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Medical Screening of the Geriatric Patient

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- Private practice owner (AquaSport PT)
- US Olympic Sports Medicine Society
- Author of Ortho Notes, Screening Notes, Sport Notes, Mobilization Notes, & > 100 peer-reviewed publications & presentations
- Co-developer of iOrtho+ Mobile App

Purpose

- To empower you with the skills needed to screen for medical conditions that may impact the course of intervention
- To make you cognizant of signs and symptoms of pathology that is outside of the scope of your professional practice

Objectives:

- Identify medical "red flags" which maybe outside the scope of practice &/or require referral to another medical professional
- Describe the signs & symptoms of the geriatric client that would differentiate musculoskeletal, neuromuscular, cardiopulmonary, gastrointestinal,& urogenital dysfunctions
- Weight (based on statistical data) the history & diagnostic tests/procedures gleamed from the examination to develop a realistic differential diagnosis within the scope of professional practice

Game Plan

- Focus on the geriatric aspect of the lifespan
- Progress by system
  - Musculoskeletal
  - Neuromuscular
  - Cardiovascular & Pulmonary
  - Integumentary
  - Gastrointestinal
  - Hepatic
  - Endocrine
  - Urogenital

Aging Issues

Physiological changes within all major systems

SUCCESS:

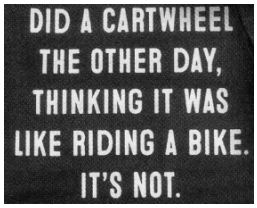
- At age 4 success is . . .Not piddling your pants
- At age 12 success is . . .Having friends
- At age 17 success is . . .Having a drivers license
- At age 35 success is . . .Having money
- At age 50 success is . . .Having money
- At age 70 success is . . .Having a drivers license
- At age 75 success is . . .Having friends
- At age 80 success is . . .Not piddling your pants

Musculoskeletal

- ↓ Muscle mass & strength
- ↓ Motor unit recruitment
- ↓ Speed of mov't (↓ type II = FT)
- ↓ Joint flexibility
- ↓ Bone mass & strength
- Cartilage degeneration

Neural

- ↓ Conduction = altered pain
- ↓ Enzymatic activity
- ↓ Reflexes
- ↑ Postural sway
- ↓ Responsiveness
- Change in sleep patterns



Cardiovascular

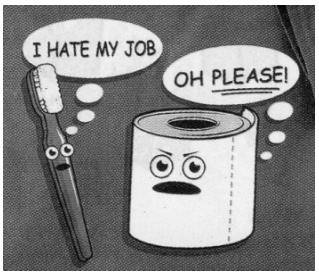
- ↓ Cardiac output
- ↑ Vascular resistance
- ↓ Lipid catabolism
- ↓ Vascular elasticity = ↑ DBP
- ↓ Response to postural stress

Pulmonary

- ↓ Recoil within the lung
- Calcification of soft tissue in the chest wall
- ↓ PO_2 from 20–70 years
- ↓ VO_2 max
- ↓ Pulmonary blood flow = ↓ O_2 Sat
- ↑ RV

Integumentary

- ↓ Vascularity =altered thermoregulation
- ↓ Sub-q tissue ↑'s risk for hypothermia
- ↓ Thickness with ↑'d risk of breakdown
- Uneven pigmentation



GI

- ↓ Peristalsis
- ↓ Enzymatic activity
- ↓ Motility

Urogenital / Renal

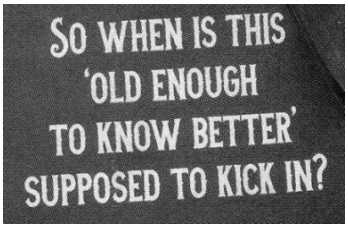
- ↓ Bladder capacity
- ↓ Bladder elasticity
- Prostate hyperplasia
- ↓ Kidney mass
- ↓ Glomerular filtration rate
- ↓ Creatinine clearance

Special Senses

- ↓ Visual acuity
- ↓ Hearing
- ↓ Smell & taste
- ↓ Thymus function
- ↓ Ca++ control
- ↓ Sweating

Immune

- ↓ Function/resistance
- ↓ T-cells
- ↓ Temperature regulation

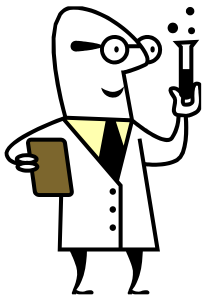


Psychosocial

- ↑ Incidence of depression
- ↑ Fatigue
- Cognitive deficits

Diagnostic Tests

- X-ray
- MRI
- CT- Scan
- US
- Bone Scan
- Dexa Scan

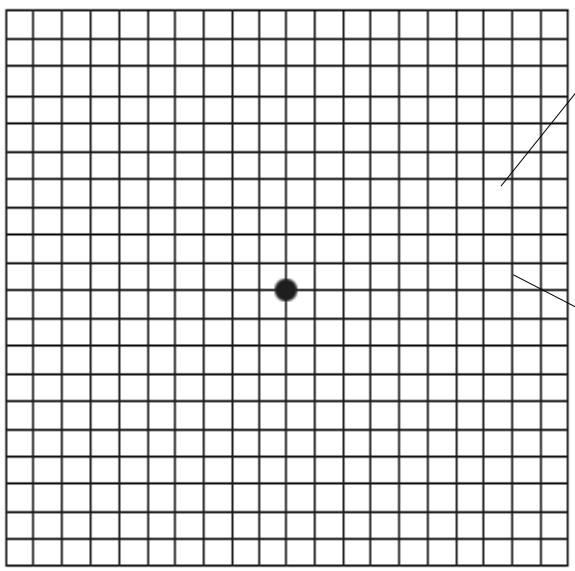


- EMG/NCV
- EKG
- EEG
- Urine Analysis
- Blood Work
- Stress Test

Visual Changes

Presentation	Possible Pathology
Spots	Impending retinal detachment, fertility drugs
Floating spots	Diabetic retinopathy
Flashes	Migraine, retinal detachment
Loss of peripheral vision, haloes around lights	Glaucoma (ocular hypertension)
Cloudy or fuzzy vision	Cataracts

Amsler Grid



Hold 14" away

Cover 1 eye

Clinical Tests

- Good diagnostic tests ?
- Good screening tests ?
- Clustering of tests ?

Another layoff at the textbook publishing company.

Clinical Decision Making

<u>Statistics:</u>

- **Sensitivity** = Se **N OUT** = if the test is negative, it is effective at ruling the dysfunction out
- **Specificity** = **Sp P IN** = if the test is positive, it is effective at confirming the dysfunction

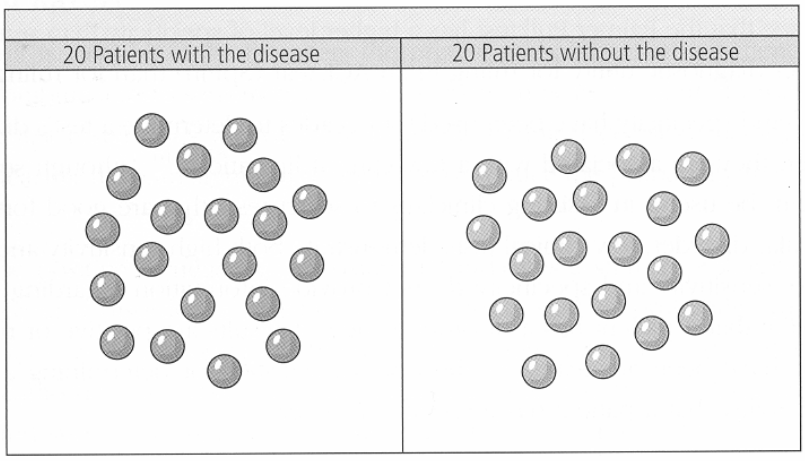


Figure 1–1: A. *20 patients with and 20 patients without the disorder.*

Cleland J, Orthopaedic Clinical Examination: An Evidence-Based Approach for Physical Therapists. Saunders Elsevier, Phila. 2005

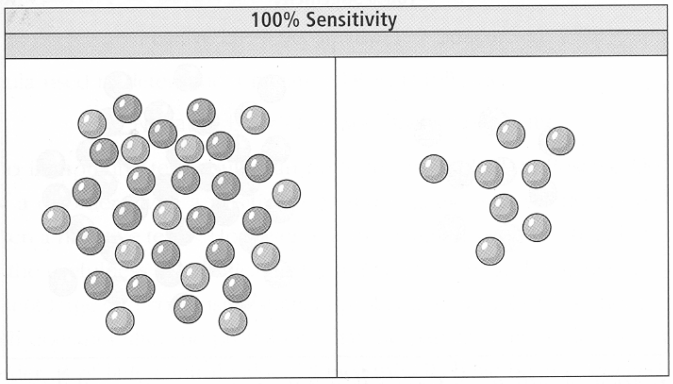


Figure 1–1: B. *100% sensitivity, inferring that if the test is positive, all those with the disease will be captured. However, note that although this test captured all those with the disease, it also captured many without. Yet, if the test is negative, we are confident that the disorder can be ruled out (SnNout).*

Cleland J, Orthopaedic Clinical Examination: An Evidence-Based Approach for Physical Therapists. Saunders Elsevier, Phila. 2005

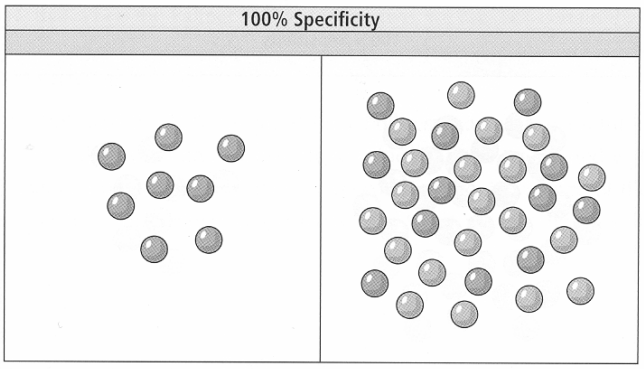


Figure 1–2: *100% specificity, inferring that if the test is negative, all those without the disease will be captured. However, note that although this test captured all those without the disease, it also captured many with. Yet, if the test is positive, we are confident that the patient has the disorder (SpPin).*

Cleland J, Orthopaedic Clinical Examination: An Evidence-Based Approach for Physical Therapists. Saunders Elsevier, Philadelphia, 2007

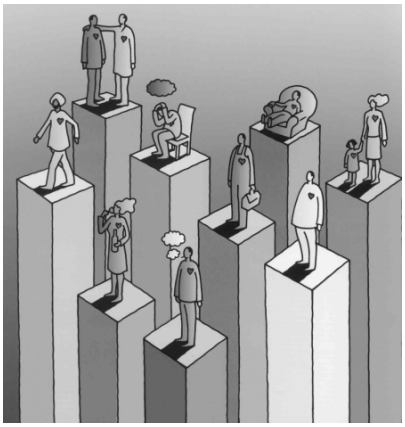
Clinical Decision Making

Statistics:

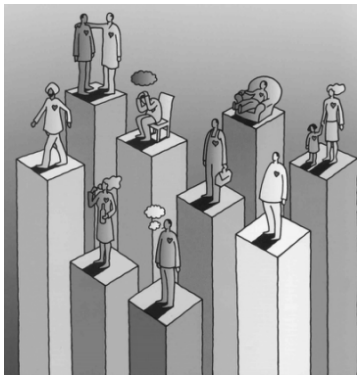
- **(–) Likelihood Ratio** = how much the odds of the disease decrease when a test is negative
- **(+) Likelihood Ratio** = how much the odds of the disease increase when a test is positive

Statistics to Rule Out

- High Sensitivity: ≥ 90
- (–) Likelihood Ratio: < 0.10 – 0.20



Statistics to Confirm



- High Specificity: ≥ 90
- (+) Likelihood Ratio: > 5 – 10

Medications

- Need to ↓ meds with ↑age due to ↓ liver & kidney metabolism
- Polypharmacy
  - adverse effects
  - interactions

Risk of falls

- Berg Balance Scale
- Tinetti Assessment Tool
- Timed Get Up & Go
- Gait Abnormality Rating Scale
- Gait Velocity
- Five-Times-Sit-to-Stand Test
- Dynamic Gait Index
- Activity-Specific Balance Confidence Scale

Berg K, Wood-Dauphinee S, Williams JI. ,1992; Tinetti, ME, 1986; Van Swearingen, Paschal, Bonino & Yang, 1996; Whitney et al,2005; Studenski et al, 2003; Nordin et al, 2008

Timed Get Up & Go

- **Task**: Get up, walk 3m, go around an object, walk back, & sit down

Mean "Timed Get Up & Go" Scores		
Age & Gender	**Without Cane**	**With Cane**
65 – 69		
Male	**9.93 ± 1.40**	**11.57 ± 1.31**
Female	**10.15 ± 2.91**	**14.19 ± 4.67**
70 – 74		
Male	**10.45 ± 1.85**	**12.23 ± 1.88**
Female	**10.37 ± 2.23**	**14.27 ± 5.22**
75 – 79		
Male	**10.48 ± 1.59**	**11.82 ± 5.22**
Female	**10.98 ± 2.68**	**15.29 ± 5.08**

Gait Velocity

Gait Speed as a Predictor of Hospitalization	
Gait Speed	**% Hospitalization within 12-months**
Slow walkers: < 0.6 m/sec	**41%**
Intermediate walkers: 0.6-1.0 m/sec	**26%**
Fast walkers: >1.0 m/sec	**11%**

Studenski et al, 2003

Five-Times-Sit-to-Stand Test

- Description: Standard chair height = 43-46cm; sit with back against the chair; feet placed in comfortable position; start timing when person begins mov't & stop when buttocks touches chair for 5th time
- Instructions to Participant: Cross your arms across the chest, stand up & sit down 5 times as quickly as you can

Normative Values	
Age & Balance	**Score (mean ± sd)**
< 60 yrs & no balance problem	**8.2 ± 1.7 sec**
< 60 yrs with balance problem	**15.3 ± 7.6 sec**
> 60 yrs & no balance problem	**13.4 ± 2.8 sec**
> 60 yrs with balance problem	**16.4 ± 4.4 sec**

Studenski et al, 2003; Bohannon, 2006

Cumulative Test Results

% Correctly Identified with Balance Disorders		
Model	< 60 yrs	> 60 yrs
ABC	**87%**	79%
DGI	82%	**83%**
FTSST	81%	60%
ABC + DGI	88%	79%
ABC + FTSST	**89%**	76%
DGI + FTSST	80%	**86%**
ABC + DGI + FTSST	88%	80%

Whitney et al, 2005

Warning Signs of Elder Abuse

- Bruises, black eyes, welts, lacerations
- Multiple reports of falls / fx
- Open wounds, cuts, punctures, pressure ulcers (untreated in various stages of healing)
- Internal injuries / bleeding
- Broken eyeglasses
- Signs of being restrained (rope marks)
- Multiple trips to the ER
- Depression
- Over- and under-utilization of prescribed medications
- Soiled or torn clothing
- Malnutrition / weight loss
- Frequent changes in medical providers
- Sudden change in an elder's behavior
- Confusion attributed to dementia
- A caregiver's refusal to allow visitors to see an elder alone

Mandatory Reporters

- Social workers
- School personnel
- Medical providers
- Child care providers
- Camp
- Medical examiners/coroners
- Law enforcement officers
- Animal control officers
- Members of the clergy
- Coaches & Athletic directors

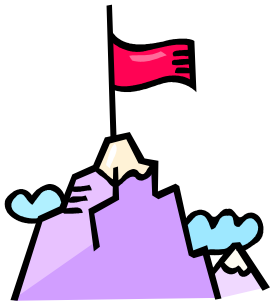
Intervention = RADAR

- Routinely screen every client
- Ask directly, kindly, non-judgmentally
- Document your findings
- Assess the client's safety
- Review options & provide referrals

*** Guidelines for Recognizing & Providing Care for Victims of Domestic Violence

Generalized Systemic Red Flags

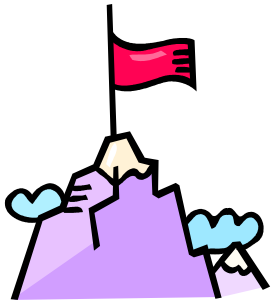
- Insidious onset with no known mechanism of injury
- Symptoms out of proportion to injury
- No change in symptoms despite position, rest, or treatment
- No pattern to the symptoms; unable to reproduce symptoms
- Symptoms persist beyond expected healing time
- Recent or current fever, chills, night sweats, infection
- Unexplained weight loss, pallor, nausea, dizziness, vomiting, b&b changes (constitutional symptoms)



Goodman, C, Snyder, T. Differential Diagnosis in Physical Therapy, WB Saunders Company, Phila, 3rd ed, 2000

Generalized Systemic Red Flags

- Headache or visual changes
- **Change** in vital signs
- Bilateral symptoms
- Pigmentation changes, edema, rash, nail changes, weakness, numbness, tingling, burning
- Hx of cancer
- > 40 yo gender, ethnicity, race
- Night pain
- Progressive neurology symptoms
- Cyclic presentation
- Joint pain with skin lesions



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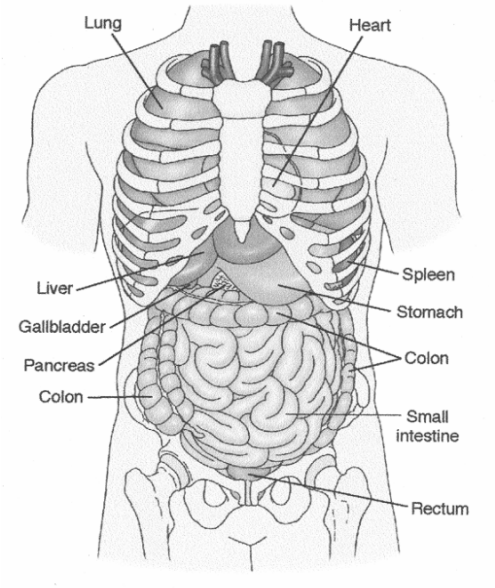
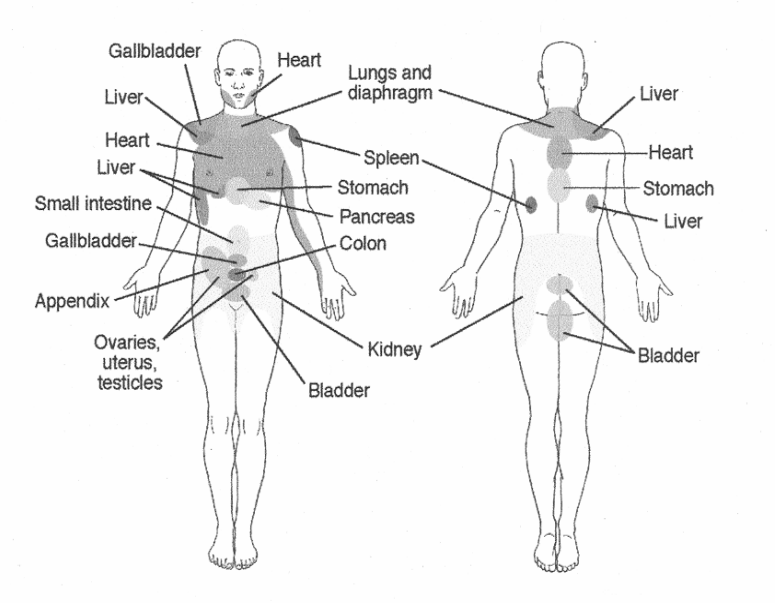


Gulick, DT Screening Notes, FA Davis, Phila, 2006



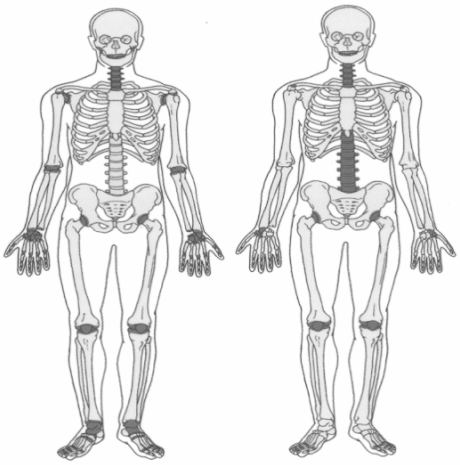
Gulick, DT Screening Notes, FA Davis, Phila, 2006

System Review

- **Musculoskeletal**
- Neuromuscular
- Cardiovascular & Pulmonary
- Integumentary
- Gastrointestinal
- Hepatic
- Endocrine
- Urogenital

Musculoskeletal Pathology

- Arthritis
  - OA
  - RA
- Osteoporosis



Gulick, DT Screening Notes, FA Davis, Phila, 2006

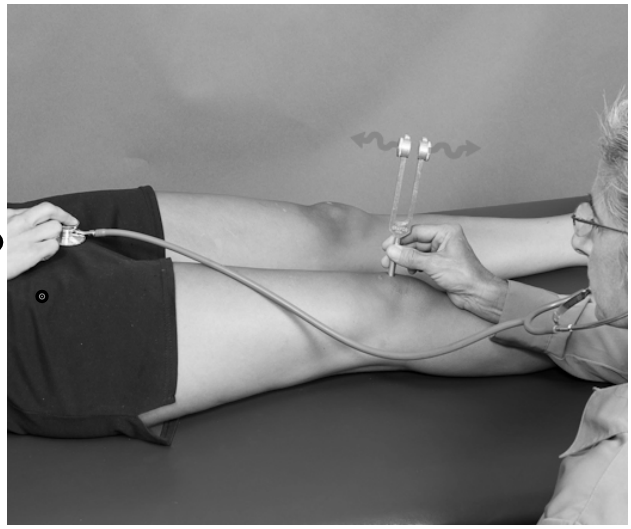
Musculoskeletal Pathology

<u>Patellar – Pubic Percussion Test</u>

- Sensitivity = 94: (–) LR = 0.06
- Specificity = 95; (+) LR = 20.4
- Technique: Patient in supine, scope on symphysis pubis & tuning fork on patella; listen for a change in sound quality with both LE's
- (+) = osseous problem, i.e. fracture, cancer

