



# *Therapists Moving Forward: Screening for Disease*

2006 COA Conference  
Therapist Category

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# Purpose of this lecture

- 1. Review evaluation principles that will aid the therapist in differentiating between mechanical musculoskeletal problems and pathologic conditions
- 2. Review the concepts of 'Medical Screening Review' and provide visuals/forms which may provide an efficient means of gathering information and performing a systems review
- 3. Provide an evidence-based approach to detecting disease in low back and upper quarter patients

# Handouts

- Sample medical screening form
- Specific Screening Questionnaires:
  - Elbow, wrist, and hand
  - Cervical spine and shoulder
  - Low Back
  - Thoracic spine
  - Pelvis, hip and thigh
  - Knee, calf, ankle, and foot
- Organ Systems Review Questionnaires:
  - GI, urogenital, cardiovascular, and pulmonary

# Case Study

- 28 y/o Active duty Army SGT
- Reason for visit: can't pass a PT test. Requesting gradual exercise program.
- Constitutional symptoms: nausea, malaise, difficulty sleeping, later abdominal pain

# Case study

- Results: Splenomegaly secondary to Non-Hodgkin's lymphoma
- Treatment: chemotherapy and later bone marrow transplant

# Therapists: Clinical Role

- Clinicians responsible for:
  - Taking an appropriate history
  - Generating a working diagnosis
  - Performing a clinically relevant physical examination
  - Confirming or disputing our working diagnosis
  - Categorizing the patient into an appropriate treatment category
  - \*\*\* Screen for conditions that may impact our treatment or are not appropriate altogether

# With patient trust, comes great personal responsibility

- As clinicians, we must be able to:
  - Identify patients who require immediate referral
  - Identify patients who require non-emergent referral, but still may benefit from rehabilitation
  - Identify patients in which we can treat

# Where should we focus?

- Research consistently leans towards patient demographic information, location of symptoms, and historical information as the most important information leading us to an underlying disease process/condition



# How do we do this?

- Medical Screening Review
  - 1. Medical History Screening form
  - 2. Well-planned patient interview
  - 3. Directed physical examination
  - 4. Additional regional systems review as needed

# Example: Medical History Screening Form (Modified from Brooke Army Medical Center's Physical Therapy Dept)

## MEDICAL HISTORY SCREENING FORM, Physical Therapy, BAMC

Circle YES or NO...

Have you or any immediate family member ever been told you have:.....

	<u>Self</u>	<u>Family</u>
<input checked="" type="checkbox"/> Cancer ? .....	Yes.....No	Yes..... No
Diabetes ? .....	Yes ....No	Yes..... No
High blood pressure ? .....	Yes ....No	Yes..... No
Heart disease ? .....	Yes.....No	Yes..... No
Angina/chest pain ? .....	Yes.....No	Yes..... No
Stroke ? .....	Yes.....No	Yes..... No
Osteoporosis ? .....	Yes ....No	Yes..... No
Osteoarthritis ? .....	Yes.....No	Yes..... No
Rheumatoid arthritis ? .....	Yes.....No	Yes..... No

In the past 3 months have you had or do you experience:

- A change in your health ? .....
- Nausea/Vomiting ? .....
- Fever/chills/sweats ? .....
- Unexplained weight change ? .....
- Numbness or tingling ? .....
- Changes in appetite ? .....
- Difficulty swallowing ? .....
- Changes in bowel or bladder function ? .....
- Shortness of breath ? .....
- Dizziness ? .....
- Upper respiratory infection ? .....
- Urinary tract infection ? .....

Are you currently:

- Pregnant ? .....
- Depressed ? .....
- Under Stress ? .....

Check all that apply...I currently have difficulty

- Driving
- Getting up from a chair
- Walking
- Bending at the waist
- Standing
- Lifting

If you are accustomed to regular exercising check the ones that give you difficulty now

- Playing Sports
- Running
- Calisthenics

Circle YES or NO

Do you have a history of:

- Allergies/Asthma ? .....
- Headaches ? .....
- Bronchitis ? .....
- Kidney disease ? .....
- Rheumatic fever ? .....
- Ulcers ? .....
- Sexually transmitted disease ? .....
- Seizures ? .....

