathological tremor
  - Resting (PD)
  - Intention/action (cerebellar)
  - Tardives dyskinesia
- Essential tremor
  - Only an issue if it interferes with function
- Orthostatic tremor

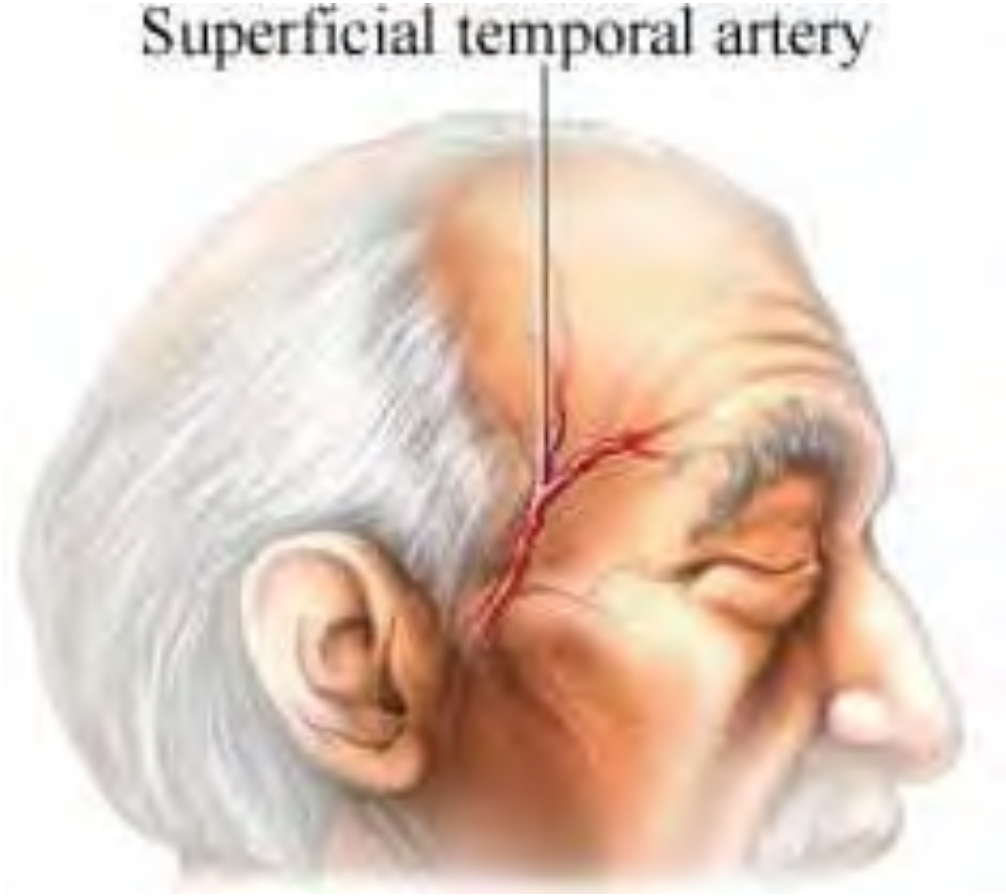
Q6: Tremors

- A 80-year old female patient presents to physical therapy with evidence of intention tremors. What activity would **MOST** likely cause the tremor to be expressed?

- 1- reaching for a glass of water
- 2- trying to sit motionless
- 3- speaking
- 4- turning around during gait

Rheumatic Conditions

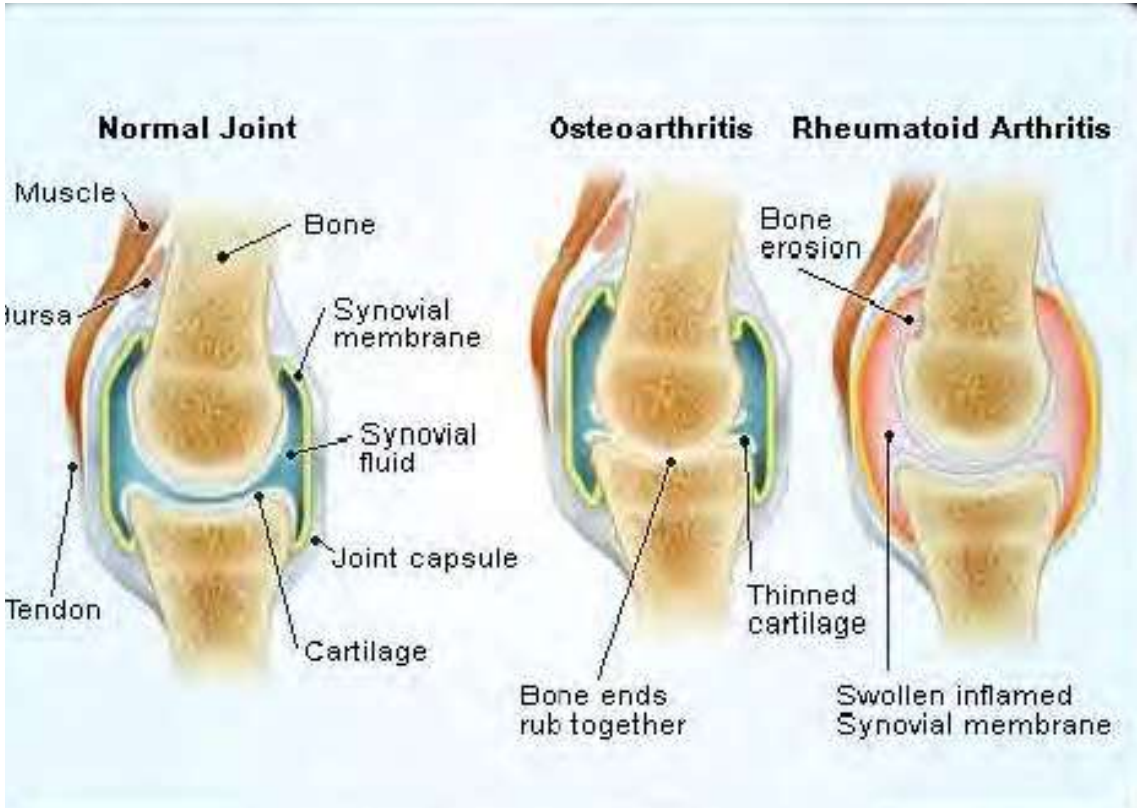
- Rheumatoid arthritis
- Fibromyalgia rheumatica
- Gout
- Pseudogout



Rheumatoid Arthritis

Definition

- Autoimmune disease
- warmth, pain, and redness
- decrease of range of motion
- Reducible (initially) and later fixed deformities
- Muscle weakness and atrophy
- Involves multiple joints.
- <u>Must be progressive.</u>
- Also involves the organs and eyes!

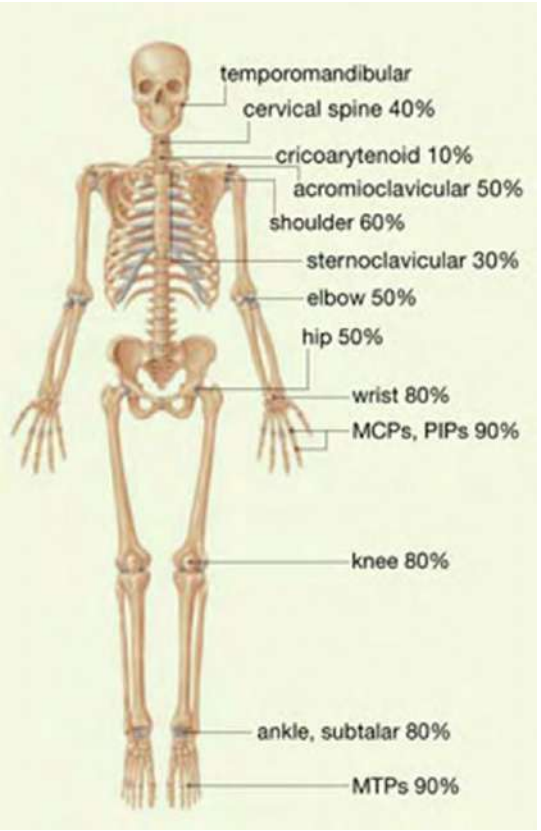


Diagnosis

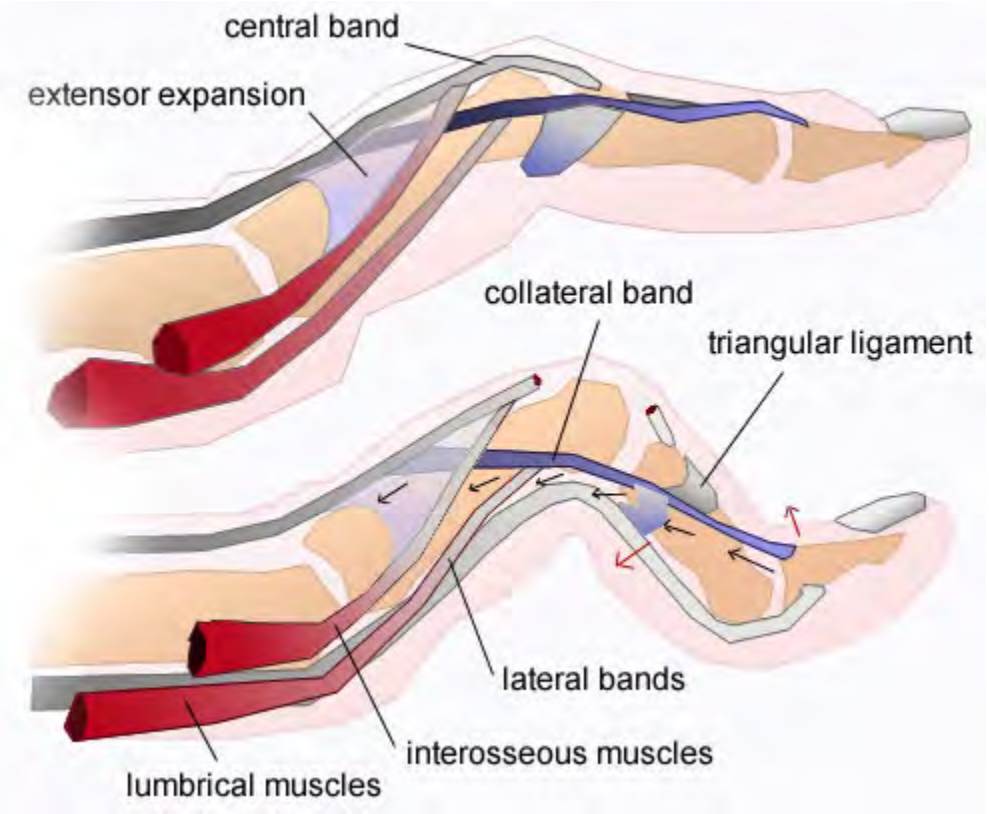
- Blood tests
  - Rheumatoid factor
  - ESR
  - C-Reactive protein
- Radiography
  - C1-C2 laxity
  - hands

Presentation

- Nodules form in pressure areas
- Deformities of joints
- Symmetrical presentation
- Morning stiffness
- 3 or more joints
- Inflammation signs & symptoms
- Fatigue
- Malaise

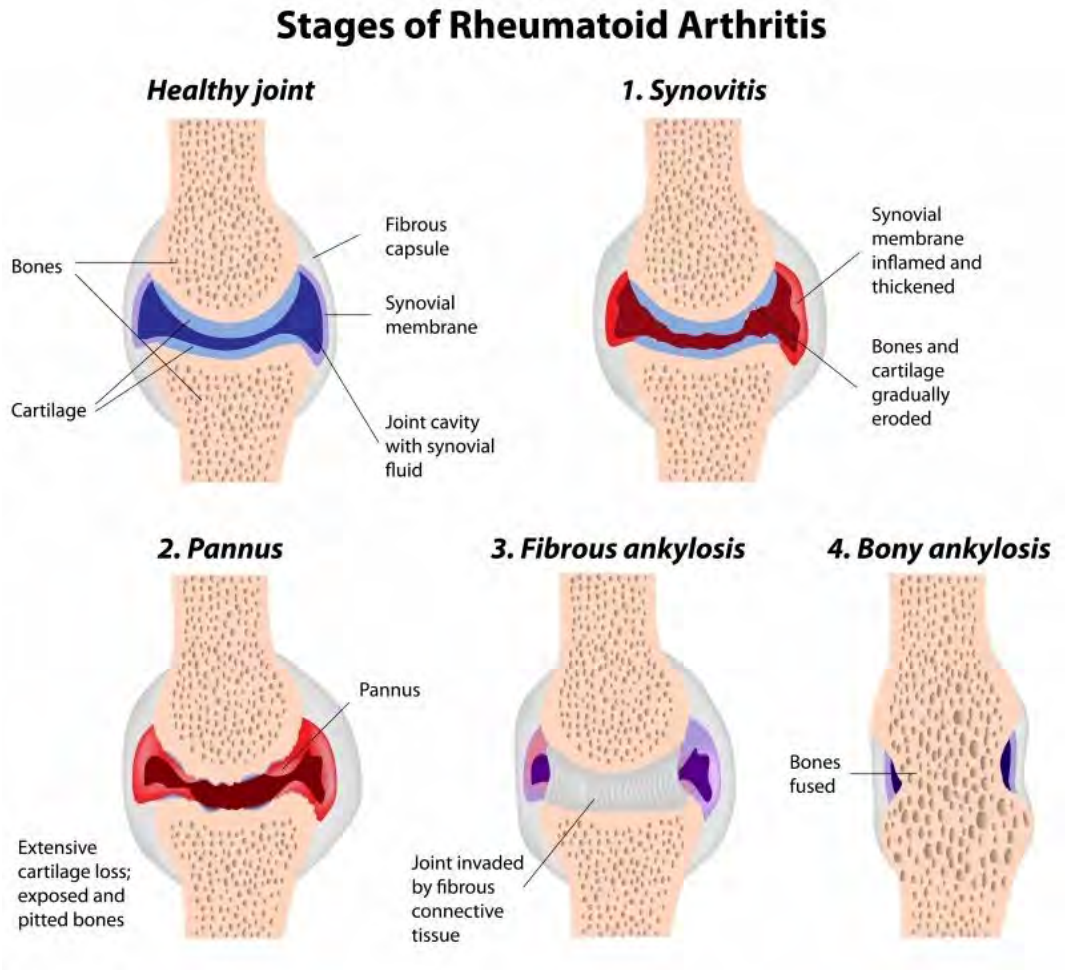


Hand Deformities



Prognosis

- 20% have remission following 1st episode
- Process can burnout but leave residual deficits
- Complications
  - Stretched capsules leads to dislocations and subluxes
  - Scar tissue forms and contracts the joints and causes deformity
  - Pannus causes cartilaginous necrosis
  - Flexion contractures
  - Mm atrophy
  - Tendon rupture
  - C1-c2 instability