Patellar – Pubic Percussion Test

VIDEO



Gulick, iOrtho+ mobile app

Influence of Fluoroquinolone (FQ): gram (–) antibiotic for resp, uro, GI infections

- FQ has a high affinity for connective tissue
- FQ is toxic to type 1 collagen synthesis & promotes collagen degradation
- Risk of tendon damage is dose dependent
- "Black box warning"
- Damage has been reported to occur in as little as a few hours to a few months; mean onset in 6 days
- Because of decreased renal clearance, effects could occur up to 1 year later

Kim & Del Rosso, 2010

Influence of Fluoroquinolone (FQ)

Risk of tendon damage increases if the client:

- > 60 years old
- concurrent corticosteroid use (46-fold ↑)
- renal failure
- diabetes
- history of tendon rupture

Kim & Del Rosso, 2010

Influence of Fluoroquinolone (FQ)

- FQ can effect any tendon but 89.8% of the time it is the Achilles tendon
- Signs & Symptoms:
  - Pain 2-3 cm proximal to calcaneal attachment
  - Swelling & inflammation
  - "Snap" or a "pop" with bruising
  - (+) Thompson sign

Kim & Del Rosso, 2010

Influence of Fluoroquinolone (FQ)

- Signs & symptoms can occur up to 2 weeks before rupture
- Rupture may be avoided if:
  - tendon is protected from WB
  - heel lift is used
  - crutches & bracing is used
- Protection of the tendon may need to be done for up to 6 months

Kim & Del Rosso, 2010

System Review

- Musculoskeletal
- **Neuromuscular**
- Cardiovascular & Pulmonary
- Integumentary
- Endocrine
- Urogenital

Neurological Pathology

- Myasthenia Gravis
- Guillian-Barre Syndrome (GBS)
- Normal Pressure Hydrocephalus
- Parkinson's Disease
- Alzheimer's Disease

Myasthenia Gravis

<u>Signs & Symptoms</u>

- **Diplopia & ptosis = most common symptoms**
- Proximal muscle weakness
- Cranial nerve weakness
- Problem controlling eye mov't & facial expressions
- Difficulty swallowing & chewing
- Dysarthria
- Change in voice quality
- No sensory changes & no change in DTRs

Guillian-Barre Syndrome (GBS)

Signs & Symptoms

- Weakness – symmetrical LE > UE > respiratory
- Paresthesia start in toes & progress proximal (no loss of sensation)
- Asymmetrical facial weakness, dysphasia, dysarthrias
- Cranial nerves effected in 45-75% of cases
- Unstable vital signs
- ↓ Reflexes & hypotonia
- Fever, nausea, fatigue
- Pain = LB & buttocks

Normal Pressure Hydrocephalus

Etiology

- Natural system of draining/absorbing CSF is disrupted
- Pressure slowly increases (NPH is a misleading)
- Can occur after a head injury, TIA, meningitis, infection, or tumor but may also be unknown

Normal Pressure Hydrocephalus

Symptoms include:

- Parts of brain most often affected:
- **LEGS** – Gait disturbance – wide BOS, slow/shuffling steps
- **COGNITION** – Dementia, forgetfulness, short-term memory loss
- **BLADDER** – Urinary frequency (every 1-2 hrs) => incontinence

Clinical Triad (slow progression)

- **Wobbly**
  - Described as the "feet being glued to the floor"
  - No loss of arm swing like in PD
- **Wozzy**
  - Beware of misdiagnosis with hearing loss
- **Wet**
  - Beware of medications

Typical NPH Gait

http://www.bing.com/videos/search?q=video+of+nph+gait&FORM=VIRE1#view=detail&mid=55D9B99BEFBB2419481D55D9B99BEFBB2419481D

Leo Cullum, 1998

NPH Scale

Normal = score of 15

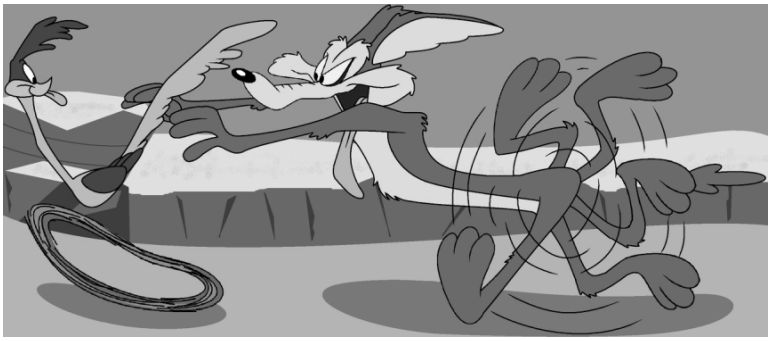
- **Gait evaluation**
  1. Bedridden/unable to ambulate
  2. Ambulate with assist
  3. Independent ambulation but unstable
  4. Abnormal but stable
  5. Normal gait
- **Cognitive function**
  1. Vegetative
  2. Severe dementia
  3. Severe memory & behavior problems
  4. Memory problems reported by family
  5. Normal
- **Sphincter disturbance**
  1. Urinary & bowel incontinence
  2. Continuous urinary incontinence
  3. Sporadic urinary incontinence
  4. Urinary urgency
  5. No sphincter dysfunction

Normal Pressure Hydrocephalus

- 6 functional status measures
  - FIM, TUG, Tinetti, Peg Test, CAM, MMSE
- Improvement in gait precede incontinence & cognition
- Tests that were sensitive to differential change:
  - TUG & Tinetti
  - FIM – ADL portion only
  - CAM – higher cognitive functions only

Feick D, et al, Sensitivity & Predictive Value of OT & PT Assessments in the Functional Evaluation of Patients with Suspected NPH. Journal of Reb Med. 2008;40:715-720

NPH Post-Shunt Gait



- http://www.bing.com/videos/search?q=video+of+nph+gait&FORM=VIRE9#view=detail&mid=84C3CE6B065635AE81FA84C3CE6B065635AE81FA

Parkinson's Disease

Increasing prevalence with increasing age:
Juvenile onset = 10-20 yo
Young onset = 21-40 yo
Most common = 60-70 yo (average = 62.5)

Cardinal Motor Symptoms
- Tremor at rest – absent in 20%
- Rigidity
- Bradykinesia
- Gait & balance problems

Fernandez HH, 2012

Parkinson's Disease

Although tremor is the most common initial symptom in Parkinson disease, occurring in approximately 70% of patients, it does not have to be present to make the diagnosis.

http://reference.medscape.com/viewarticle/844022_4

Parkinson's Disease

Craniofacial features
- Masked face
- Sialorrhea (drooling)
- Anosmia (loss of smell)
- Soft speech
- Dysarthria
- Dysphagia

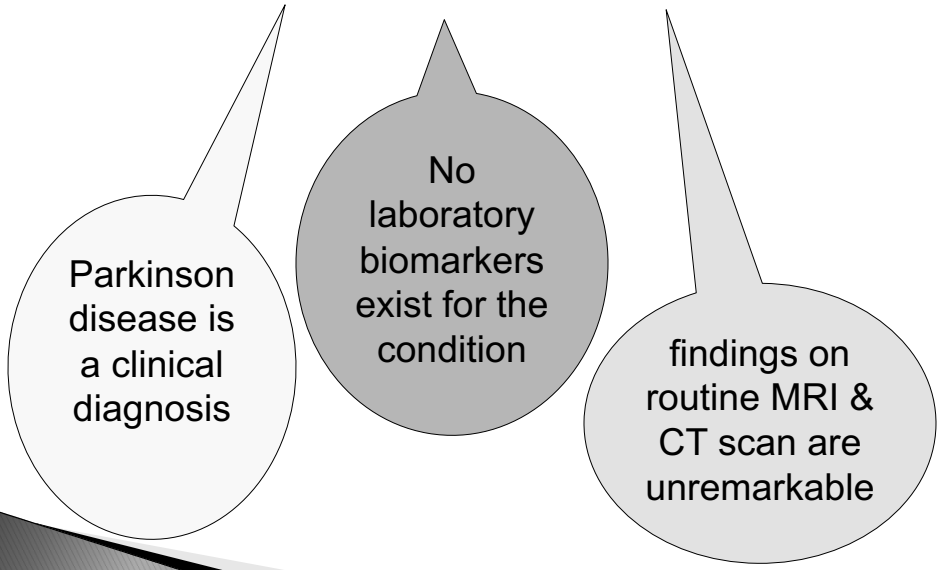
Autonomic features
- Urinary urgency
- Constipation
- Sexual dysfunction