Are your symptoms: (check one)

- Getting worse
- The same
- Improving

How are you able to sleep at night? (check one)

- Fine
- Moderate difficulty
- Only with medication

Check all that apply...

Do you have a problem with ... (check all that apply)

- Hearing
- Vision
- Speech
- Communication

How do you learn best?

- Seeing
- Doing
- Hearing

Do you or have you in the past smoked tobacco?

YES NO

If yes, \_\_\_\_\_ Packs x \_\_\_\_\_ Years.  
Last tobacco use \_\_\_\_\_

Do you drink alcoholic beverages? YES NO

If yes, \_\_\_\_\_/week.

Date of last physical examination \_\_\_\_\_

List medications currently using:

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# Example: Medical History Screening Form

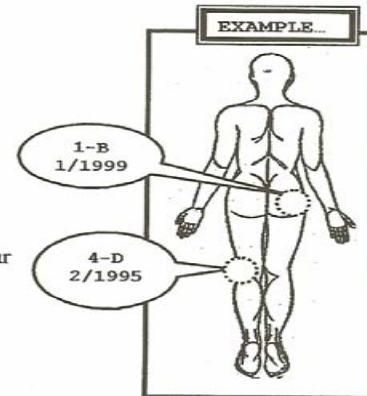
## Please Create A Chart Of Your CURRENT Symptoms (See Example)

► This list provides some examples of words that may help describe your pain. **USE ALL THAT APPLY.**

#1.....Sharp	#5.....Throbbing	#9.....Heavy
#2.....Shooting	#6.....Ache	#10.....Tight
#3.....Burning	#7.....Tingling	#11.....Pulling
#4.....Dull	#8.....Numb	#12.....Stabbing

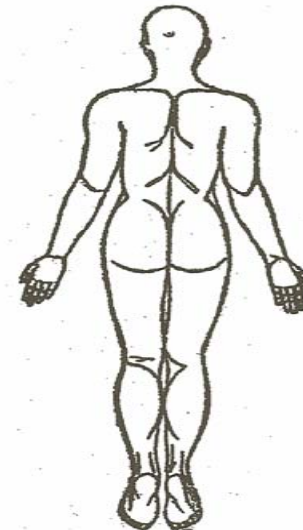
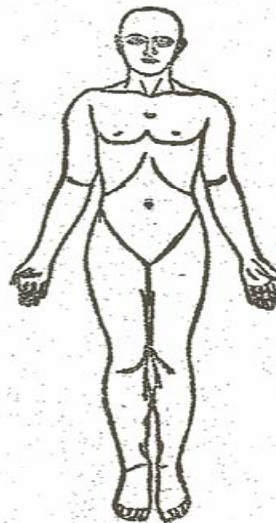
► This list provides words that may help describe the behavior of your symptoms. **USE ALL THAT APPLY.**

- A. **constant** (*never goes away*)
- B. **intermittent** (*relieved with some positions or rest*)
- C. **occasionally** (*daily or less frequent*)
- D. **infrequently** (*once a week or month*)
- E. **previously** (*no longer present*)
- F. **variable** (*sometimes worse than other times*)