Treatment

- Meds
  - NSAIDS
  - Steroids
  - Disease Modifying Anti rheumatic Drugs (DMARDs)

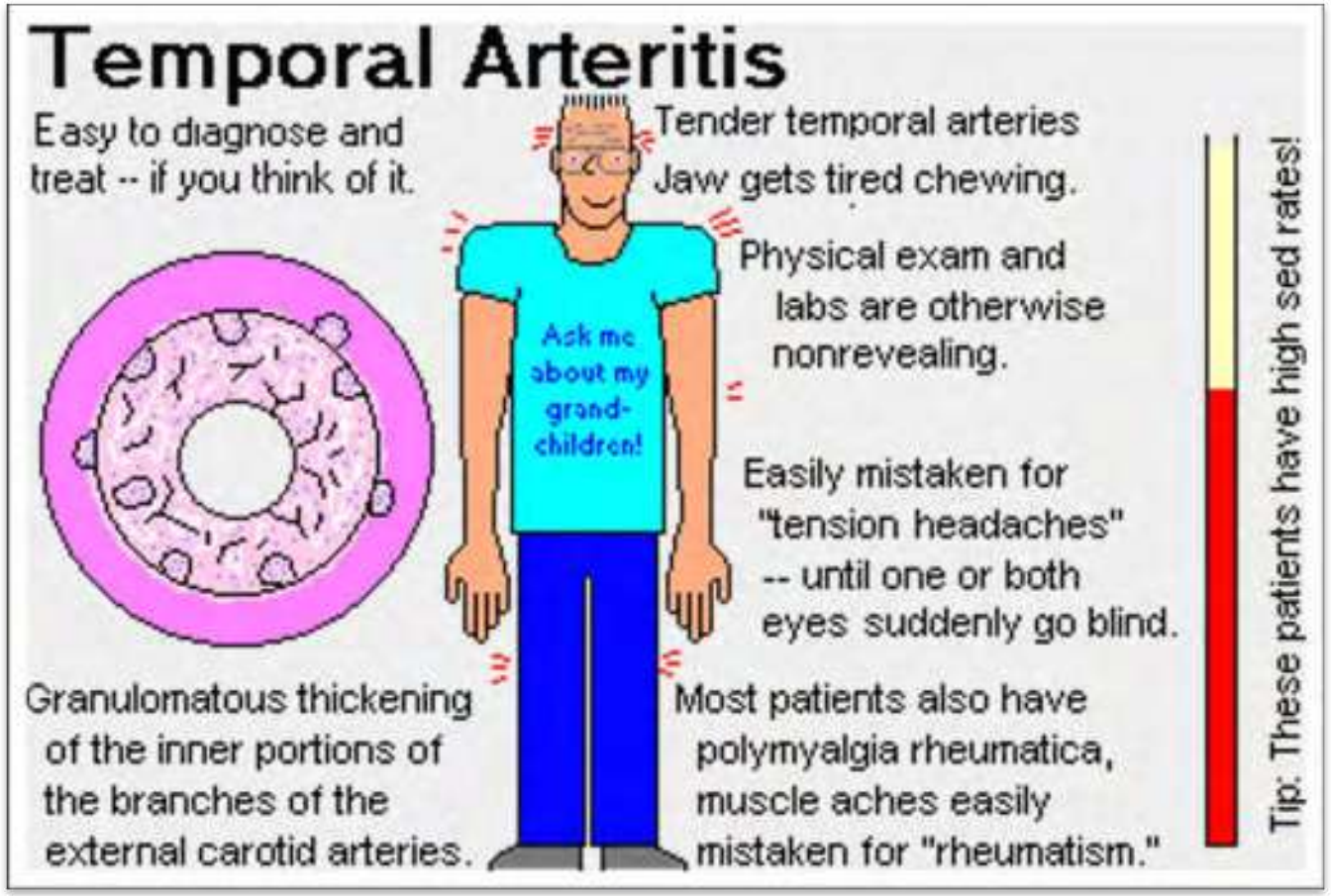
- Removable splints
- Arthoplasty and arthrodesis
- Synovectomy
- Tendon grafts

Differentiate

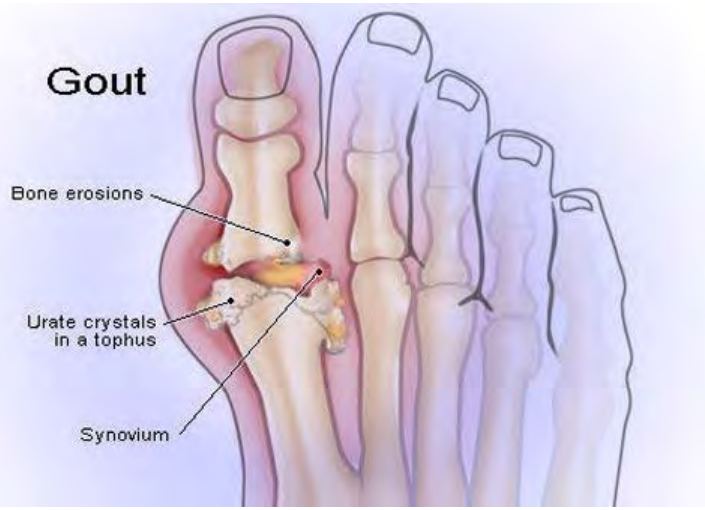
- Systematic Lupus Erythematosus (SLE)
- Osteoarthritis
- Gout

Polymyalgia Rheumatica (PMR)

- S&S
  - Gradual onset of stiffness and pain
    - Symmetrical
    - Worse in the morning
    - Pelvic/shoulder girdles
- Tests
  - High ESR
  - C-reactive proteins
- Can have serious complications



Gout


Gout
Bone erosions
Urate crystals in a tophus
Synovium


Origin of the Gout

Diagnosis

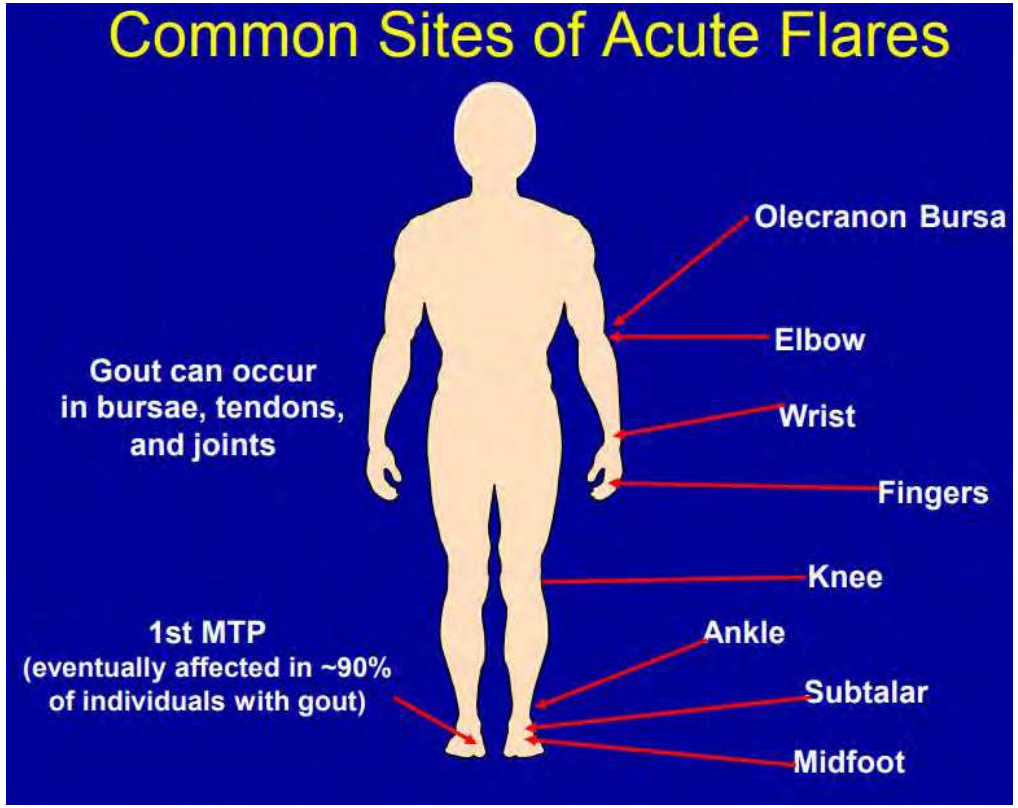
- Arthrocentesis
- Blood tests
  - Uric acid level
- Radiography

Figure 1

Figure 2

Presentation

- Inflammation s&s
- Difficulty walking
- Chronic phase
  - Tophi
  - Deformity



Stages of Gout

- Asymptomatic tissue deposition
- Acute Gouty Arthritis
- Intercritical Gout
- Chronic Articular and Tophaceous Gout

Chronic Gout

- Characterized by chronic arthritis and tophi, resulting in chronic inflammatory and destructive changes

Figure 1. Plain radiograph showing severe tophaceous gout with erosions *(arrow)* around the proximal phalanx.

Prognosis

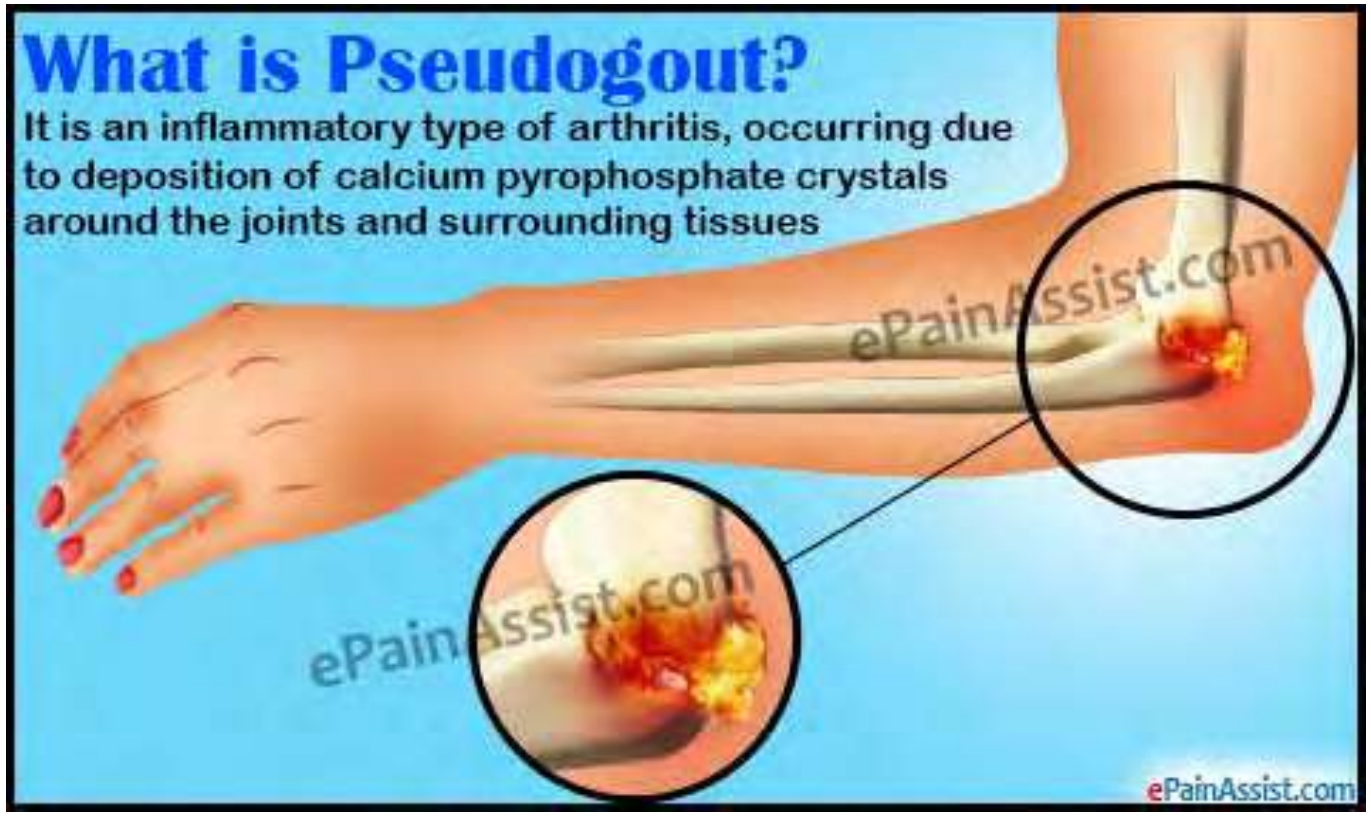
- When treated early…deformity
  will not occur
- If advances to chronic phase
  - Deformity
  - Arthritis
  - Bony erosion

Treatment

- Meds
  - NSAIDS
  - Steroids
  - Colchicine
  - Allopurinol
- PRICE
- Surgery to remove tophi

Pseudogout

- Also called CPPD-DD
- Knees
- Symmetrical
- Similar to RA



Q7: Rheumatic Conditions

- A 68-year old female has complaints of morning pain, especially in her shoulders. 3 years prior she had an episode of gout with resultant tophi formation in her 1st MTP (right). Recently she has had occurrences of what she describes as a tension headache with tenderness at the temples. What condition would be the **MOST** likely based on the provided symptoms?