Neuropsychiatric features
- Depression
- Anxiety
- Apathy
- Dementia
- Psychosis

Sensory features
- Paresthesia

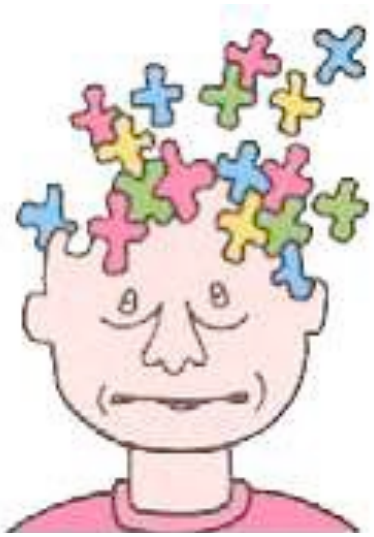
Fernandez HH, 2012

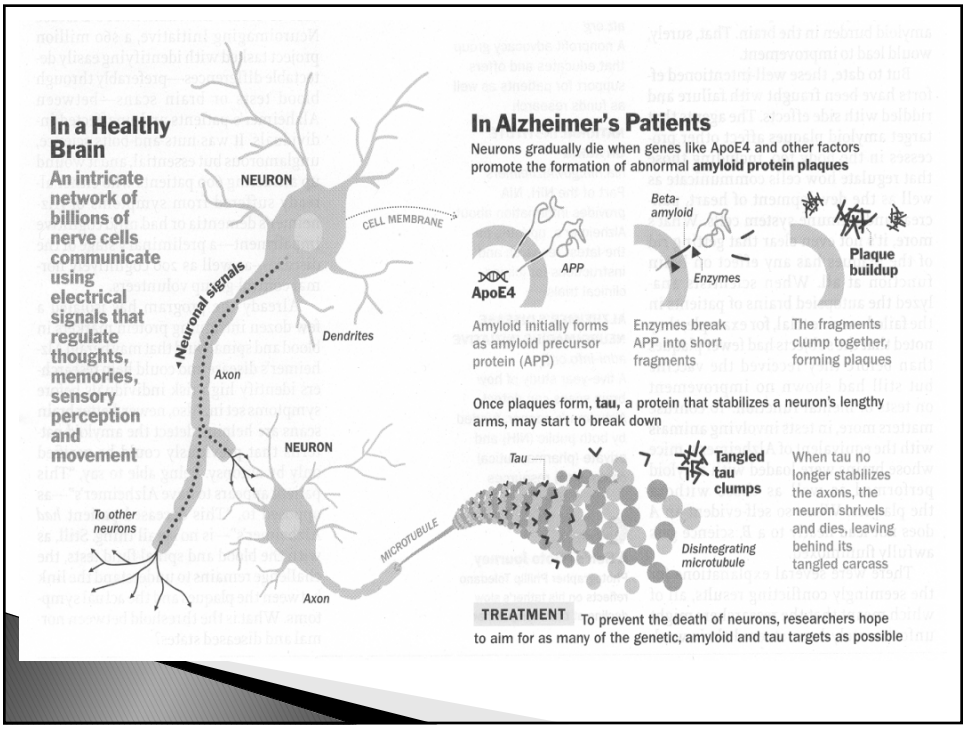
Parkinson's Disease

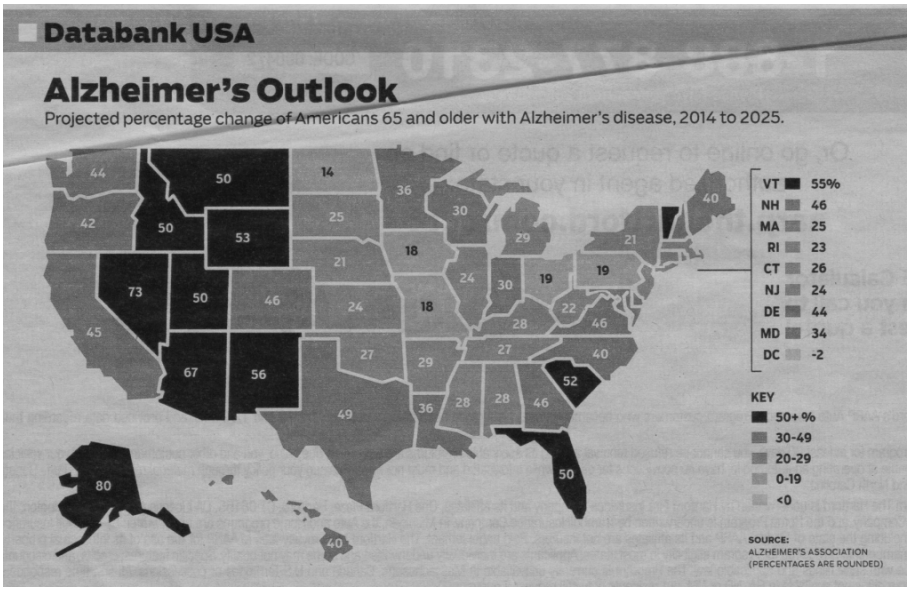


http://reference.medscape.com/viewarticle/844022_4

Cognition




In a Healthy Brain
An intricate network of billions of nerve cells communicate using electrical signals that regulate thoughts, memories, sensory perception and movement
NEURON
CELL MEMBRANE
Neuronal signals
Dendrites
Axon
NEURON
To other neurons
MICROTUBULE
Axon
In Alzheimer's Patients
Neurons gradually die when genes like ApoE4 and other factors promote the formation of abnormal amyloid protein plaques
ApoE4
APP
Amyloid initially forms as amyloid precursor protein (APP)
Beta-amyloid
Enzymes
Enzymes break APP into short fragments
Plaque buildup
The fragments clump together, forming plaques
Once plaques form, tau, a protein that stabilizes a neuron's lengthy arms, may start to break down
Tau
Tangled tau clumps
Disintegrating microtubule
When tau no longer stabilizes the axons, the neuron shrivels and dies, leaving behind its tangled carcass
TREATMENT To prevent the death of neurons, researchers hope to aim for as many of the genetic, amyloid and tau targets as possible



Stages of Alzheimer's Disease

Stage 1: No cognitive impairment

- No memory problems

Stage 2: Very mild decline

- Individual reports memory lapses – forgetting words, names, location of everyday objects
- Problems are not evident to medical professional, friends, family

Stage 3: Mild decline

- Problem with memory or concentration may be measurable in clinical testing
- Friends, family, co-workers notice deficiencies
- Common difficulties include: word finding problems, decreased ability to remember names when introduced to new people, poor reading retention, losing/misplacing valuable objects, decreased ability to plan or organize

Stages of Alzheimer's Disease

Stage 4: Moderate decline (mild or early stage Alzheimer's Disease)

- Deficiencies noted in medical interview
- Decreased knowledge of recent occasions or current events
- Impaired ability to perform challenging mental math – count backwards from 100 by 7's
- Decreased capacity to perform complex tasks – planning dinner for guests, paying bills, etc
- Reduced memory of personal history
- Individual may be subdues & withdrawal in socially or mentally challenging situations

Stages of Alzheimer's Disease

Stage 5: Moderately severe decline (moderate or mid-stage Alzheimer's Disease)

- Major gaps in memory & deficits in cognitive function
- Assistance in day-to-day activities
- Unable to recall address, telephone number, name of school graduated
- Confused about time, day of week, season
- Has trouble with less challenging mental math – count backwards from 40 by 4's or from 20 by 2's
- Usually retains knowledge about self, names of spouse & children
- Usually does not require assistance with eating or toileting

Stages of Alzheimer's Disease

Stage 6: Severe decline (moderately severe or mid-stage Alzheimer's Disease)

- Significant personality changes, hallucinations or compulsive behaviors may emerge
- Loss of awareness of recent experiences
- Generally recall own name & distinguish familiar faces but may forget the name of spouse, caregiver
- Needs helps with ADLs & toileting; disruption in sleep/wake cycle
- Tends to wander and become lost

Stages of Alzheimer's Disease

Stage 7: Very severe decline (severe or late stage Alzheimer's Disease)

- Loss of ability to respond to the environment & the ability to control mov't
- Speech becomes unrecognizable
- Needs help with eating (difficulty swallowing); generally incontinent
- Loss of ability to ambulate without assistance
- Poor muscle control, abnormal reflexes, muscle rigidity

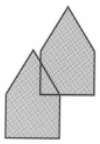
Alzheimer's Association

Mini Mental State Examination

- Orientation
- Registration
- Attention & Calculation
- Recall
- Language

Folstein, MF, Folstein SE, & McHugh PR, 1975

Mini Mental State Examination (MMSE)

Score	Maximum	Task
	5 5	**Orientation:** What is the (year) (season) (date) (day) (month)? Where are we (state) (country) (town) (building) (floor)?
	3	**Registration:** Name 3 objects: 1 second to say each. Ask the patient all 3 after you have said them. Give 1 pt for each correct answer. Repeat them until he/she learns all 3. Count & record trials: _____
	5	**Attention & Calculation:** Serial 7s. Score 1 point for each correct answer. Stop after 5 answers (Alternative question: Spell "world" backward)
	3	**Recall:** Ask for the 3 objects repeated above. Give 1 point for each correct answer.
	2 1 3 1 1 1	**Language:** Name a pencil & watch Repeat the following "No, ifs, ands, or buts" Follow a 3-stage command: "Take a paper in your hand, fold it in half, & put it on the floor." Read & obey the following: "Close your eyes." Write a sentence Copy the design shown: 
	30	**Total score (Normal ≥ 24)**

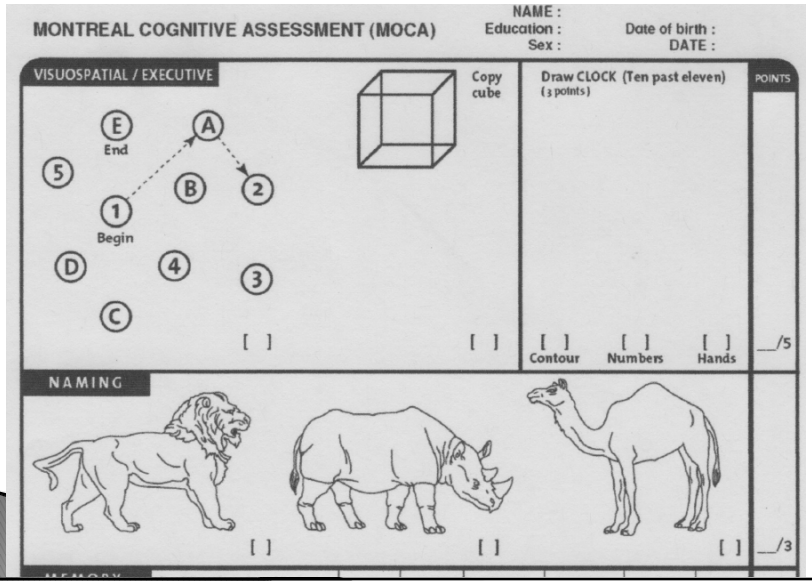
Source: Folstein MF, Folstein SE & McHugh PR (1975).