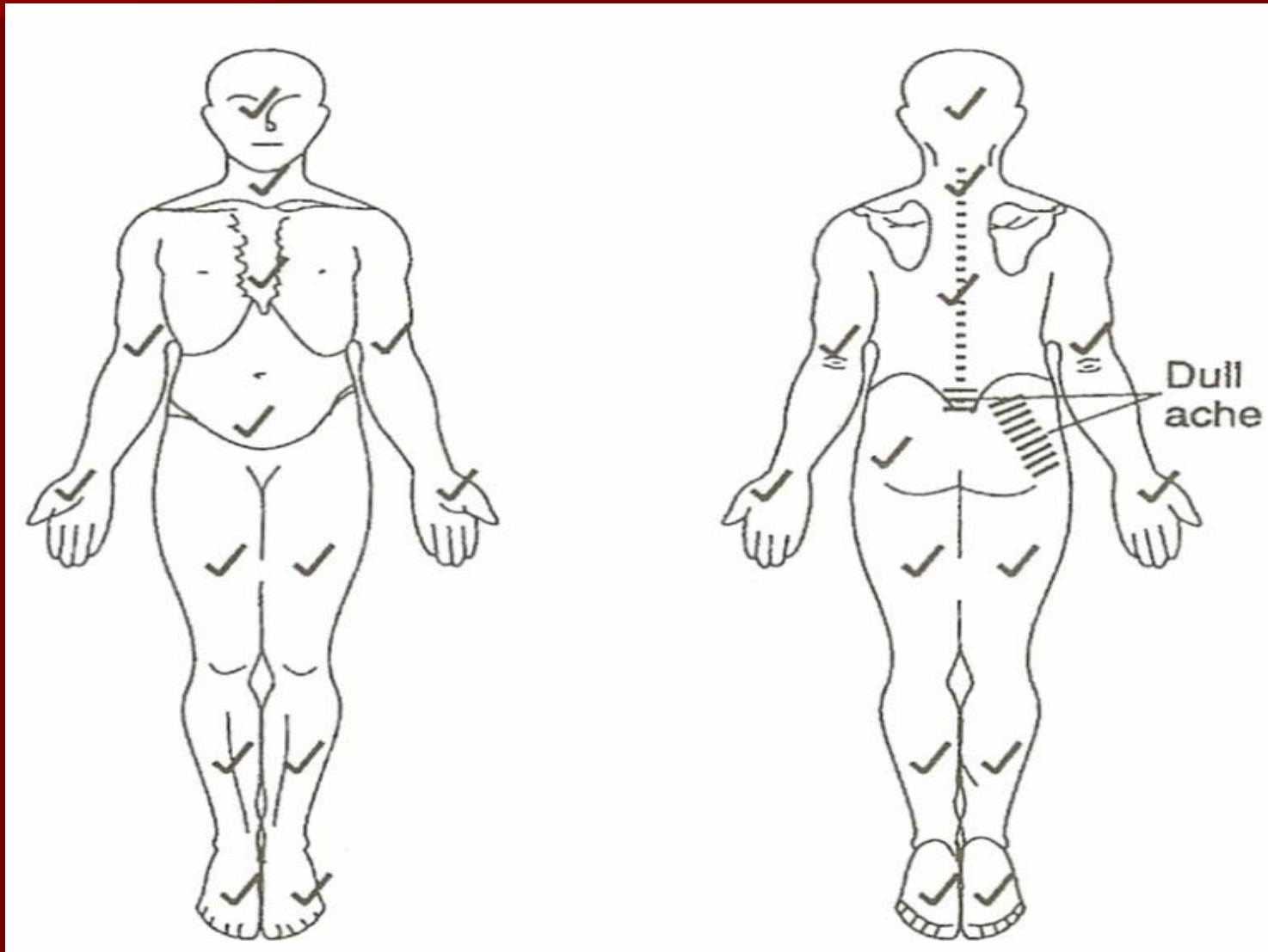


### **INSTRUCTIONS:**

1. Draw each area of your pain or other symptoms onto the chart.
2. Choose the corresponding number and letters from the previous lists to describe your symptoms or use your own words.
3. Put the date each area of symptoms started for this episode to the best of your memory.



# Sample: Body chart Boissonnault



# Regional Medical Systems Review<sub>(Boissonnault 2000)</sub>

- Regional Review of Systems
  - Using a checklist
  - Each major body system
- Raise suspicion if:
  - Patient answers “yes” to one or more items
  - Physician is unaware of complaint
  - If complaint is steadily worsening

# When should you use the regional/advanced medical screening checklists?

- Each breakdown of systems has a relatively consistent and predictable pain pattern
  - Shoulder girdle, thoracic region
    - Screen cardiovascular, pulmonary, & GI system
  - Thoracolumbar region
    - Screen cardiac, pulmonary, GI, and urogenital
  - Lumbar/Pelvic
    - Screen cardiac, GI, and urogenital

# Flags and their meaning

- Nausea/Vomiting
  - GI system, pregnancy, cancer, medication side effects
- Fever/chills/sweats: many common ailments to include: flu, occult infection, or cancer
- Unexplained weight change
  - 5% over a 4 week period
  - Variety of ailments to include: GI disorders, diabetes, hyperthyroidism, adrenal insufficiency, common infections, malignancies, and depression
- Numbness and tingling
  - Indicative of nerve irritation or compression, may also indicate malignancy
- Syncope
  - Sudden but temporary loss of consciousness
  - Associated with inadequate blood flow to the brain