- 1- rheumatoid arthritis
- 2- ankylosing spondylitis
- 3- chronic gout
- 4- polymyalgia rheumatica

UTI

- Most common infection regardless…
- Predisposed if they have other pathologies…
- Can also be from their environment…
- Presents uniquely in older adults

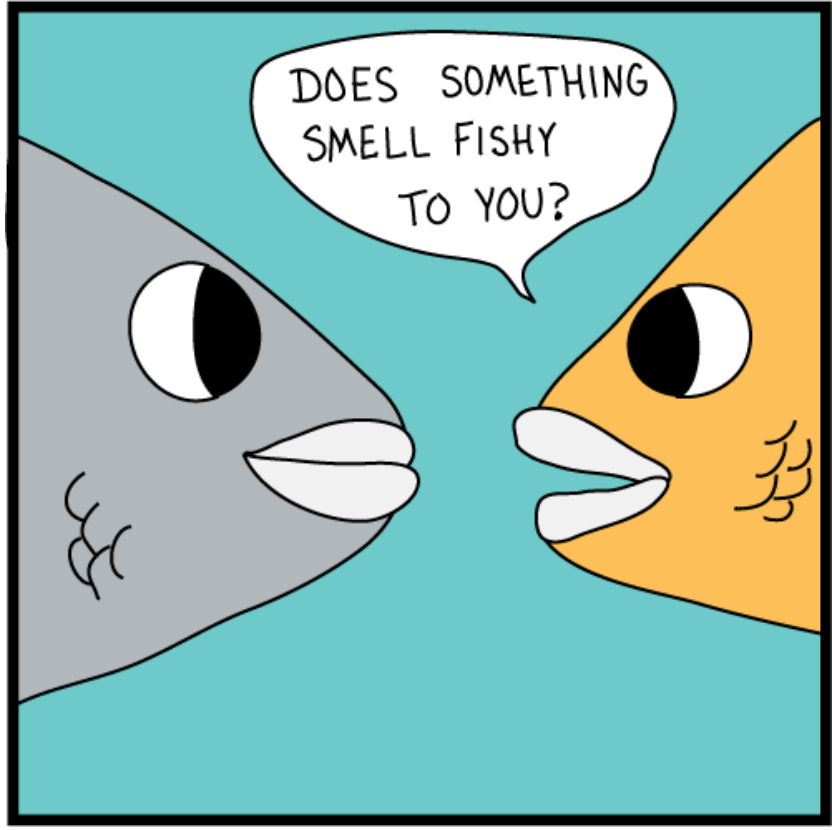


***Table 4** - Urinary incontinence mnemonic DIAPERS.*

D	Delirium, dementia, diabetes
I	Infection, inflammation
A	Atrophy of the vaginal tissues
P	Pharmacology, psychologic
E	Excessive urine output
R	Restricted mobility
S	Stool impaction, sacral nerve root pathology

Macular degeneration

- Wet vs Dry
- Decreased color sensitivity
- Dark adaption effected
- Not to be confused with presbyopia

C. difficile

- Opportunistic bacteria
- Bleach surfaces
- handwashing – no gel
- Highly contagious
- Deadly in older adults
- Treatment

Frailty

- 5 S&S
  - Weight loss
  - Slow gait speed
  - Weak grip
  - Dec activity level
  - Self-reported exhaustion

For some reason, these new birds didn't seem as interested in William's bird seed.

Herpes Zoster

- Acute eruption of latent varicella
- Postherpetic neuralgia
- Bell's Palsy
- Red papules
  - 2-4 weeks
- Crusted lesions-not infectious

Cellulitis

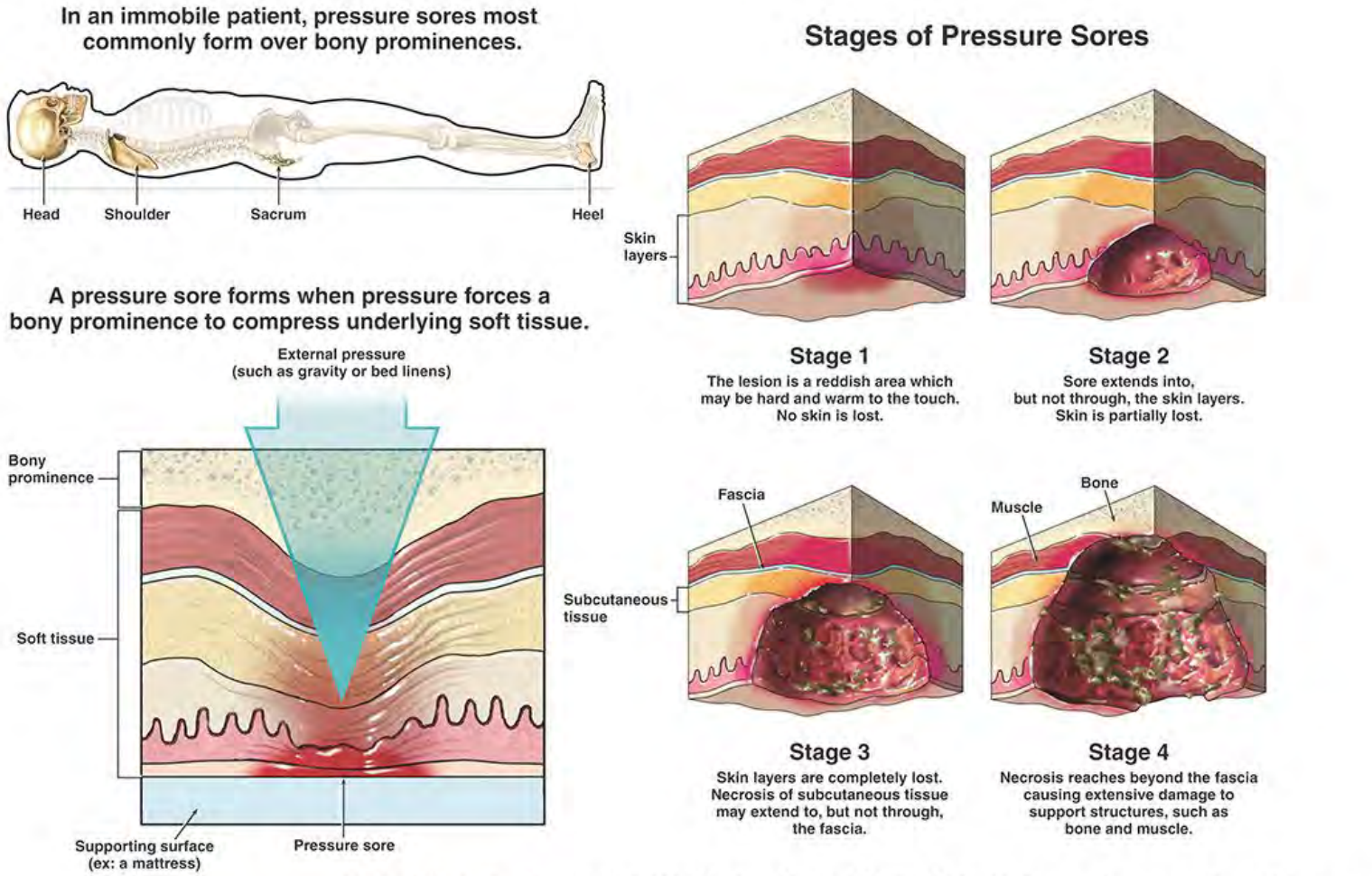
- Bacterial infection
- Red, hot, swollen, edematous
- Ankle weights?

Skin tears

- Can be serious
- Reportable
- Preventable

Pressure injury

- Higher risk
- Preventable
- Mindful with orthotics

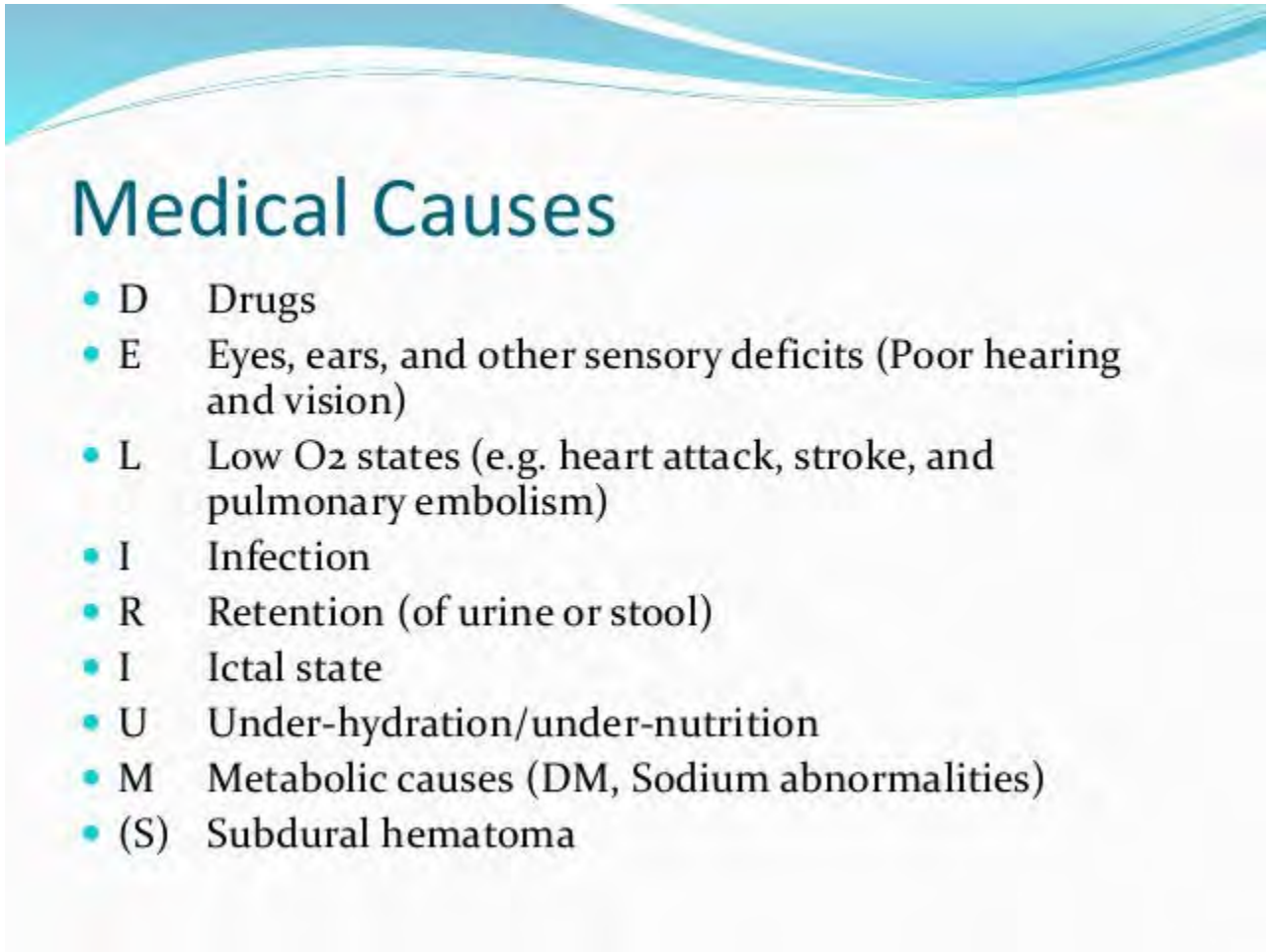


Cognition

- Delerium
- Dementia
- Alzheimers Ds
- Depression

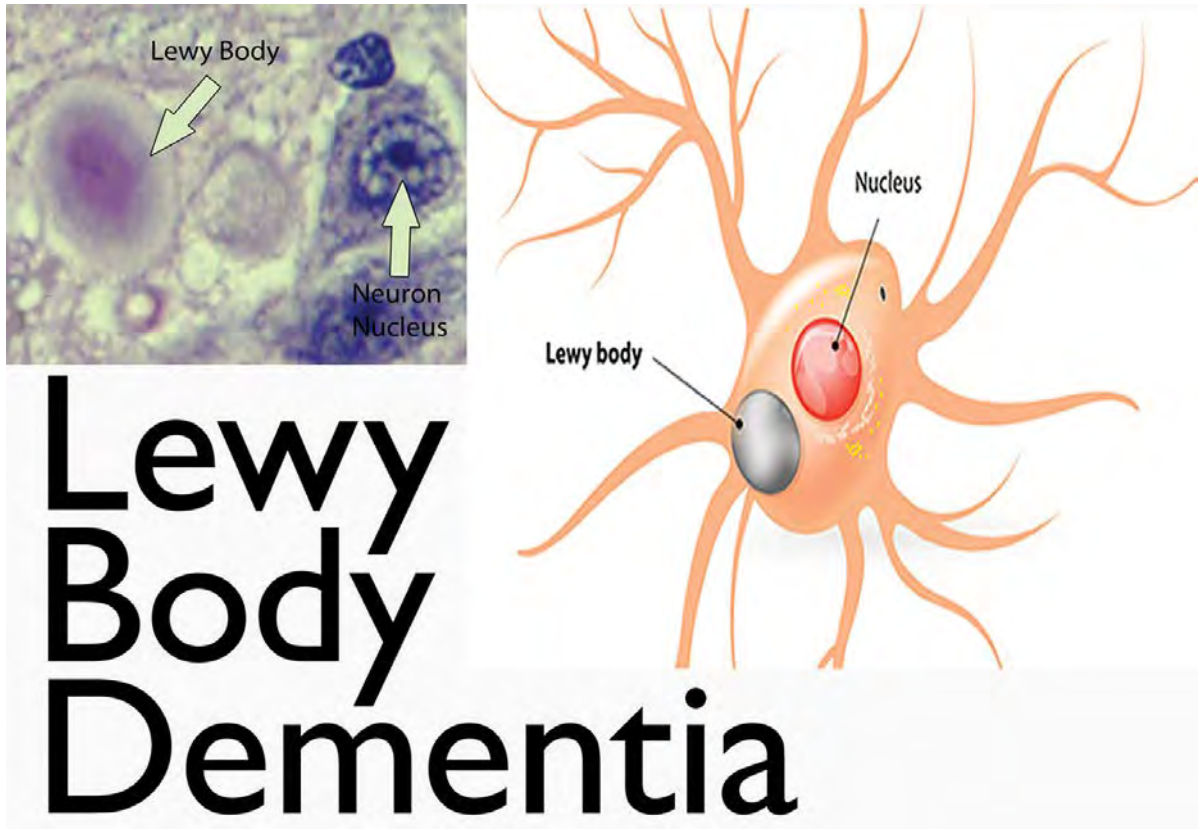
Delerium

- Acute state
- UTI, medicine, Sepsis
- Transient



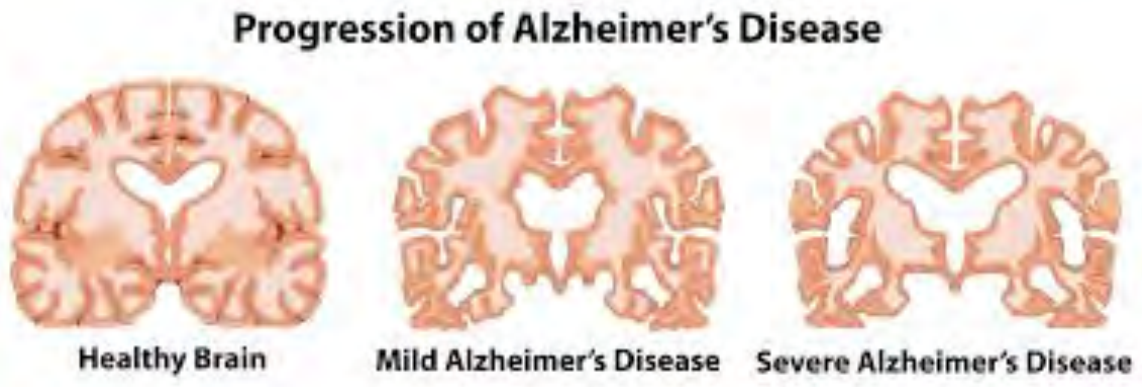
Dementia

- Global decline in cognitive abilities
- Numerous causes
  - Vascular dementia
  - Lewy Body
  - Frontotemporal
  - Wernicke-Korsakoff