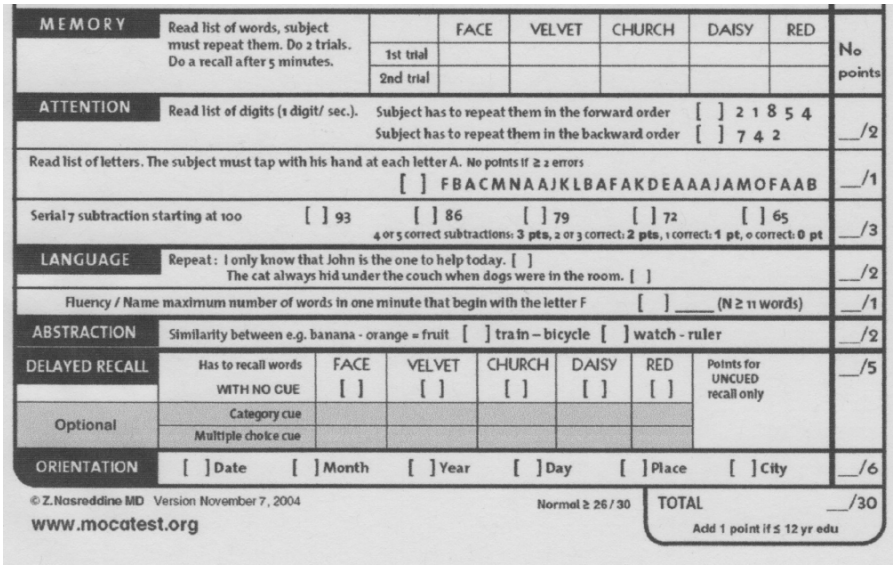
MMSE

The maximum score on the Mini Mental State Exam is 30. In general, scores fall into four categories:

- 24 – 30 = normal
- 20 – 23 = mild impairment/Alzheimer's
- 10 – 19 = moderate impairment/Alzheimer's
- 0 – 9 = severe impairment/Alzheimer's

Montreal Cognitive Assessment (MoCA)





MEMORY	Read list of words, subject must repeat them. Do 2 trials. Do a recall after 5 minutes.		FACE	VELVET	CHURCH	DAISY	RED	No points
		1st trial						
		2nd trial						
ATTENTION	Read list of digits (1 digit/ sec.).	Subject has to repeat them in the forward order [ ] 2 1 8 5 4 Subject has to repeat them in the backward order [ ] 7 4 2						__/2
Read list of letters. The subject must tap with his hand at each letter A. No points if ≥ 2 errors [ ] F B A C M N A A J K L B A F A K D E A A A J A M O F A A B								__/1
Serial 7 subtraction starting at 100 [ ] 93 [ ] 86 [ ] 79 [ ] 72 [ ] 65 4 or 5 correct subtractions: 3 pts, 2 or 3 correct: 2 pts, 1 correct: 1 pt, 0 correct: 0 pt								__/3
LANGUAGE	Repeat: I only know that John is the one to help today. [ ] The cat always hid under the couch when dogs were in the room. [ ]							__/2
Fluency / Name maximum number of words in one minute that begin with the letter F [ ] ____ (N ≥ 11 words)								__/1
ABSTRACTION	Similarity between e.g. banana - orange = fruit [ ] train – bicycle [ ] watch - ruler							__/2
DELAYED RECALL	Has to recall words WITH NO CUE		FACE [ ]	VELVET [ ]	CHURCH [ ]	DAISY [ ]	RED [ ]	Points for UNCUED recall only	__/5
Optional	Category cue							
	Multiple choice cue							
ORIENTATION	[ ] Date [ ] Month [ ] Year [ ] Day [ ] Place [ ] City							__/6

© Z. Nasreddine MD Version November 7, 2004 — Normal ≥ 26 / 30 — TOTAL __/30

www.mocatest.org — Add 1 point if ≤ 12 yr edu

http://www.mocatest.org/pdf_files/instructions/MoCA_alt_version_3_English-instructions-June_13_2011.pdf

Peanut Butter Test

- Alzheimer's typically affects your sense of smell because the olfactory cortex is the first to show signs of dysfunction
- Test = measure distance that peanut butter could be smelled through left vs right nostril
- (+) test = could not detect smell until 5" closer to the left compared to right nostril

Stamps, Journal of Neurological Sciences

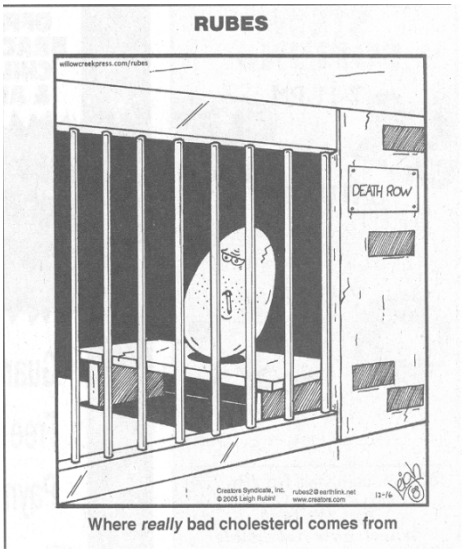
System Review

- Musculoskeletal
- Neuromuscular
- **Cardiovascular & Pulmonary**
- Integumentary
- Endocrine
- Urogenital

CV & Pulmonary Pathology

- Statins
- DVT => Pulmonary Embolus
- AAA
- Hypertension
- Dehydration
- Pneumonia

How do Statins work?



Where *really* bad cholesterol comes from

Adverse Effects of Statins

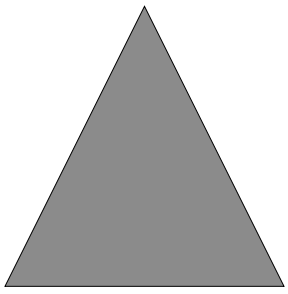
- Loss of muscular coordination
- Trouble talking & enunciating words
- Loss of balance
- Loss of fine motor skills (difficulty writing)
- Trouble swallowing
- Constant fatigue
- Joint & muscle aches & stiffness
- Vertigo & disorientation
- Blinding headaches

Promising New Drug?

- PCSK9 inhibitors
- Taken by injection 1-2x/month
- Shown to reduce "bad" cholesterol by 50-60%
- Potentially available towards the end of 2015

Virchow's Triad

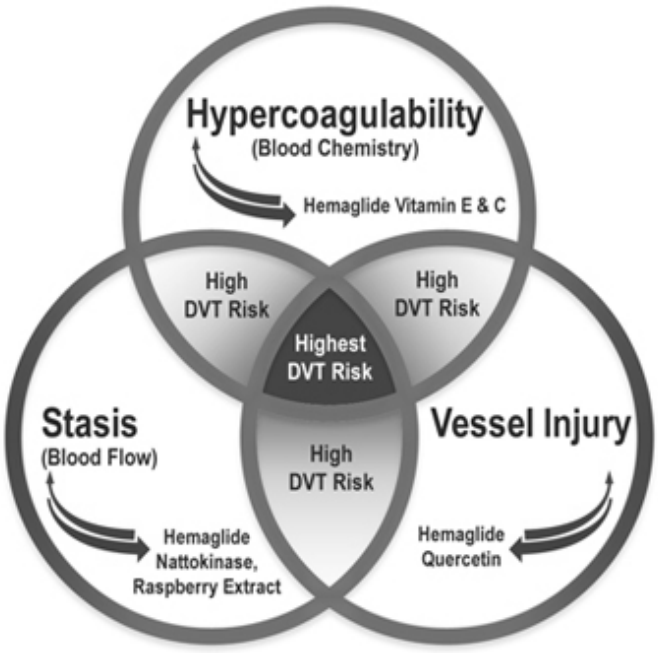
Localized Trauma



Venous Stasis
(causes venous dilation, intima damage, clotting factor)

Hypercoagulation
(dehydration, maligancy, oral contraceptives, smoking)

Muller & Teply, CSM 2010



VTE = VenoThomboEmbolism

- 2 million VTEs in USA per year
- 3rd only to CAD & CVA
- 10% of all hospital deaths
- 1st appear in superficial veins at valve/cusp
- 90% in long saphenous vein
- Proximal mortality > distal (knee=dividing pt)

Anand SS, Wells PS, Hunt D, et al., 1998; Autari, 1996

Homans Sign (dorsiflexion sign)

- Described a DVT as an "insecure thrombus waving in the current"
- Statistics:
  - 42% predicted with Homans
  - 59% predicted with S & S
  - 41% had chest pain 1st

Need a better tool

Homan, 1934; Allen et al, 1943; Wells, 1997

Wells Clinical Score for Deep Vein Thrombosis	
Clinical Parameter Score	**Score**
Active cancer (treatment ongoing or within 6 months)	**+ 1**
Paralysis or recent plaster immobilization of LE	**+ 1**
Recently bedridden for >3 days or major surgery < 4 weeks	**+ 1**
Localized tenderness along the distribution of the deep venous system	**+ 1**
Entire leg swelling	**+ 1**
Calf swelling > 3 cm compared to the asymptomatic leg	**+ 1**
Pitting edema (>asymptomatic leg)	**+ 1**
Previous DVT documented	**+ 1**
Collateral superficial veins (nonvaricose)	**+ 1**
Alternative diagnosis (as likely or > that of DVT)	**- 2**

Modified Wells Score

Additional feature:

- Previously documented DVT +1

Results:

- Similar accuracy (Wells vs Modified Wells)
- No added benefit

Engelberger et al, 2011

VTE = VenoThomboEmbolism

- After neurosurgery = risk as high as 50% & remains in hypercoagulation state for weeks
- COPD increases risk due to immobility
- General mortality rate
  - 1.04% during the weekend
  - 0.66% during the week

Anand SS, Wells PS, Hunt D, et al., 1998; Autari, 1996; Paramo

Strong Risks of DVT

- Fracture – pelvis, femur, tibia
- Total joint replacement
- Major surgery
- Major trauma
- SCI

Heick & Farris, 2015

Additional Risks of DVT

- AIDS
- Varicose veins
- Pacemakers
- Pregnancy
- Obesity
- Acute myocardial infarction
- Long airline flights (> 2 hrs)
- Recent central venous catheterization
- Blood type A
- Anti-thrombin deficiency
- Oral contraceptives

Anand SS, Wells PS, Hunt D, et al., 1998

DVT Morbidity & Mortality

30% of patients will suffer recurrent DVT within the next 10 years, greatest risk in the first 2 years

CSM 2010

Clinical Pearl #1

- Performing 1 minute of active ankle pumping decreases venous stasis & increases venous blood flow for up to 30 minutes after exercise

McNally & Mollan, 1997

Clinical Pearl #2

- ASA works via an irreversible binding of COX-1 enzyme rendering the platelet permanently unable to aggregate
- NSAIDs do the same on a reversible basis with inhibition related to half-life (2-12 hrs)
- **ASA (not enteric-coated) should be taken at least 30-minutes before or more than 8 hours after ibuprofen (NSAID) to avoid attenuation of ASA effect**

Gengo FM , et al. Effects of Ibuprofen on the Magnitude & Duration of Aspirin's Inhibition of Platelet Aggregation. Clinical Pharmacology. 2008;48:117-122
Yokoyama H, et al. Influence of Non-steroidal Anti-inflammatory Drugs on Antiplatelet Effect of Aspirin. Journal of Clinical Pharmacy & Therapeutics. 2013;38:12-15

Signs & Symptoms of a PE

- Angina-like pain or crushing chest pain
- Dyspnea, wheezing, rales
- ↓ BP
- Hemoptysis, chronic cough
- Fever
- Tachypnea (> 16/min)
- Tachycardia (> 100/min)
- Diaphoresis

PE rates have increased 2.5x in the last decade
(Stein, 2010)