# Flags and their meaning

- Difficulty swallowing\*
  - Neurologic disorder, tumor, fracture, pericarditis
- Changes in bowel or bladder function
  - Urinary retention or complete inability to retain = cauda equina
  - Increased frequency/dysuria = urogenital dysfunction
  - Blood in stool = dark could indicate GI bleed, bright red is likely external i.e. hemorrhoid
  - Blood in urine = infection, urogenital dysfunction
- Dizziness/lightheadedness
  - Medication side effects, hypoglycemia, cardiovascular dysfunction, BPPV



# Flags and their meaning

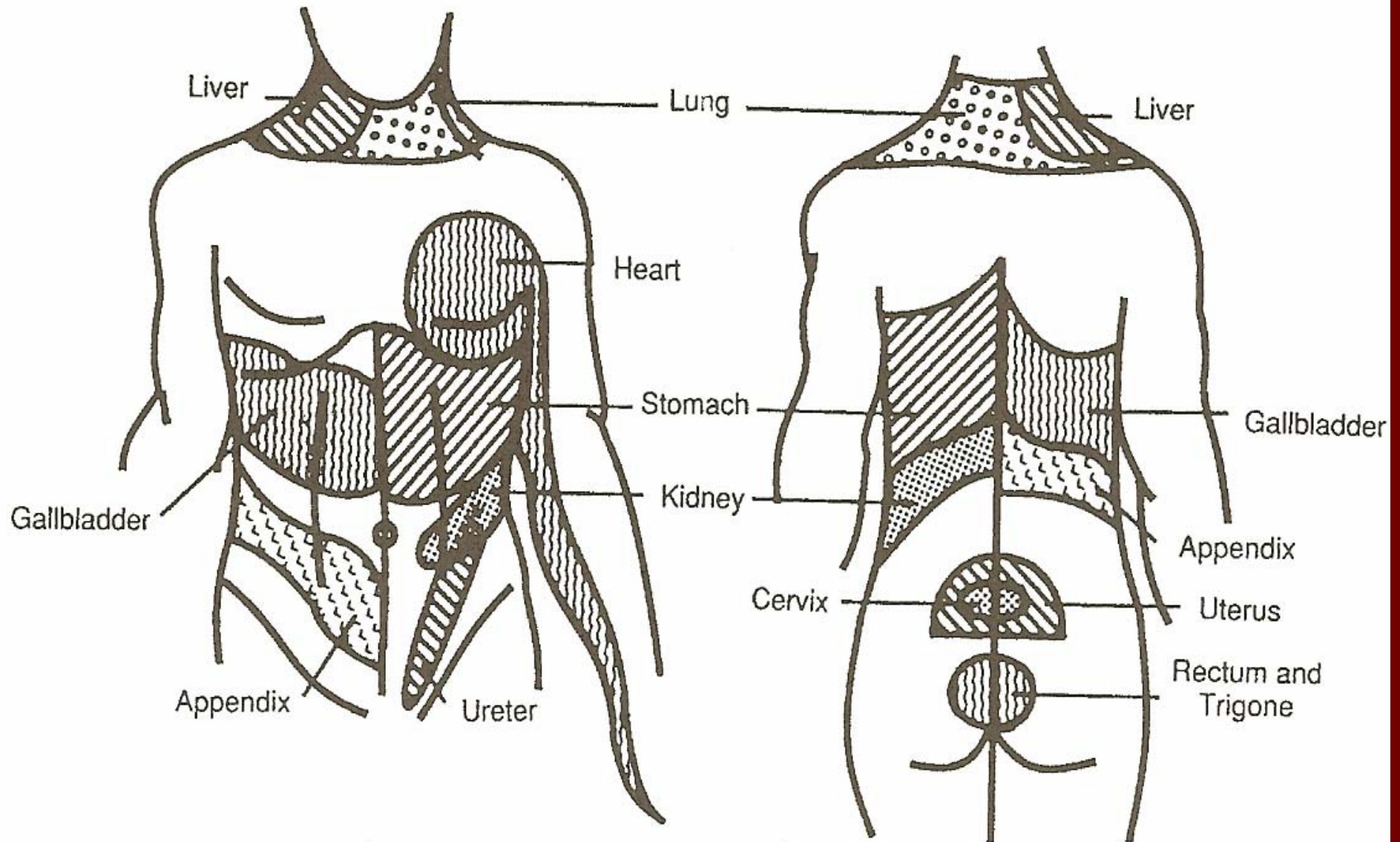
- Dyspnea/SOB/Upper respiratory infection
  - Indicative of cardiovascular or pulmonary dz
- Urinary tract infection
  - Can cause increased urinary frequency, blood in urine, also may develop into kidney infection and may present as low back pain due to referral or actual infection proceeding to that region
  - Osteomyelitis may result in deep, dull, central LBP can start with a UTI
- Allergies/Ulcers/Kidney Disease
  - can all affect medications patient should not use
  - (i.e. NSAIDS or medication they are allergic to)
- Rheumatic Fever\*