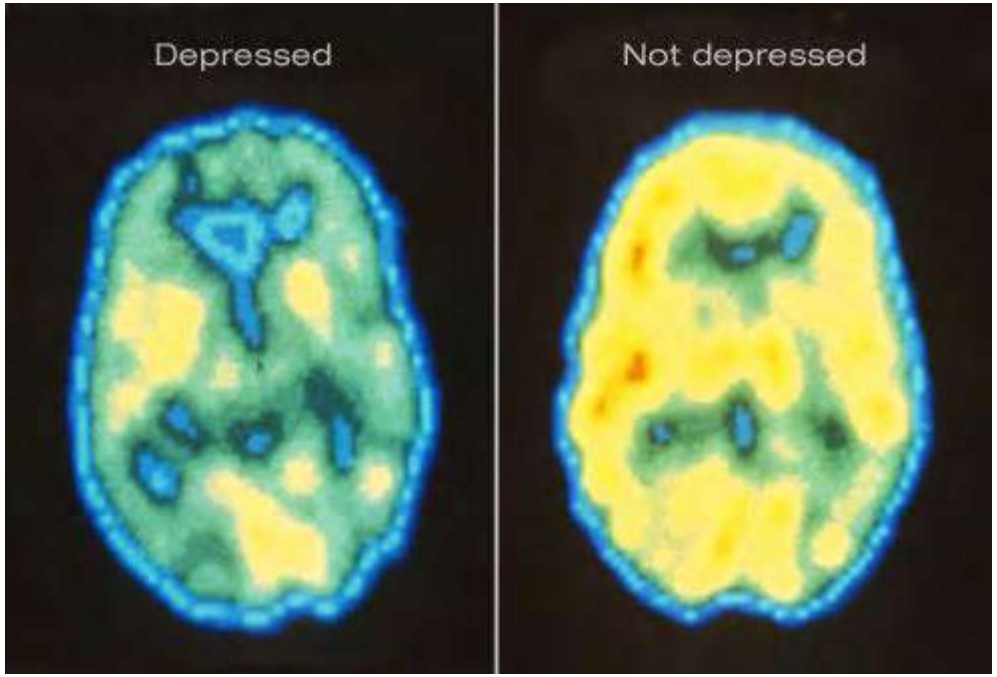
Alzheimer's Disease

- Degenerative disease
- S&S
  - Anxiety
  - Lose ability to think abstractly
  - Progressive memory loss
- 3 Phases
  - 2-4 yr prior to dx
    - Emotional lability
    - Difficulty learning
  - 2-10 after dx
    - Difficulty recognizing familiar people
    - Making up stories
  - 1-3 yrs prior to death
    - Disorientation
    - Lose interest in eating/daily functions



Depression

- Insomnia
- Drug exposure
  - Benzos
- May be written off as just “being old”
- Can lead to institutionalization

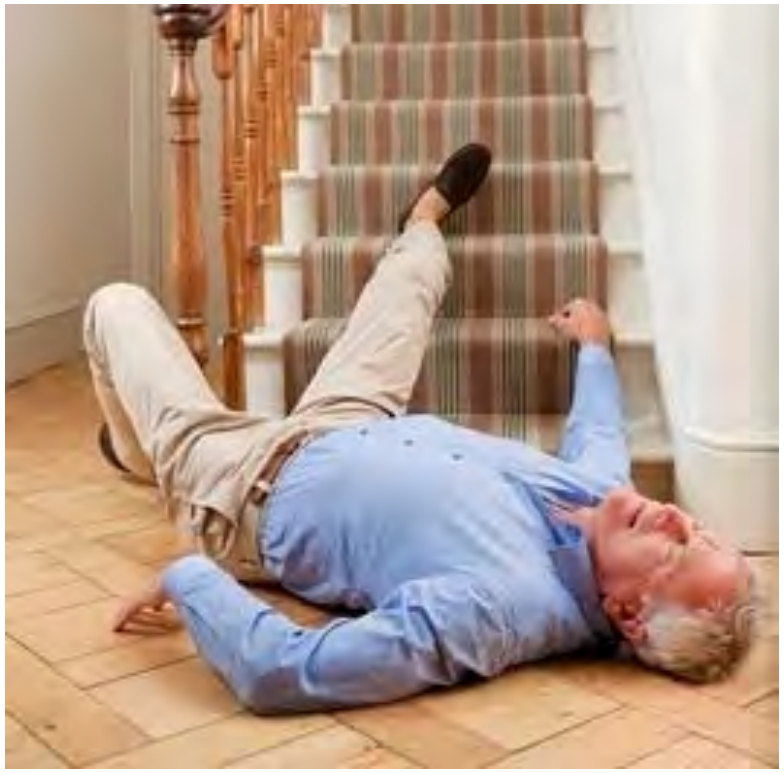


Q8: Other stuff

- A 80-year old male skilled nursing facility resident presents with crusted lesions along the T8 dermatome. What are the **MOST** appropriate precautions to take when working with this patient?

- 1- gloves, mask, splash guard, and gown
- 2- standard precautions
- 3- droplet precautions
- 4- contact precautions

Falls

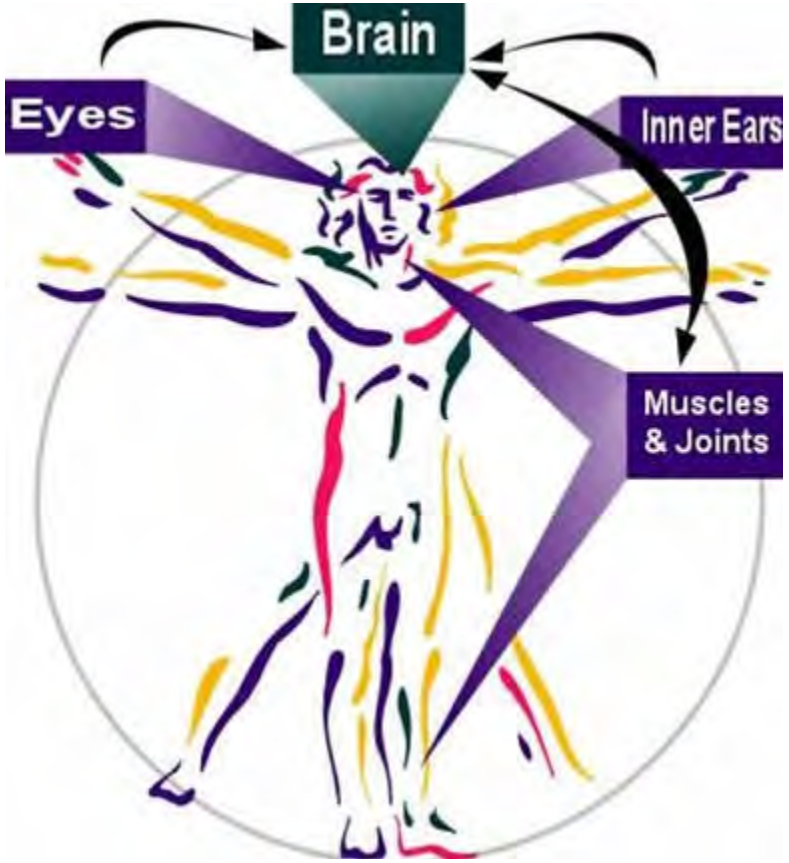


Fall risk factors

- Polypharmacy
- Certain drugs
- Environmental hazards
- Certain diseases
  - Parkinsons
  - CVA
  - PVD
  - Neuropathy
- Recurrent Fallers:
  - 2x or greater falls in a year
- Uses an assisted device

Falls: Balance & Postural Control

- 3 Major Systems
  - Sensory
    - Visual
    - Vestibular
    - Proprioceptive
  - Central Processing
    - CNS
  - Neuromuscular
    - MMT
    - ROM
    - Posture

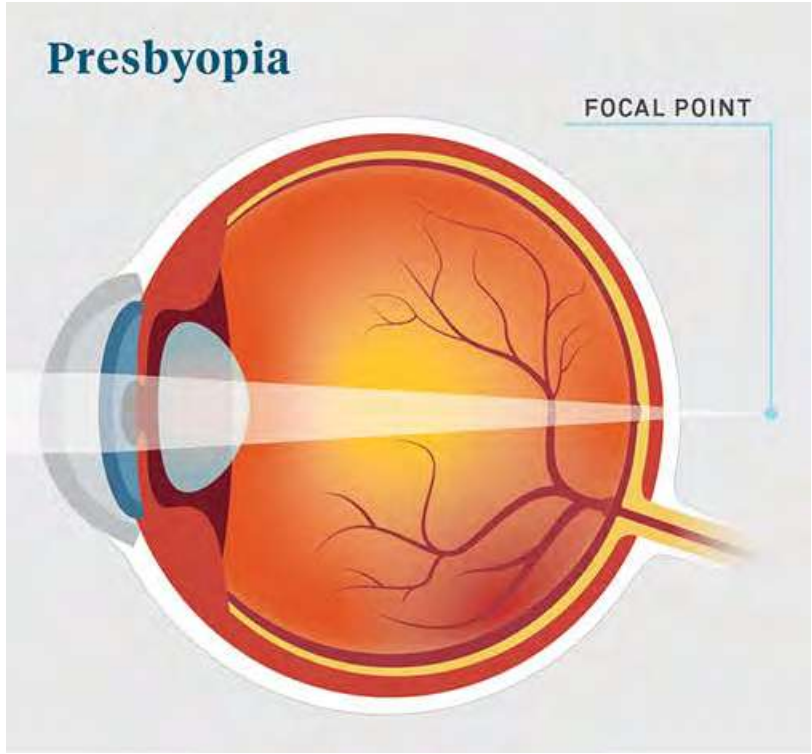


Sensory

- Somatosensory input:
  - Age relate declines:
    - 2 pt discrimination
    - Mm spindle activity
    - Proprioception
    - Cutaneous receptors in LE
    - Vibration
      - Diminished in 50% > 75 yo
      - Found to be a main determinant of postural control (sway)
        - Lower vibration sense→ higher the sway

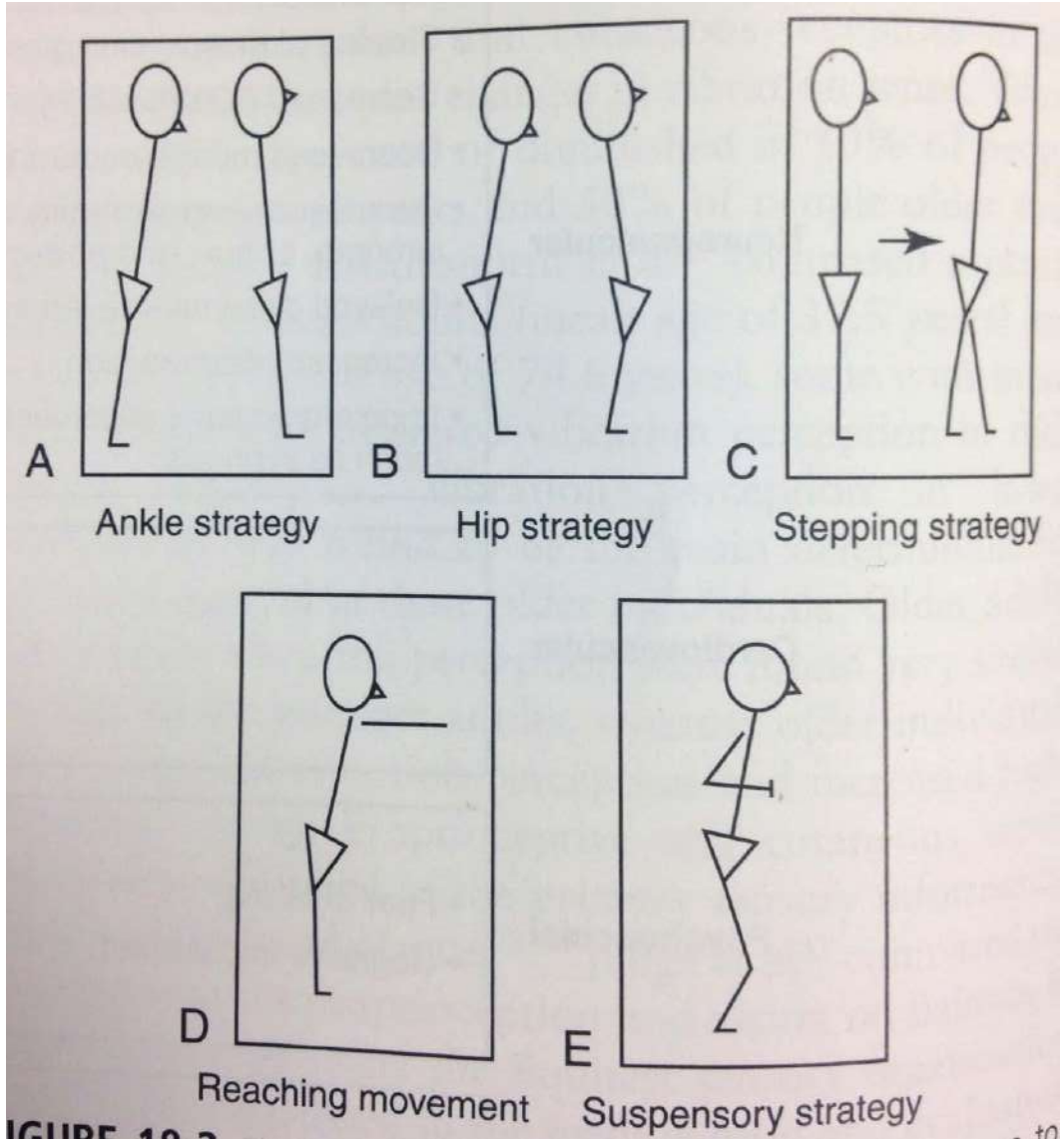
Sensory

- Vision
  - With age declines:
    - Visual acuity
    - Contrast sensitivity
      - As it improves(post cataract sx) falls decrease by 2 fold
    - Depth perception
- Vestibular
  - 12x more likely to fall if impaired vestibular function
  - Age related declines
    - Vestibular nn fibers
    - Hair cells



Central Processing

- Determines the appropriate strategy
  - Ankle= Small disturbance to BOS
    - Requires ankle strength, mobility, and proprioception
    - Small perturbations
    - Distal→prox mm sequencing
  - Hip= Sudden and forceful disturbance to BOS
    - Narrow support surface
    - Medium perturbations
    - Prox→distal sequencing
  - Stepping = stepping forward/backwards/out to regain equilibrium following destabilization
    - Large perturbations
  - Reaching= grasping for support using arms
    - Large perturbations