Conditions that Mimic DVT

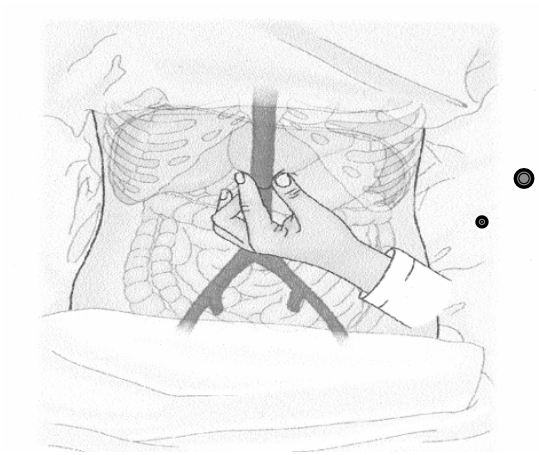
- Baker's cyst
- Sciatica
- Cellulitis
- Hematoma
- Myositis
- & more

Palpation of Aorta

- Supine with hips/knees flexed
- At the upper abdomen, half way between xiphoid & umbilicus, just (L) of midline, press firm & deep to palpate the pulsation of the aorta
- Place your thumb on 1-side & your index/middle finger on the other side
- Palpate for a prominent lateral expansion of the aorta (aortic aneurysm)
- **Red flag**: Aortic pulse width > 2 cm; Back pain with palpation; Bruit on auscultation

Bates B 1995; Boissonnault WG 2005; Munro J & Campbell I 2000

Palpation of Aorta



Gulick, DT Screening Notes, FA Davis, Phila, 2006

Clinical Signs of Hypertension

- Spontaneous epistaxis
- Occipital h/a
- Dizziness
- Visual changes
- Nocturnal urinary frequency
- Flushed face

Goodman, C, Snyder, T., 2000

Effects of Dehydration

Causes

- ↓ CNS fx with ↓ thirst
- Vomiting / diarrhea
- DM
- Excess sweating / fever
- Surgery
- Meds (diuretics)

Signs & Symptoms

- Altered mentation
- Lethargy / agitation
- Light-headedness or syncope
- Orthostatic hypotension
- Weakness

Pneumonia

One of the most common causes of death in elderly

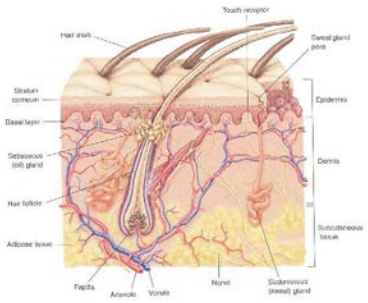
- Typical symptoms:
  - Productive cough (Rust-colored sputum)
  - **Fever**, chills
  - Pleuritic chest pain
  - SOB
- Additional symptoms:
  - Confusion
  - CHF
  - Anorexia
  - Change in sleep habits

System Review

- Musculoskeletal
- Neuromuscular
- Cardiovascular & Pulmonary
- **Integumentary**
- Endocrine
- Urogenital

Integumentary Pathology

- **Braden Scale for the Risk of Pressure Ulcers** http://www.bradenscale.com/braden.PDF
- **Cellulitis**
- **Herpes Zoster**



Braden Scale

Risk	1	2	3	4
Sensory Perception – Ability to respond meaningfully to pressure related discomfort	Completely limited	Very limited	Slightly limited	No impairment
Moisture – Extent to which skin is exposed to moisture	Completely moist	Moist	Occasionally moist	Rarely moist
Activity – Amount of physical activity	Bedfast	Chairfast	Walks occasionally	Walks frequently
Mobility – Ability to change or control body position	Completely immobile	Very limited	Slightly limited	No limitations
Nutrition – Usual food intake pattern	Very poor	Probably inadequate	Adequate	Excellent
Friction & Shear	Severe problem	Problem	Potential problem	No apparent problem

Scoring: The lower the score, the higher the risk of a pressure ulcer

Cellulitis

People at Risk

- Diabetes
- Circulatory problems
- Liver disease
- Eczema
- Psoriasis
- Severe acne
- Congestive heart failure

Cellulitis

Signs & Symptoms

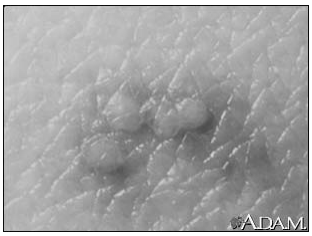
- **Recent skin disruption**
- Pain, swelling, warmth
- Erythema with streaks & vague borders
- Fever & chills
- Headache
- Low BP
- Enlarged lymph nodes
- Small red spots appear on top of reddened skin

Herpes Zoster

- 2/3 of pt. are > 50 y.o.
- Pain, tenderness, & paraesthesia in the dermatome may be present 3-5 days before vesicular eruption
- Prodromal pain may mimic cardiac or pleural pain
- Erythema & vesicles follow a dermatomal distribution
- Pustular vesicles from crusts lasting 2-3 weeks
- **Thoracic (50%)** & ophthalmic division of trigeminal nerve are most commonly affected regions
- Contagious via respiratory droplets or direct contact with blisters

Herpes Zoster

Acyclovir (oral or IV) should be administered within 72 hours of onset of rash

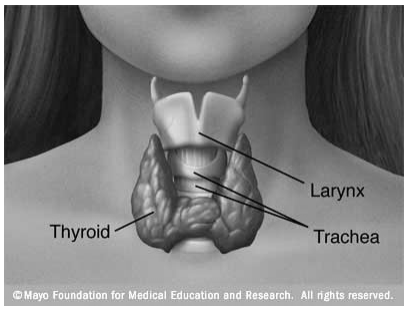


Rehberg & Rehberg, 2012

System Review

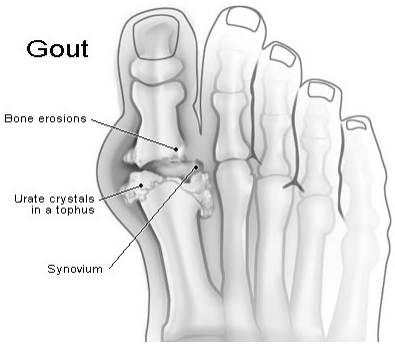
- Musculoskeletal
- Neuromuscular
- Cardiovascular & Pulmonary
- Integumentary
- **Endocrine**
- Urogenital

Endocrine Pathology



- **Gout**
- **Hypothyroidism**
- **Hyperthyroidism (Graves' Disease)**
- **Parathyroidism**

Gout

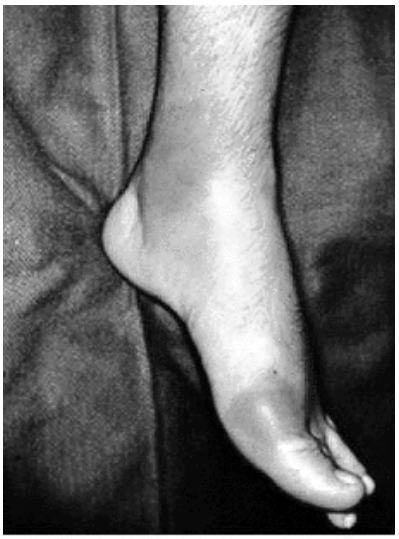


- Problem with ↑ purine leading to ↑ uric acid
- Uric acid:
  - 2/3 produced by body
  - 1/3 purines in food
- Foods high in purine = shellfish, organ meats, dried beans, peas, anchovies, high-fructose corn syrup
- Alcohol (especially beer) ↓ ability to get rid of purines

Hainer, Matheson, & Wilkes, 2014

Gout

- Rapid onset of sudden severe pain
- **Inflammation of 1st MTP**, knee, wrist, or elbow
- Redness, swelling
- Tenderness, hypersensitivity
- Fever, chills



Reprinted from the Clinical Slide Collection on the Rheumatic Diseases, copyright 1991, 1995, 1997. Used by permission of the American College of Rheumatology.

Gout

- Treatment
  - NSAID (Beware of GI bleeding)
  - Colchicine – take within 12 hours of attack (no analgesic properties)
  - Corticosteroids if NSAIDs & Colchicine are contraindicated (taper to avoid rebound flares)
- Medications that ↓ uric acid levels may also be used for prevention

Female sex hormones increase urinary excretion of uric acid so premenopausal women have a lower prevalence of gout

Hainer, Matheson, & Wilkes, 2014

Hypothyroidism

- ↓ Basal metabolic rate
- Dry skin
- Muscle / joint pain
- Proximal weakness
- Lethargy, depression, apathy
- Confusion
- Weight gain
- Edema around the eyes
- Loss of lateral eyebrow
- Cardiomegaly
- Constipation
- Cold intolerance
- Brittle nails
- Sparse/coarse hair
- Peripheral edema
- Jt effusion with Ca++ deposits
- CTS
- Slow healing
- Hoarseness
- **PR < 60 in untrained person**

Hyperthyroidism (Graves' Disease)

Patients ≤ 50 yo

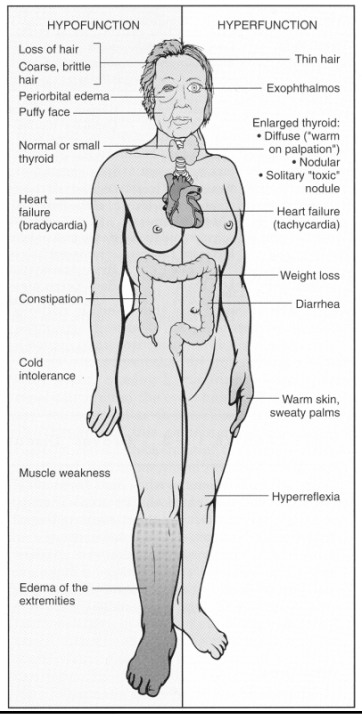
- Tachycardia
- Hyperactive reflexes
- ↑ Sweating
- Heat intolerance
- Fatigue
- Tremor
- Nervousness
- Polydipsia
- Weakness
- ↑ Appetite
- Dyspnea
- Weight loss

Patients ≥ 70 yo

- Tachycardia
- Fatigue
- Weight loss
- Tremor
- Dyspnea
- Apathy
- Anorexia
- Nervousness
- Hyperactive reflexes
- Weakness
- Depression
- ↑ Sweating
- Polydipsia

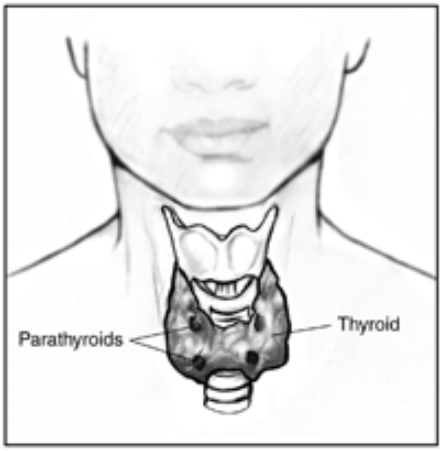
Trivalle et al 1996

Hypo- & Hyper- Thyroidism

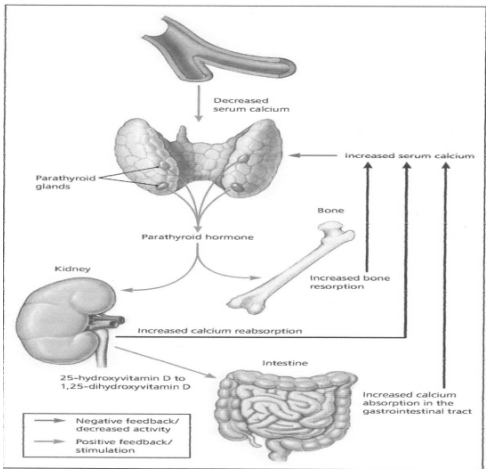


Parathyroid Gland

- 4 parathyroid glands
- Size & shape of a grain of rice
- Purpose = makes "parathyroid hormone" to control **ALL** Ca++ levels in the body
- Range = 8.8 – 10.2



PTH increases serum Ca++ via…



Michels & Kelly, 2013

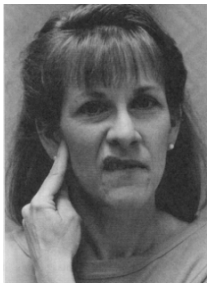
Hypo-Parathyroidism

- **VERY RARE**
- **Results from removal of all 4 glands**

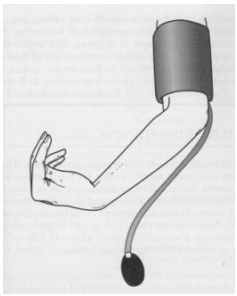
Hypocalcemia symptoms:

- Irritability
- Cardiac arrhythmia
- Skeletal muscle cramping
- Tingling in fingers
- Dry/scaly skin
- Pigment changes
- Thin hair & brittle nails
- (+) Chvostek's sign

Hypo-Parathyroidism



- (+) Chvostek's sign
  - Hyperirritability of facial nerve when tapped



- (+) Trosseau's sign
  - Carpal spasm when inflated BP cuff is maintained between DBP & SBP for 3 minutes

http://search.mywebsearch.com/mywebsearch/video.jhtml?searchfor=video+of+Chvostek%E2%80%99s+sign&ts=1370384439601&p2=^ZU^xdm918^S05006^us&n=77D[illegible]857&ss=sub&st=hp&ptb=38927557-9786-402E-B964-B08D0BA2A7C6&tpr=[illegible]&si=eclwf100130&vid=kvmwsTU0InQ

Hyper-Parathyroidism

- 1 gland "**goes bad**" in 91% of the time
- 2 glands in 8%
- 3 or 4 glands in 1%

- affects nearly
  - 1 in 500 women
  - 1 in 2000 men
- most often in the 5th, 6th & 7th decades of life

Hyper-Parathyroidism

- When the gland grows or develops a benign tumor, it makes too much PTH
- Excess hormone takes Ca++ out of the bone & into the blood

Hyper-Parathyroidism

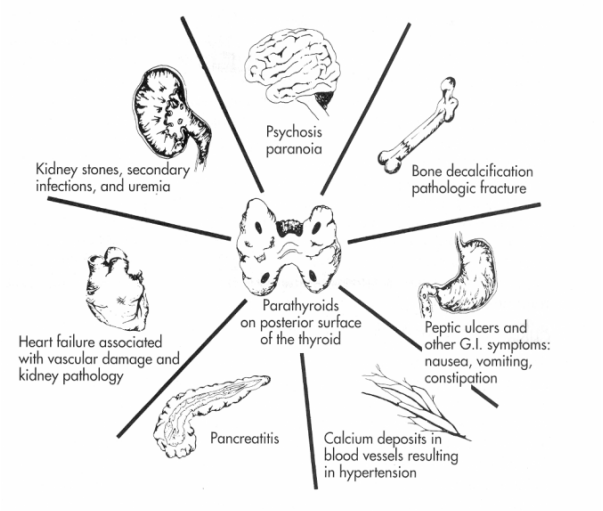
High Ca++ levels:

- Make you feel bad
- Ruins kidneys, liver, & arteries
- Causes strokes & cardiac rhythm problems
- Causes kidney stones & osteoporosis
- Increased chance of cancers: breast, kidney, & prostate

Hyper-Parathyroidism

- ↑ DTRs
- Fatigue, drowsiness
- Proximal weakness
- Arthralgia/myalgia
- Reflux/Peptic ulcer
- Kidney stones
- ↑ BP
- Heart palpitations
- Pancreatitis, Gout
- Thinning hair
- Mental slowing or memory px
- Emotional irritability
- Hypercalcemia
- Difficulty sleeping
- Headaches

Result of Excess Parathyroid Hormone



10 Parathyroid Rules of Norman

- There are no drugs that will make parathyroid disease better….**NONE**.
- Nearly **ALL** parathyroid patients have symptoms; 95% know it-- & feel bad. Most of the rest just don't know it until the disease is fixed.
- Symptoms of parathyroid disease do **NOT** correlate with the level of calcium in the blood. Many patients with only slightly elevated Ca++ & PTH will have **BAD** symptoms & develop severe osteoporosis.
- **ALL** patients with parathyroid disease have Ca++ levels & PTH levels that go up & down. Fluctuating levels of Ca++ are typical of parathyroid disease.
- All patients with hyperparathyroidism will develop osteoporosis. **ALL**

New York Times, 1998

10 Parathyroid Rules of Norman

- Taking Fosamax, Actonel, Boniva, or Reclast (etc) will **NOT** help bones that are being attacked by a bad parathyroid. These osteoporosis drugs have no place in the treatment of parathyroid disease.
- Parathyroid disease will get worse with time in **ALL** patients. It will not stay the same, nor will it get better on its own.
- There is only one treatment for hyperparathyroidism: **Surgery**
- Nearly **ALL** parathyroid patients can be cured with a minimal operation.
- The success rate & complication rate for parathyroid surgery is **VERY** dependent upon the surgeon's experience.

New York Times, 1998

Parathyroid Surgical Outcome

- Osteoporosis begins to improve immediately
- Bone pain resolves in 6–12 hours
- Acid reflux is gone in 2–4 days
- Headaches gone in 1 week
- HTN is better in a few weeks
- Arrhythmias subside within 1 month
- CNS symptoms improve in 1–2 months
- Hair loss resolves in 3–4 months

System Review

- Musculoskeletal
- Neuromuscular
- Cardiovascular & Pulmonary
- Integumentary
- Endocrine
- **Urogenital**

Urogenital Pathology

- Pain with micturition
- Leukocytes & bacteria in urine (white casts)
- Cloudy urine
- Back pain
- Fever, chills
- Nausea
- Loss of appetite
- Pain with percussion over kidneys

Incontinence

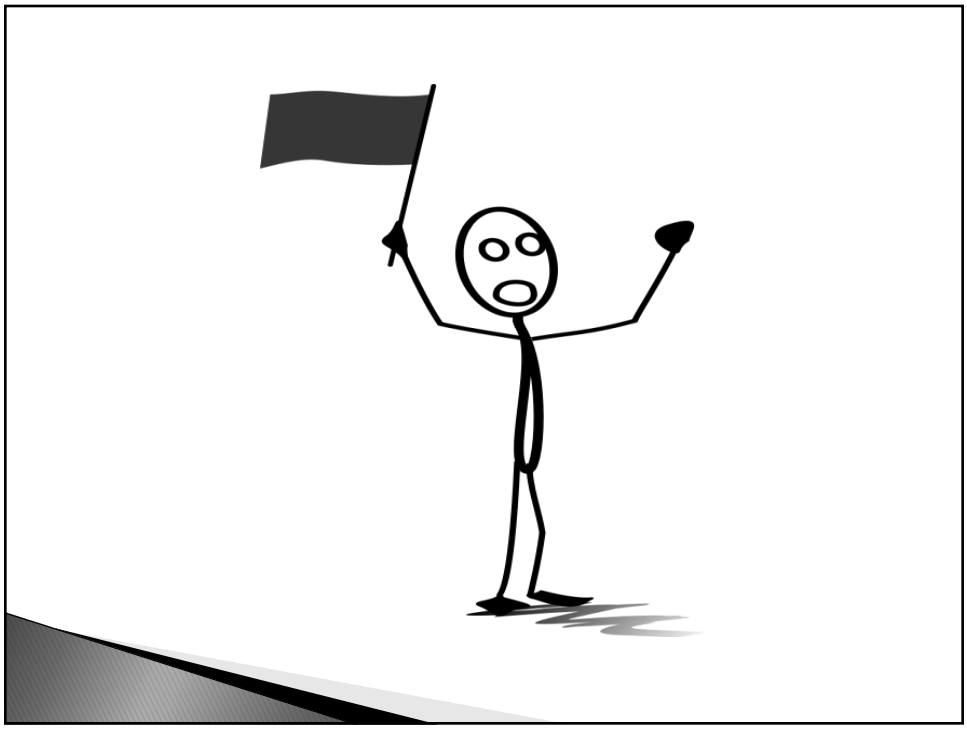
- **Quality of Life Issue**
  - Embarrassment; decreased socialization
  - Burden of care
  - Risk of falls
  - Cost

Resch & Diedrich, 2009

Incontinence

- **Characteristics**
  - 40% from 60-80 years old
  - 36% after 3+ children
  - 26% with BMI over 25
  - 26% diuretics
  - 18% after hysterectomy (prostate)
- **Medications:**
  - Diuretics can increase frequency & urge
  - Ca++ channel blockers increase retention
  - Antidepressants cause incomplete emptying

Roher et al, 2005



~2014 US New Cancer Cases

Men		Women	
Prostate	27%	Breast	29%
Lung-Bronchus	14%	Lung-Bronchus	13%
Colon-Rectal	8%	Colon-Rectal	8%
Urinary Bladder	7%	Uterine	6%
Skin Melanoma	5%	Thyroid	6%
Kidney	5%	Lymphoma	4%
Lymphoma	4%	Skin Melanoma	4%
Oral-Pharynx	4%	Kidney	3%
Leukemia	4%	Pancreas	3%
Liver-Bile Duct	3%	Leukemia	3%