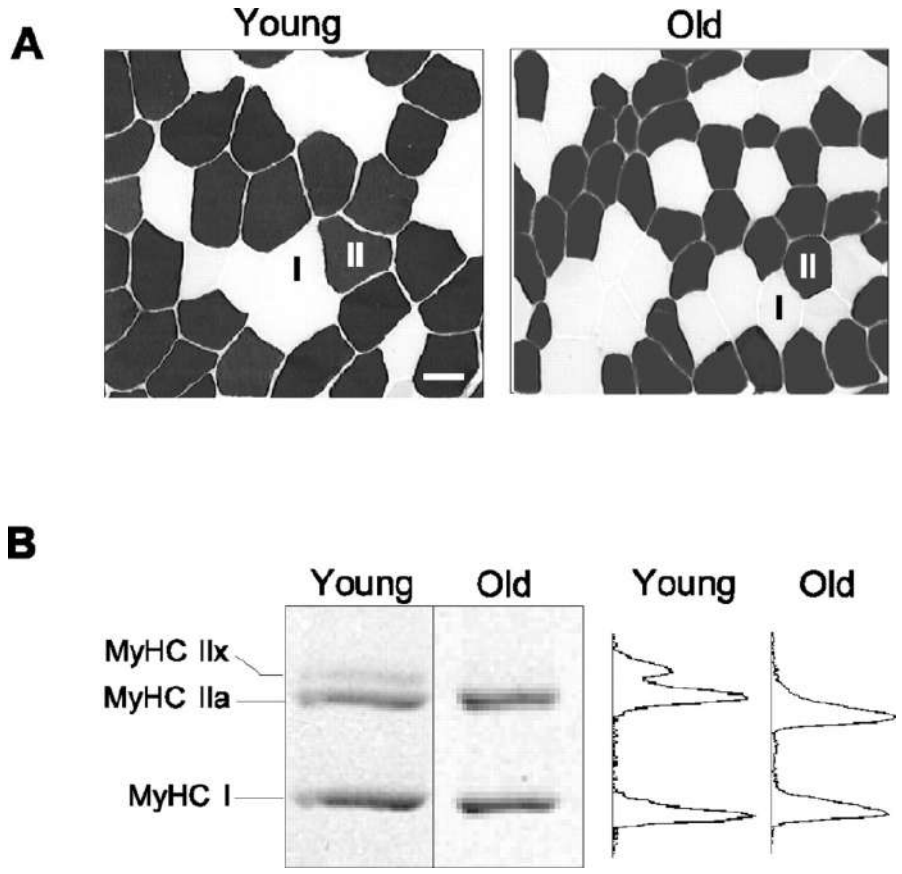
Q9: Balance

- A 82 year old male patient presents to physical therapy status post a fall without injury. The patient reports falling after the anterior surface of their right shoe contacted a raised section of pavement while walking at a speed of 1.2 m/s. What balance strategy would be the **MOST** appropriate to decrease fall risk in this scenario?

- 1- stepping strategy
- 2- reaching strategy
- 3- ankle strategy
- 4- hip strategy

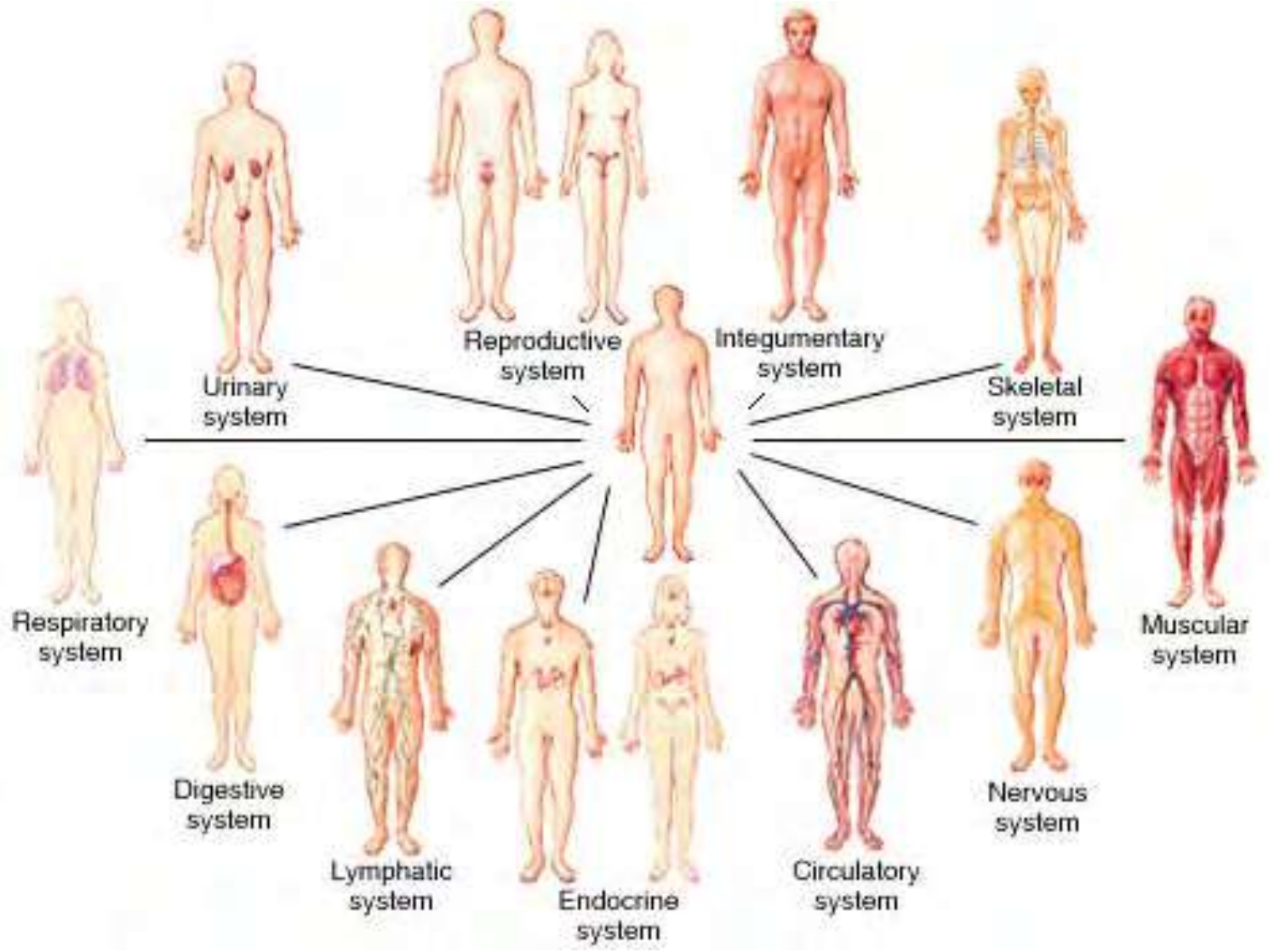
Neuromuscular System

- Age Related Declines:
  - Strength 40%
    - Diminished in the lower extremities of older adult fallers
      - 4x greater falls risk
  - Increased latency/reflexes
  - Diminished torque production distally
  - Conversion of type II→I fibers



Must Test

- Somatosensory
  - Light touch
  - Proprioception
  - vibration
- Vision
  - Acuity
  - Contrast sensitivity
- Vestibular
  - VOR
- Coordination
- Neuromuscular
  - Reflexes
  - MMT
  - ROM
  - Tone
  - posture



Evidence based quality indicators for best practice in managing older adults at risk for falling

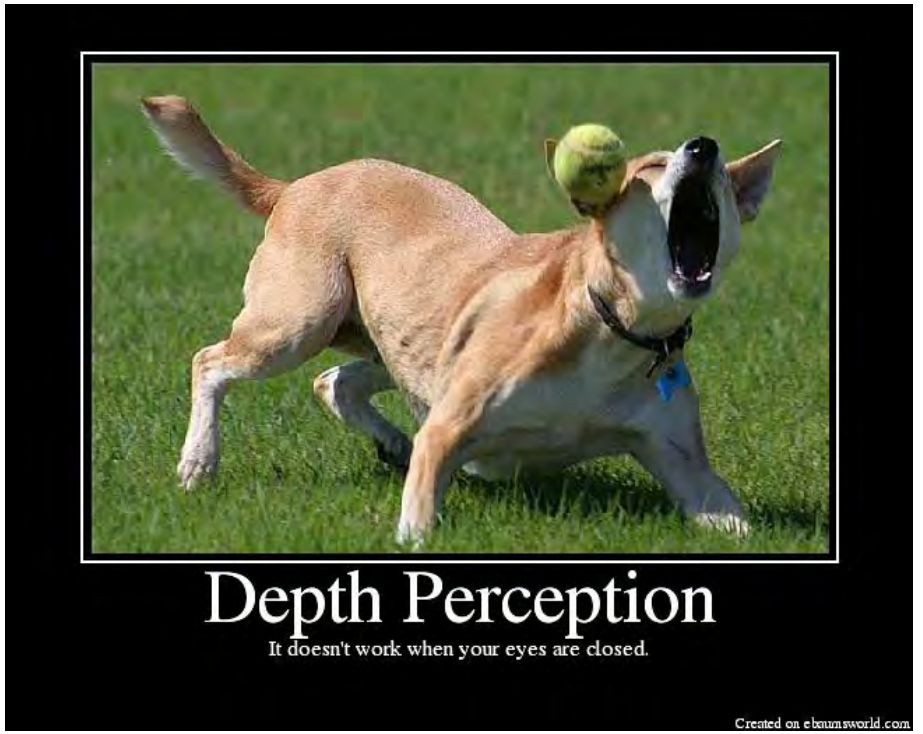
- For all older adults
  - History of falls in last 12 months
  - Gait, balance, MMT assessment
  - Prescribe AD if appropriate
    - Demonstrated poor balance, postural sway, impaired proprio
  - Prescribe exercise if appropriate
    - Demonstrated gait abnormality, poor balance, poor strength
- Additionally, those who have fallen 2x/yr or more or fallen once with injury
  - OHTN test
  - Home hazard eval
  - Medication review
  - Cognition assessed
  - Visual acuity examined

Q10: Falls

- A 89-year old female patient reports having had a fall with injury within the past 12 months. Examination reveals her blood pressure to be 120/80 regardless of position, her medications are appropriate, and her Snellen test was normal for her age. What assessment would **BEST** provide feedback on the patient's fall risk?
- 1- orthostatic hypotension
- 2- evaluate Beer's list medications
- 3- assess visual acuity
- 4- home hazard evaluation

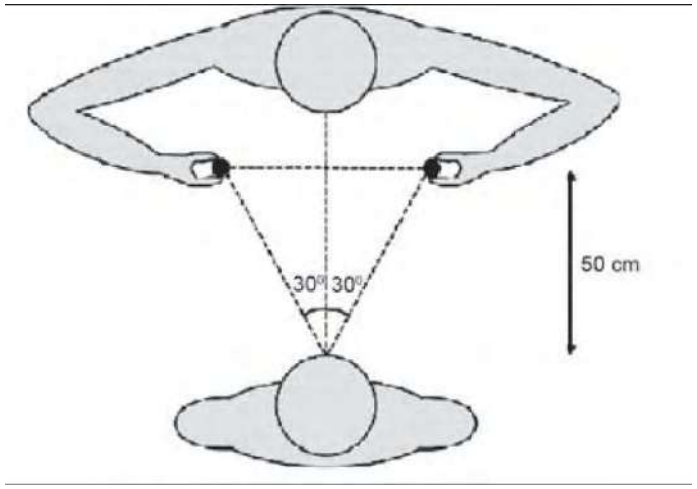
Sensory Exam

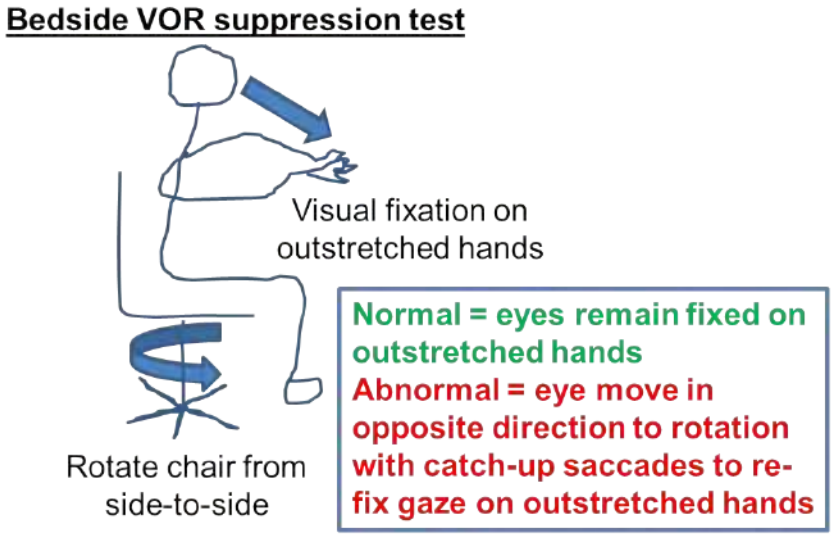
- Vision
  - Acuity –Snellen Chart
    - If patient wears glasses, have them perform with on/off to mimic how they may move about the house
  - Contrast Sensitivity –Hamilton-Veale chart
  - Depth Perception- anterior finger test
  - Field Restrictions- lateral finger test



Sensory

- Vestibular
  - Smooth pursuit= tracking test with stationary head
  - Saccade testing= rapidly alternating eye movements
  - VOR=gaze fixation with head motions





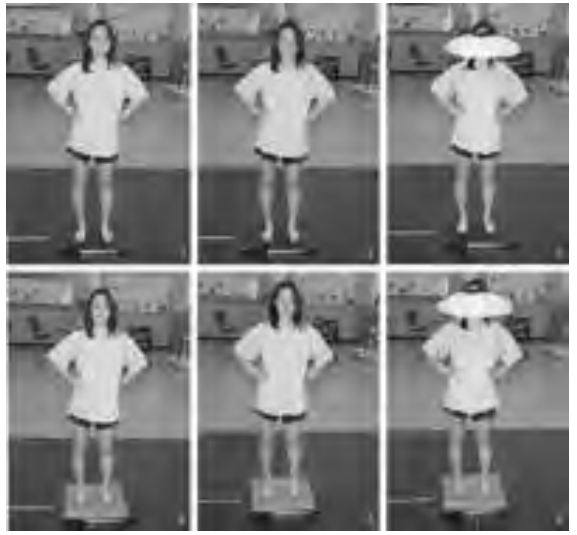
Sensory

- Somatosensory
  - Proprioception: joint position
  - Vibration: Tuning fork at 1st Met Head
  - Cutaneous sensation: 2pt discrim, light touch, deep pressure

Site	Threshold Distance
Fingers	2-3 mm
Upper Lip	5 mm
Cheek	6 mm
Nose	7 mm
Palm	10 mm
Forehead	15 mm
Foot	20 mm
Belly	30 mm
Forearm	35 mm
Upper arm	39 mm
Back	39 mm
Shoulder	41 mm
Thigh	42 mm
Calf	45 mm

Sensory Integration Testing

- Clinical Test of Sensory Interaction & Balance(CTSIB)
  - 6 conditions
    - 1- Eyes open, Stand on floor, vision static
    - 2- Eyes closed, Stand on floor
    - 3- Eyes open, Stand on floor, vision conflict
    - 4- Eyes open, stand on foam, vision static
    - 5-Eyes closed, stand on foam
    - 6- Eyes open, stand on foam, vision conflict



Q11: Balance

- A 99-year old female presents with poor balance. Her dynamic gait index score is below the expected cut-off score for her age, however her Tinetti balance assessment score is normal. On the CTSIB test, what condition would she **MOST** likely be deficient?

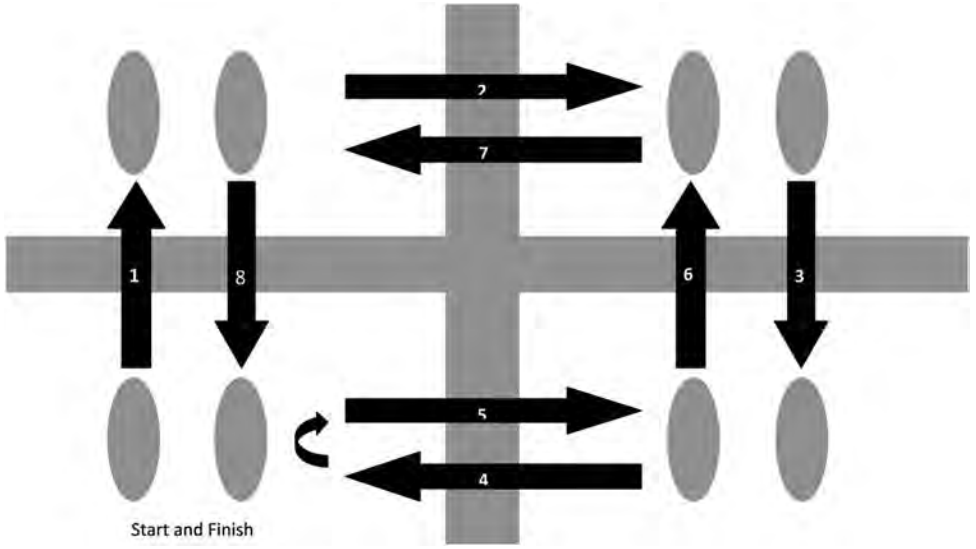
- 1- Eyes open, Stand on floor, vision static
- 2- Eyes closed, Stand on floor
- 3- Eyes open, Stand on floor, vision conflict
- 4- Eyes closed, stand on foam

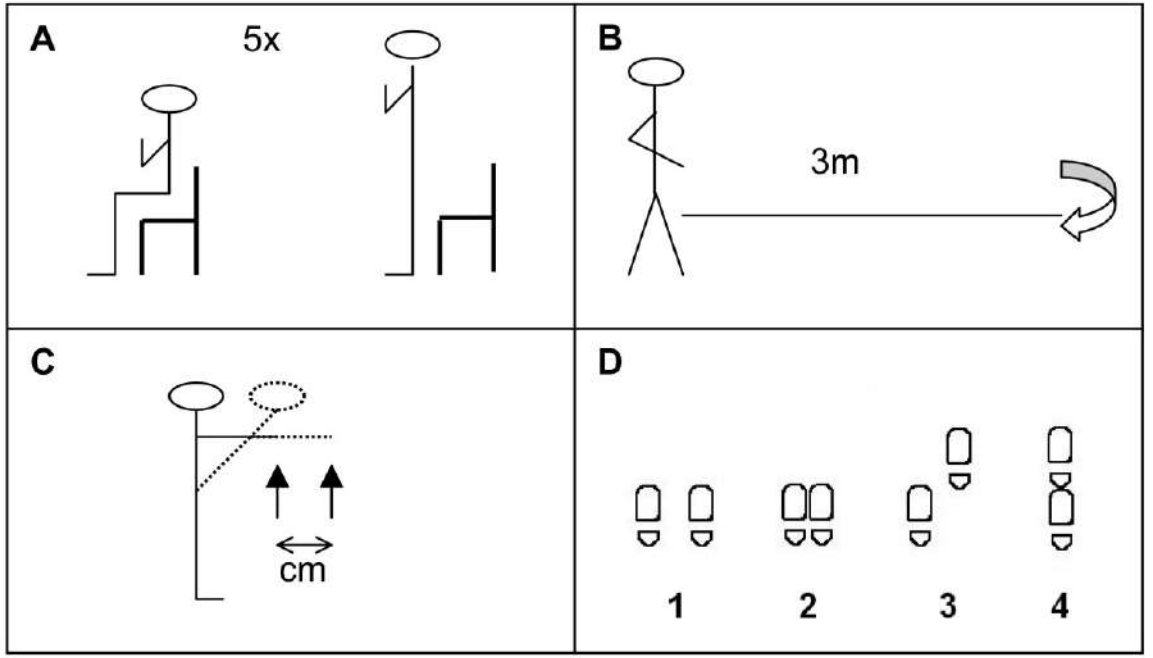
Functional Balance

- Single leg stance
  - 30 seconds= low risk
- Rhomberg
  - Stand with feet together, arms crossed, eyes closed
  - <30s=fall risk
  - Sharpened Rhomberg= tandem
- Functional Reach Test
  - <6”=fall within next 6 months
- Five time sit→stand
  - >15s=fall risk
- TUG
  - >13.5 seconds = fall risk

Outcome Measures

- Dynamic Gait Index
  - Suspected Vestibular issues
  - <19 = fall risk
- Berg Balance Scale
  - <45= fall risk
- Four Square Test
  - >15s=fall risk
- Gait speed
  - **Single best indicator for disability**
  - 1.2 m/s to cross a street
  - 1.2-1.6m/s normal





Q12

- A 71- year old male patient presents for a fall risk evaluation. He scores below the cut-off on the TUG, above the cut-off score on the Berg balance scale, and above the cut-off on the 4 square step test. Based on these scores, what intervention would be the **MOST** appropriate to prescribe?

- 1- multi-directional stepping
- 2- sit-to-stand transitions
- 3- single limb balance
- 4- stair climbing

Psychosocial

- Risky behaviors
  - Ladder climbing
  - Snow shoveling
  - Negotiating steps with loads
- Fear of Falling
  - Linked to:
    - Sedentary lifestyle
    - Deconditioning
    - Exacerbation of frailty
    - Increase risk of future falls!

Pharmacology

Pharmokinetics

- Definition:
  - How body manages medications
- Aspects:
  - Absorption
  - Distribution
  - Metabolism
  - Excretion

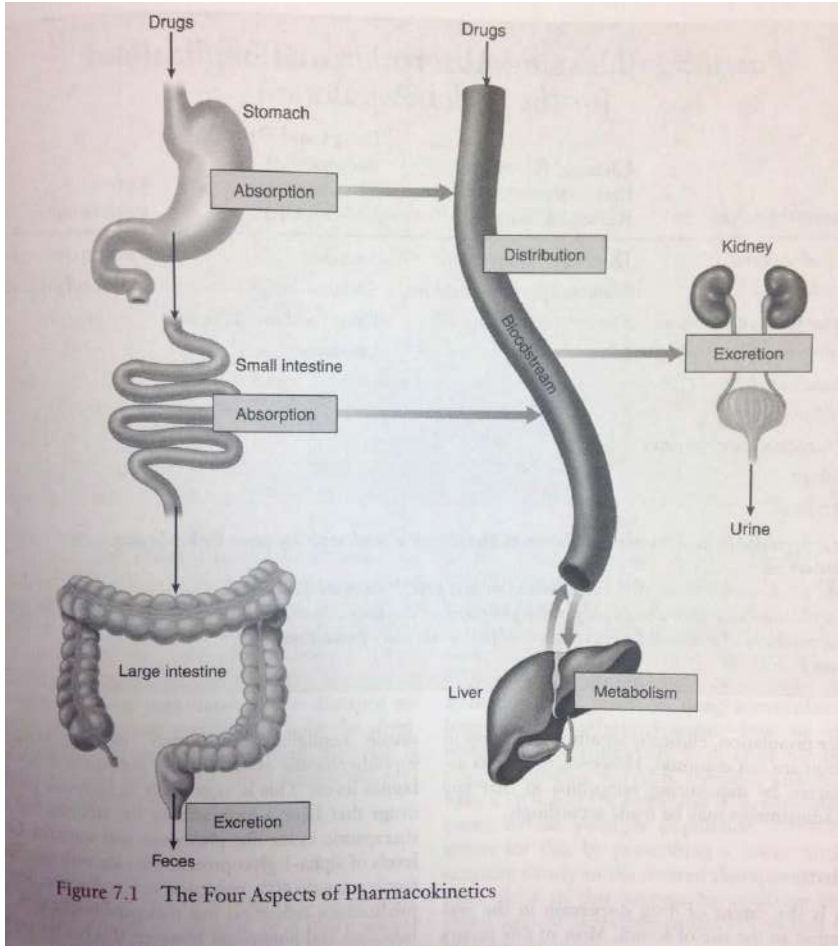
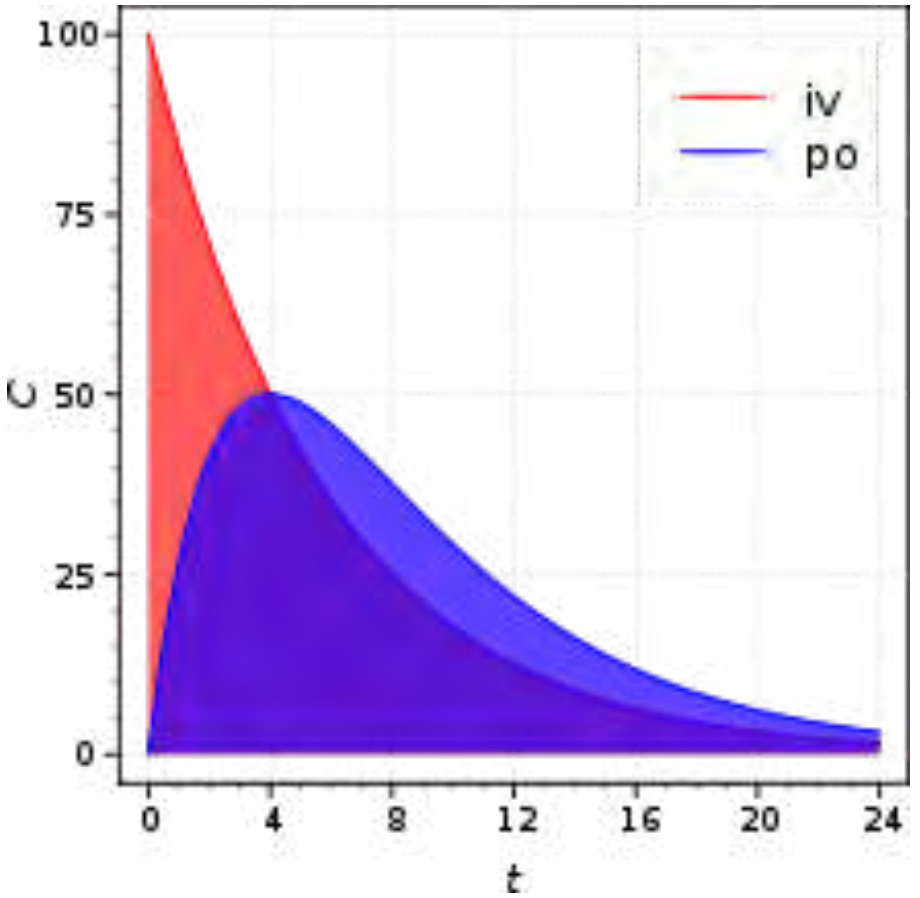


Figure 7.1 The Four Aspects of Pharmacokinetics

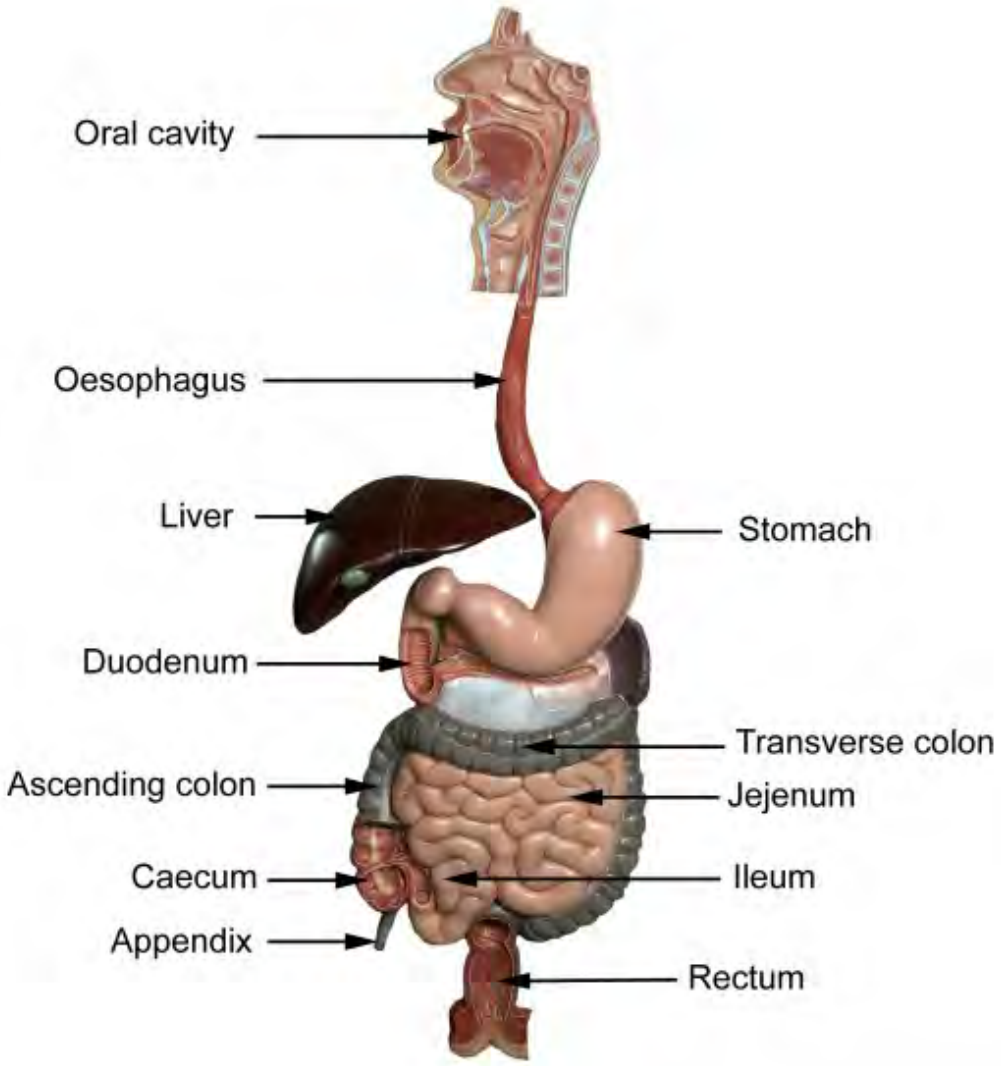
- Absorption
  - Impacted by bioavailability of medication
    - Lower the bioavailability=Higher the dose
    - IV drugs= 100% bioavailable
    - Oral= 1-100%