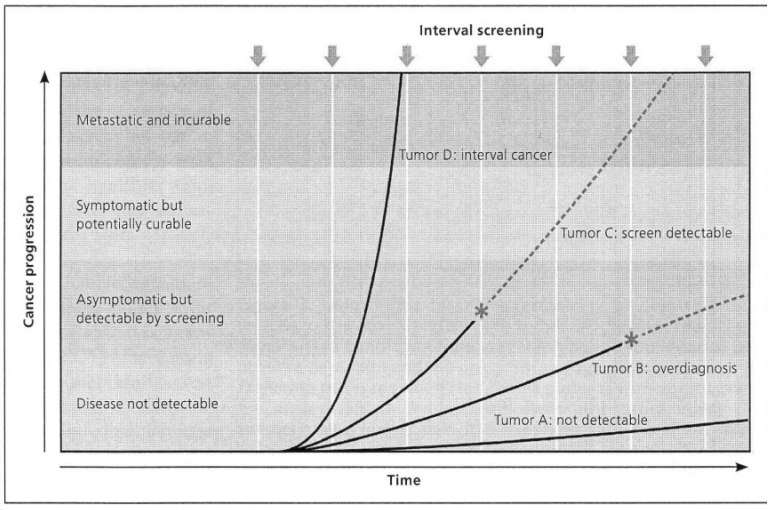
American Cancer Society, 2014

~2014 US Cancer Deaths

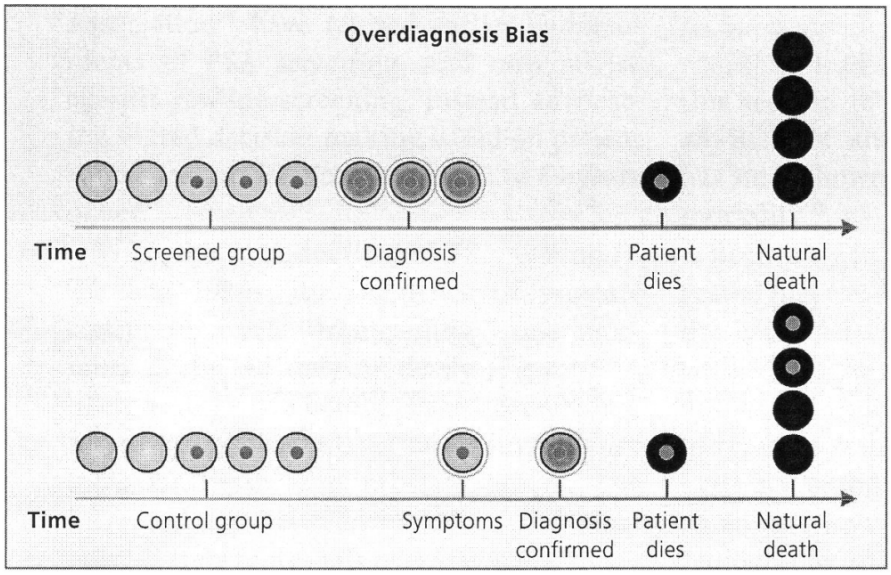
Men		Women	
Lung-Bronchus	28%	Lung-Bronchus	26%
Prostate	10%	Breast	15%
Colon-Rectal	8%	Colon-Rectal	9%
Pancreas	7%	Pancreas	7%
Liver-Bile Duct	5%	Ovary	5%
Leukemia	5%	Leukemia	4%
Esophagus	4%	Uterine	3%
Bladder	4%	Lymphoma	3%
Lymphoma	3%	Liver	3%
Kidney	3%	Brain	2%

American Cancer Society, 2014

Screen Detection & Tumor Growth Rate



Gates, 2014



Patz, Goodman & Bepler, 2000

Cancer Risk Factors

- Internal
  - Hormones
  - Immune conditions
  - Inherited mutations (BRCA)
- External
  - Chemicals & Radiation
  - Viruses, Smoking, Alcohol
  - Sexual Behaviors
  - Diet

Early Warning Signs of Cancer

- **C** = Change in bowel & bladder
- **A** = A sore that fails to heal in 6 weeks
- **U** = Unusual bleeding or discharge
- **T** = Thickening/lump (breast or elsewhere)
- **I** = Indigestion or difficulty swallowing
- **O** = Obvious change in wart or mole
  - **A** = Asymmetrical shape
  - **B** = Border irregularities
  - **C** = Color – pigmentation is not uniform
  - **D** = Diameter > 6 mm
  - **E** = Evolution (change in status)
- **N** = Nagging cough or hoarseness (rust colored sputum)

Goodman, C, Snyder, T. Differential Diagnosis in Physical Therapy, WB Saunders Co, Phila, 3rd ed, 2000

Monohemispheric Brain Tumor

- The purpose of the study was to determine the sensitivity & specificity of 13 clinical tests for detection of subtle motor deficits in patients with unilateral brain tumors
- Summary:
  - Sensitivity = 1 – 51%
  - Specificity = 70 – 100%

Maranhao, Maranhao-Filho, Lima, & Vincent, 2010

Clinical Tests

- Spasticity of conjugate gaze
- Platysma sign
- Forearm rolling test
- Finger rolling test
- Digit quinti sign
- Souques interosseous sign
- Pronator drifting test
- Mayer sign
- Finger tapping sign
- Digit quinti rolling sign
- Foot tapping test
- Babinski sign
- Chaddock sign

Clinical Test	Maneuver	Positive Sign
Forearm rolling	Make fists, hold forearms horizontal & roll arms	1 arm orbits around other
Finger rolling	Use index fingers pointing towards each other ~ 1 finger length apart; roll fingers	1 finger orbits around other
Souques interosseous sign	Pt raises both UE to 180° of shoulder flexion	Involved fingers ext & abd
Finger tapping	Index finger to thumb IP quickly x 10 sec	> 5 rep difference
Foot tapping	Sit, knee & ankle @ 90°, keep heel on floor & tap foot x 10 sec	> 5 rep difference
Babinski sign	Stimulate lateral plantar surface with blunt object	Extension of great toe

Clinical Test	Sens	Spec	PPV	NPV
Forearm rolling	16%	100%	100%	37%
Finger rolling	41%	93%	92%	44%
Souques interosseous sign	23%	80%	70%	34%
Finger tapping	18%	90%	78%	35%
Foot tapping	23%	93%	87%	37%
Babinski sign	8%	100%	100%	35%

Maranhao, Maranhao-Filho, Lima, & Vincent, 2010

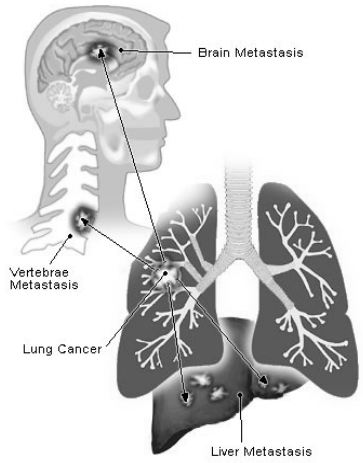
Signs & Symptoms Associated with the Most Common Primary Sites of Metastatic Tumors

- **Lung**
- **Prostate**
- **Renal**
- **Breast**
- **Colon**

Boissannault WG & Bass C. JOSPT, 1990

Lung

- > 60 yrs old
- Smoker
- C-spine, shoulder, & chest pain
- TOS symptoms
- Chronic cough
- Bloody sputum
- Wt loss; Malaise
- Fever
- Dyspnea; Wheezing
- Fecal breath odor
- Neural symptoms 2° spinal fluid mets



Lung Cancer and Metastasis

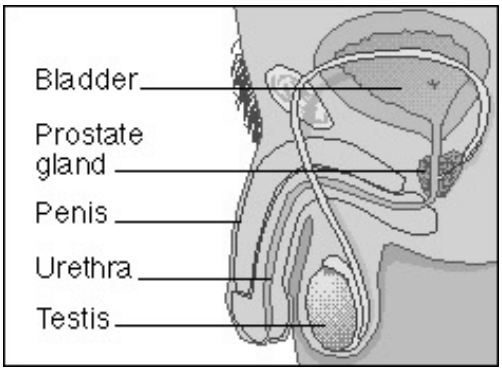
Prostate

- In 2012, there were about 240,000 cases of prostate cancer in the United States & more than 28,000 related deaths
- Men in USA have a 16.5% lifetime risk for prostate cancer

American Cancer Society. Prostate cancer. March 12, 2015.

Prostate

- > 50 yrs old
- L/S pain
- Frequent urination
- Weak urine stream
- Difficulty starting urination
- Sacral plexus symptoms



Prostate

- Only about 30 percent of the time does an elevated PSA indicate prostate cancer

PSA levels:

40 - 49 yo = 0 - 2.5

50 – 59 yo = 0 – 3.5

60 – 69 yo = 0 – 4.5

70 – 79 yo = 0 – 6.5

- Guidance falls between the extremes of "testing nobody" and "testing everybody," Peter Carroll, MD (*Medscape Medical News)*

PSA Testing

- The updated guidelines state that men should generally be referred for a prostate tissue biopsy when their PSA > 3 ng/mL.
- This creates problems
- PSA ↑ with age, & using this low threshold will ↑ the number of false-(+) tests & subject men to the harms of biopsy
- Repeat the blood work first
- The AUA suggests a biopsy threshold of 10 ng/mL to reduce these risks

National Comprehensive Cancer Network (NCCN); Dr. Richard Hoffman

PSA Testing

- Best evidence supports the use of serum PSA for the early detection of prostate cancer
- However, the specifics of when, who, & how often to perform PSA testing "remain major topics of debate"
- So how did the NCCN decide on age 45?

National Comprehensive Cancer Network (NCCN)

PSA Testing

- Panel members uniformly agreed that PSA testing should **only** be offered to men with a life expectancy >10-15 years
- If there is a life expectancy < 5 years, we have to question the value of any cancer screening
- Acute prostatitis can cause a transient rise in PSA levels for about 48 hours

Renal

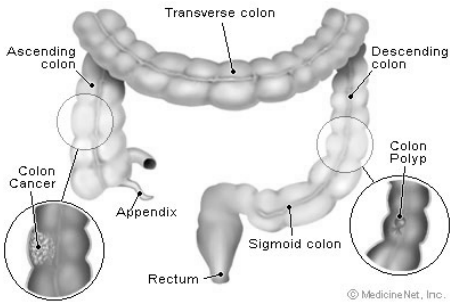
- 55-60 yrs old
- Hematuria
- Wt loss
- Malaise
- Fever
- Palpable posterior lateral abdominal mass

Breast

- 20–50 yrs old & > 65 yrs old
- Nipple discharge
- Dimpling of breast
- Palpable mass
- Brachial plexus symptoms

Colon

- > 50 yrs old
- Abdominal pain
- Lumbosacral pain
- Change in bowel habits
- Bloody stools
- Malaise
- Wt loss
- Pain unaffected by position



Colon Cancer and Polyp

Statins & Lower Cancer Mortality; Risk Cut by Up to a Half

- Statin use was associated with:
  - Women = 22–55% reduction in various CA deaths
  - Men = study looked at statin use together with the antidiabetes medication metformin & found a 40% reduction in prostate cancer mortality
- Researchers speculate that statins interfere with cell growth & metastasis by blocking cholesterol production, thereby affecting molecular pathways & inflammatory response

American Society of Clinical Oncology 2015 Annual Meeting; Medscape, June 2015

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