Factors Influencing Oral Absorption

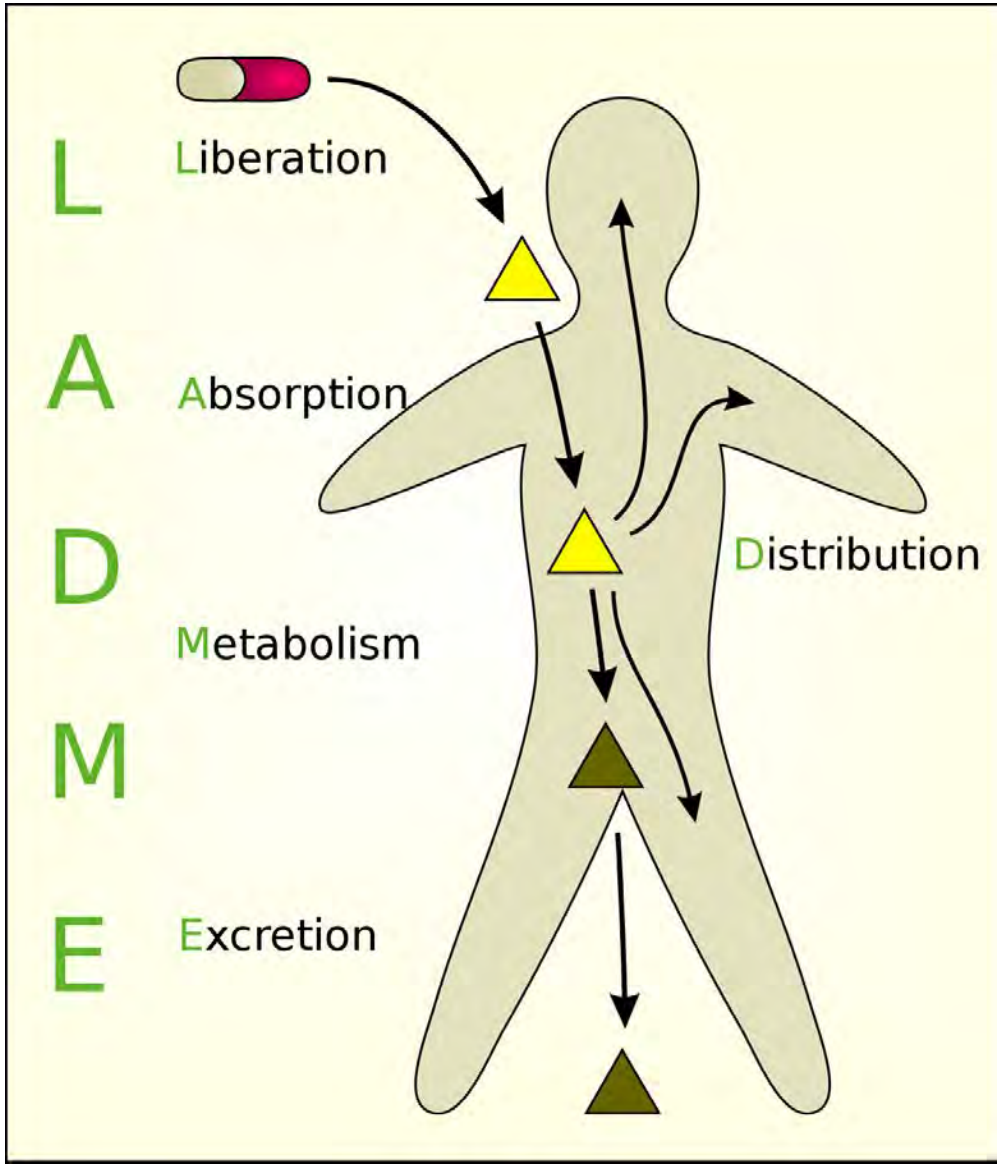
- Age related changes
  - Decreased
    - Gastric acids/acidity
    - Gastric emptying
    - Intestinal mobility
    - 30% smaller surface area

- Results:
  - **Decreased absorption rate**
  - **Increased time for peak effect**



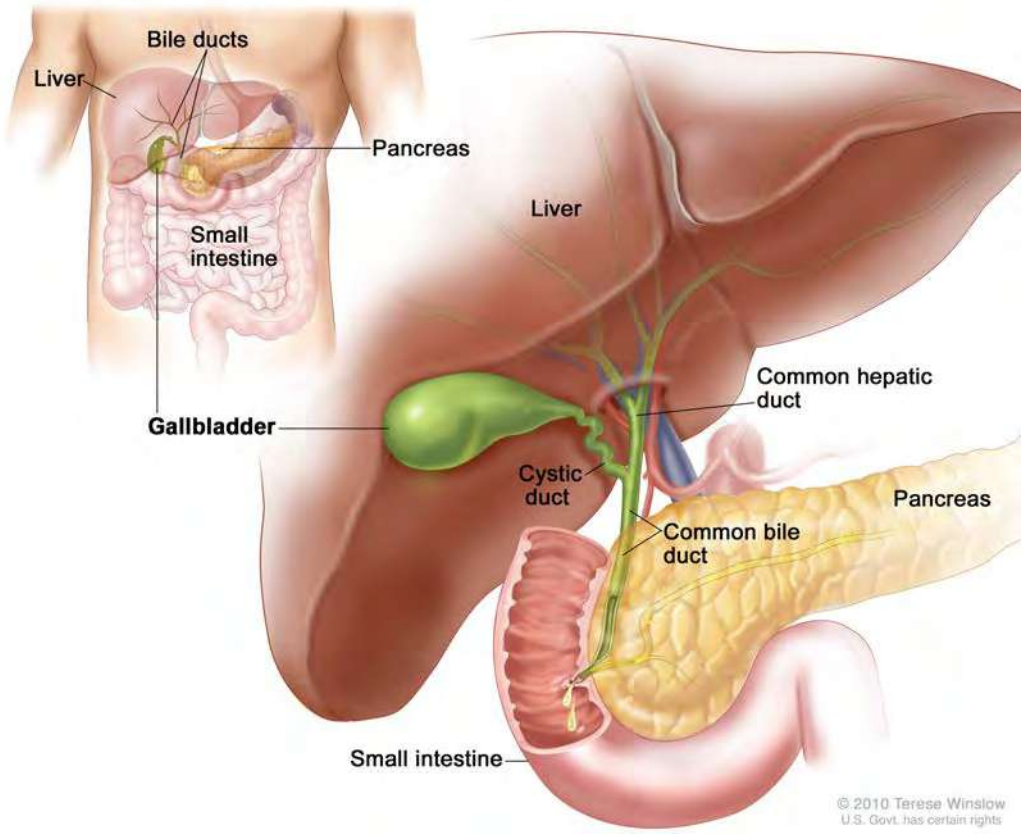
Distribution

- Definition:
  - Extent in which systemic circulation transports drug to site of action
- Age related changes:
  - Decreased:
    - Cardiac output
    - Lean body mass (dec 15%)
    - H20 content (dec 25%)
    - Serum albumin (active transport)
  - Increased
    - Peripheral vascular resistance
    - Fat mass (inc 20-40%)
    - Serum alpha-1 glycoprotein (active transport)
- Result:
  - **Decreased volume of distribution for water soluble drugs**
  - **Increased volume of fat soluble drugs**



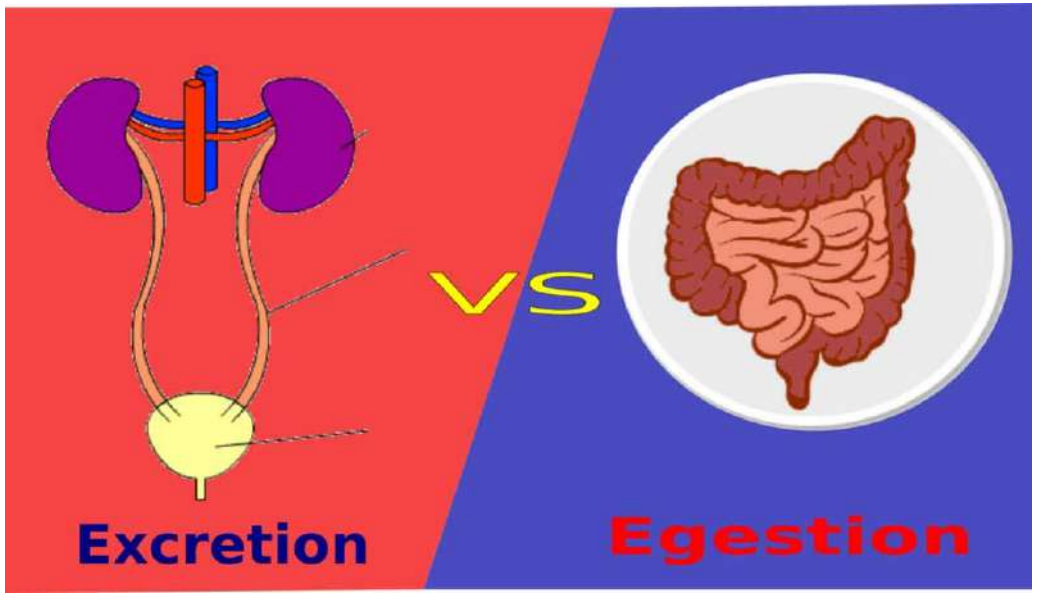
Metabolism

- Definition:
  - Biologic transformation of a drug into an active molecule. Happens mainly in the liver.
- Age related changes:
  - Decreased hepatic blood flow(40%)
  - Dec liver size (30%)
- Result:
  - **Increased half life**
  - **Decreased drug clearance**



Excretion

- Definition:
  - Elimination of drug by kidneys
  - Most effected by age
- Age related changes
  - Dec renal blood flow(25% nephron loss)
  - Dec glomular filtration rate
  - Dec tubular secretion
- Results
  - 35-50% overall function decrease in kidneys
  - Increased half life
  - Decrease drug clearance(50%)



Pharmokinetic Summary

- Delayed onset of action
- Delayed peak effect
- Prolonged duration of action
- Increased dose intervals
- Decrease dose of drugs

Q13: Pharmacokinetics

- A 77 year old female patient with end-stage renal disease presents for physical therapy. Her current medications include a water-soluble loop diuretic that is taken intravenously. During therapy she reports complaints of feeing dizzy and weak. What is the **MOST** likely explanation for these symptoms?

- 1- absorption deficiencies
- 2- inability to properly metabolize
- 3- inefficient distribution
- 4- failure to eliminate drug efficiently

Beer's List

- Goals
  - prescribing of unneccessary or potentially dangerous medications in older adults
  - Decrease prescription of High risk-Low Benefit medications
  - Decrease adverse drug reactions(ADR's)

Polypharmacy

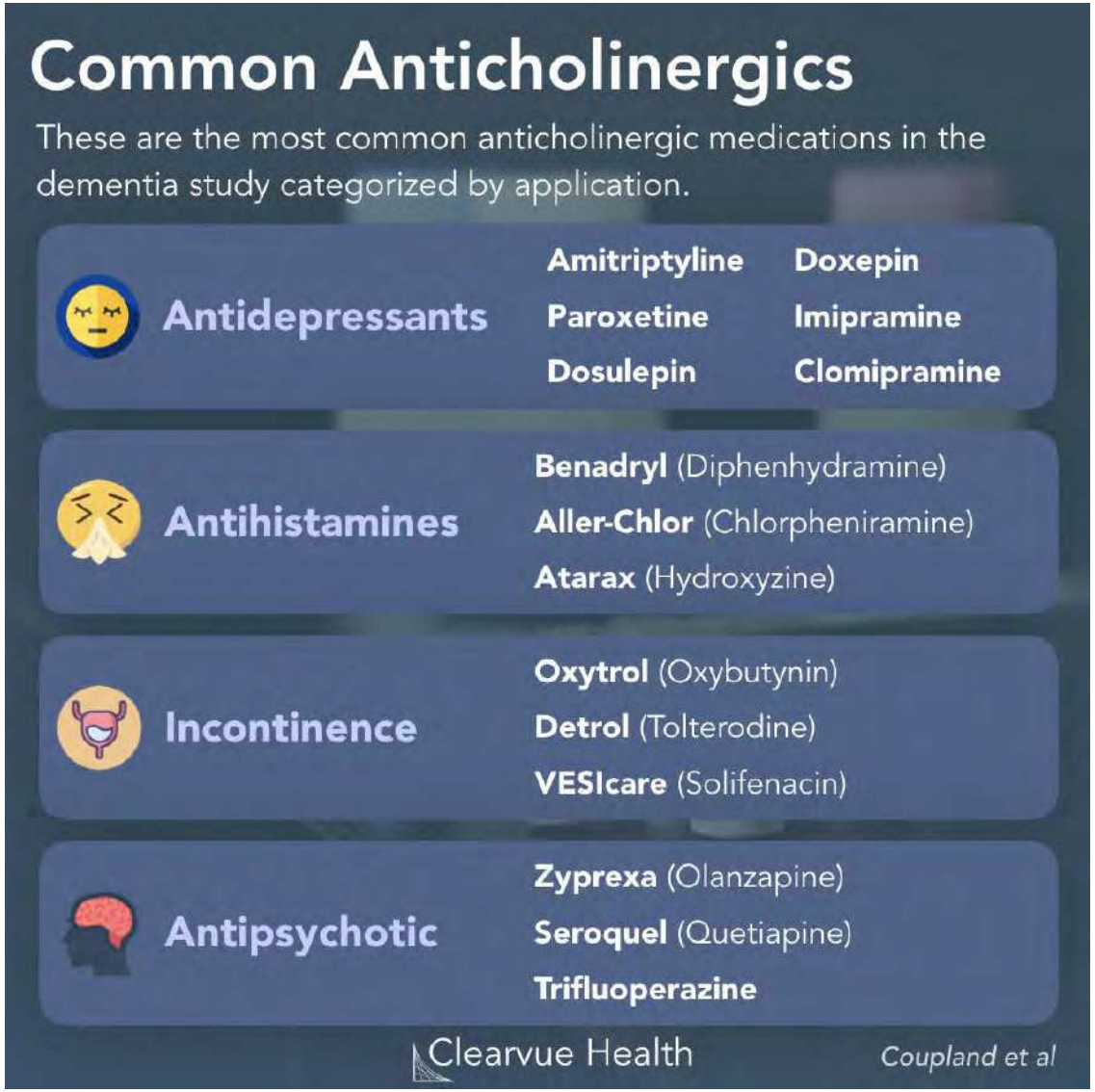
- Definition(multiple)
  - Previous- more than five drugs
  - Current-Drugs that serve no purpose
    - Rational polypharmacy: prescribed numerous drugs that are considered part of combination treatment or best practice
    - Irrational polypharmacy: multiple drugs from same class, drugs that perform the same function to treat different conditions

Polypharmacy

- Characteristics
  - Concurrent use of interacting meds
  - Contraindicated meds
  - Dosage
  - Discontinued but still using
  - Duplicate

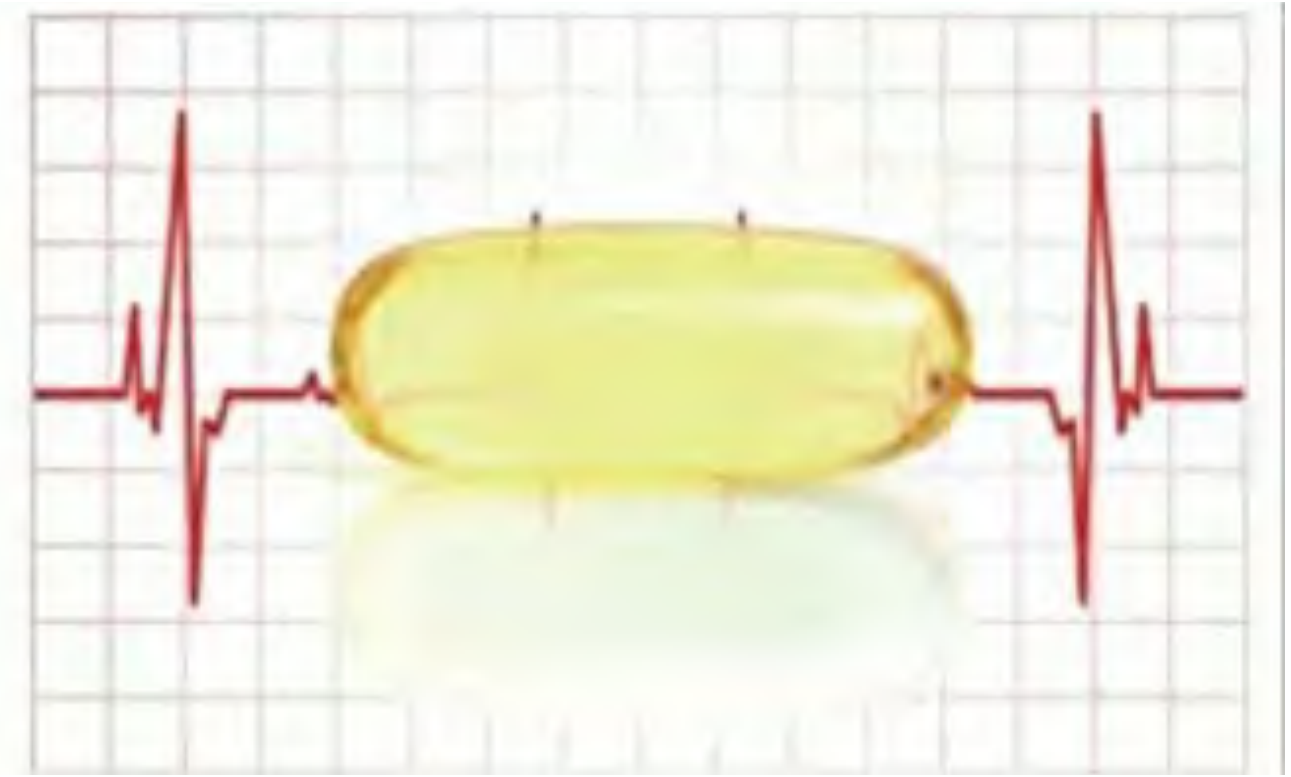
Anticholinergics

- Uses
  - Antihistamine
  - Antispasmodic
  - Antiparkinsons
- Rationale for concern
  - Clearance reduced
  - Tolerance develops (used as a hypntoic)
- Risks
  - Confusion
  - Constipation
  - Dizzieness
  - Dysequilibrium
  - sedation



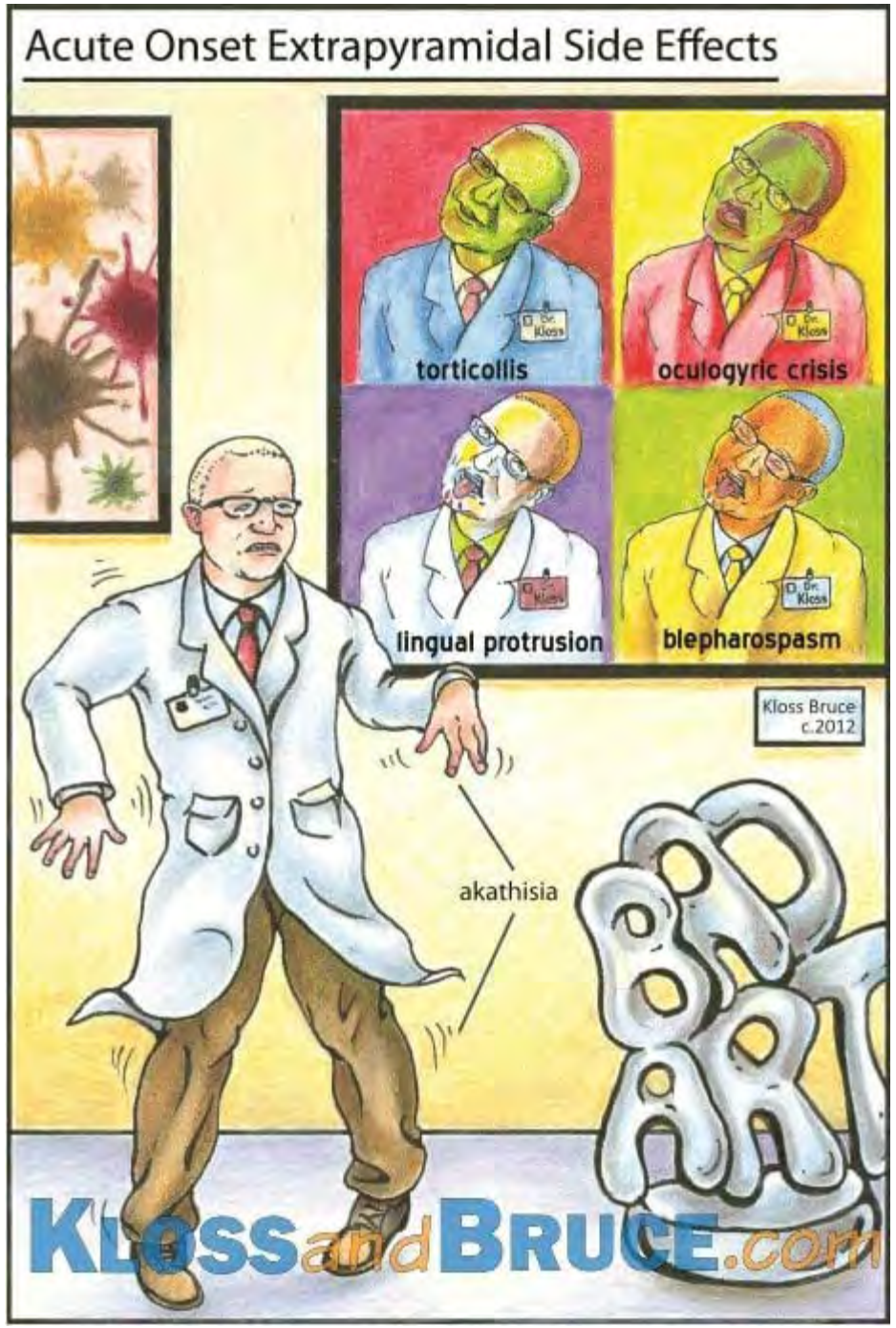
Cardiovascular

- Uses
  - HTN
  - Arrhythmias
  - BPH
  - Anxiolytic
- Risks
  - OHTN



CNS

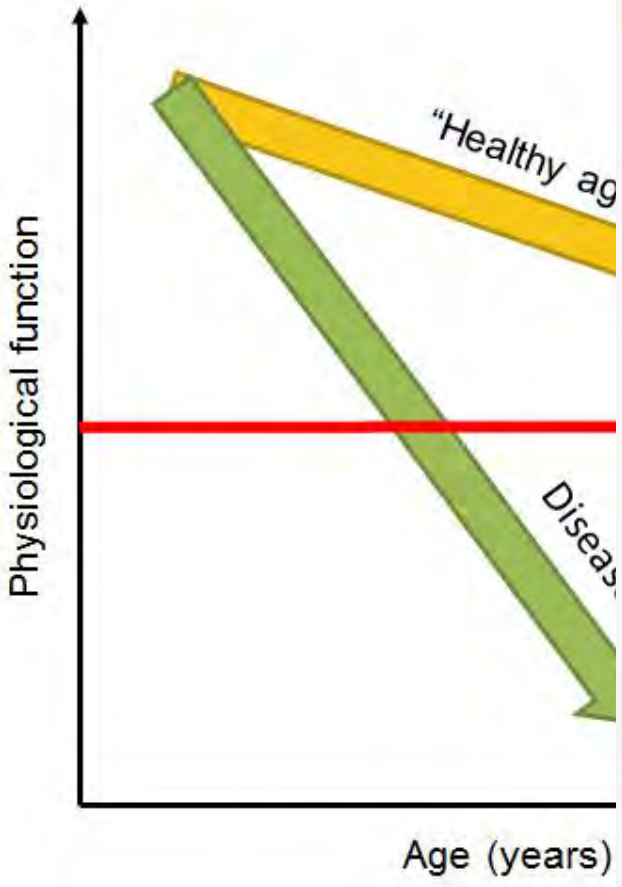
- Uses
  - Antidepressant
  - Antipsychotics
  - Sedatives
  - Anxiolytics
- Rationale for concern
  - High anticholinergic effects
- Risks
  - OHTN
  - Sedation
  - Extrapyramidal effects
  - Addiction
  - Falls



Pain medication

- Uses
  - Uhhh….
- Rationale for concern
  - Benefit vs risk ratio
    - Dependence
    - Toxicity
  - GI bleeding
  - CNS effects
- Risks
  - Addiction
  - Death
  - Confusion

In Closing



"Aging is not a disease, rather a natural process. People don't die of old age; they die of biological processes that break down."

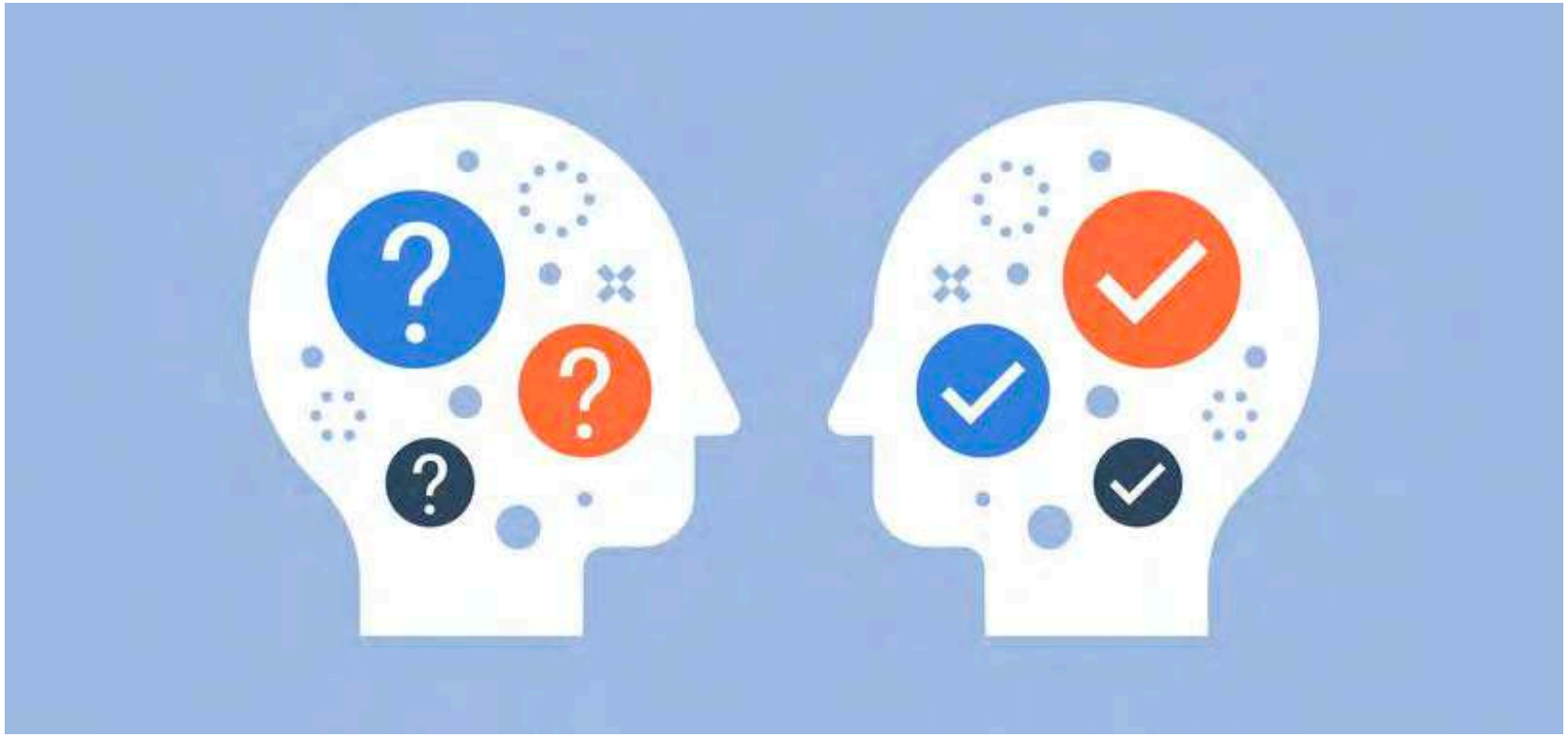
JOHN MEDINA

Brain Rules for Aging Well

Need more info?

- Email: Daniel.lee29@touro.edu
- What book?
  - Scorebuilders
    - Covers everything throughout academic review
  - In depth
    - Guccione's Geriatric Physical Therapy 2019
    - Geriatric Rehabilitation 2020

Questions?



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