# Flags and their meaning

- Kidney disease may present as flank pain
- Ulcers may present as mid-thoracic pain\*
- Sexually transmitted diseases:
  - i.e. painful urination and inflamed joints should raise awareness in a sexually active individual
  - Gonorrhoea can spread through the bloodstream and inflame joints – immediate referral required
  - Chlamydia can present as back pain
- Abdominal pain may indicate a visceral origin

# Possible local and referred pain patterns of visceral structures

Boissonnault



# Segmental Innervation and Pain Referral Sites

Koopmeiners, MD

<b>STRUCTURE</b>	<b>Segmental Innerv.</b>	<b>Pain Referral Site</b>
Heart	T1-T5	Ant cerv., upper t-spine, left UE
Lungs	T5-T6	Ipsilateral T-spine, cervical
Diaphragm	C3-C5	Cervical Spine
Esophagus	T4-T6	Substernal & upper abdominal
Stomach	T6-T10	Upper abd, mid-low t-spine
Small Intestine	T7-T10	Mid T-spine
Pancreas	T6-T10	Upper abd, low thoracic, upper lumbar

# Segmental Innervation and Pain Referral Sites

## Koopmeiners, MD

<b>STRUCTURE</b>	<b>Segmental Innerv.</b>	<b>Pain Referral Site</b>
Gallbladder	T7-T9	R upper abd, right mid-low t-spine, caudal scapula
Liver	T7-T9	Right mid-low t-spine
Bile Duct	T6-T10	Upper abd, mid t-spine
Large Intestine	T11-L1	Lower abd., mid lumbar
Kidney	T10-L1	Ipsi Lumbar, upper/lower abdomen
Bladder	T11-L2, S2-S4	Sacral apex, suprapubic, thoracolumbar

# Segmental Innervation and Pain Referral Sites

Koopmeiners, MD

<b>STRUCTURE</b>	<b>Segmental Innerv.</b>	<b>Pain Referral Site</b>
Prostate Gland	T11-L1, S2-S4	Sacral, testes, thoracolumbar spine
Testes	T10-T11	Lower abdominal, sacral
Uterus	T10-L1, S2-S4	Lumbosacral junction, thoracolumbar
Ovaries	T10-T11	Lower abdominal, sacral

Saunders text

# Visceral Disease

- Beware of poorly localized, dull, vague sensation
- Cramping, colicky pain – smooth muscle spasm
- Throbbing, cramping, aching, pressure, tightness – potentially cardiovascular
- Red flag: symptoms that do not vary with activity or rest
- Night pain

# Visceral Disease

- The behavior of an organ will depend on it's function
  - Gallbladder disease
  - Peptic ulcer
  - Kidney stones



# Prevalence of cancer

- Prevalence of cancer (CA):
  - In the United States 1 in 4 will have cancer  
(Goodman text)
  - 1,248,900 cases diagnosed in 2002 (SEER estimate)
  - 78.9 million CA survivors in United States
  - Prevalence in LBP: .67% (7 people in 1000)
  - Wong et al found that 36% of patients with a known malignancy will have a metastatic tumor

# Imaging utility in detecting cancer

## ■ Plain films:

- Sensitivity = .6 Specificity = .95-.99
- +LR = 12-100 - LR = .4

## ■ Bone scan (NMBS)

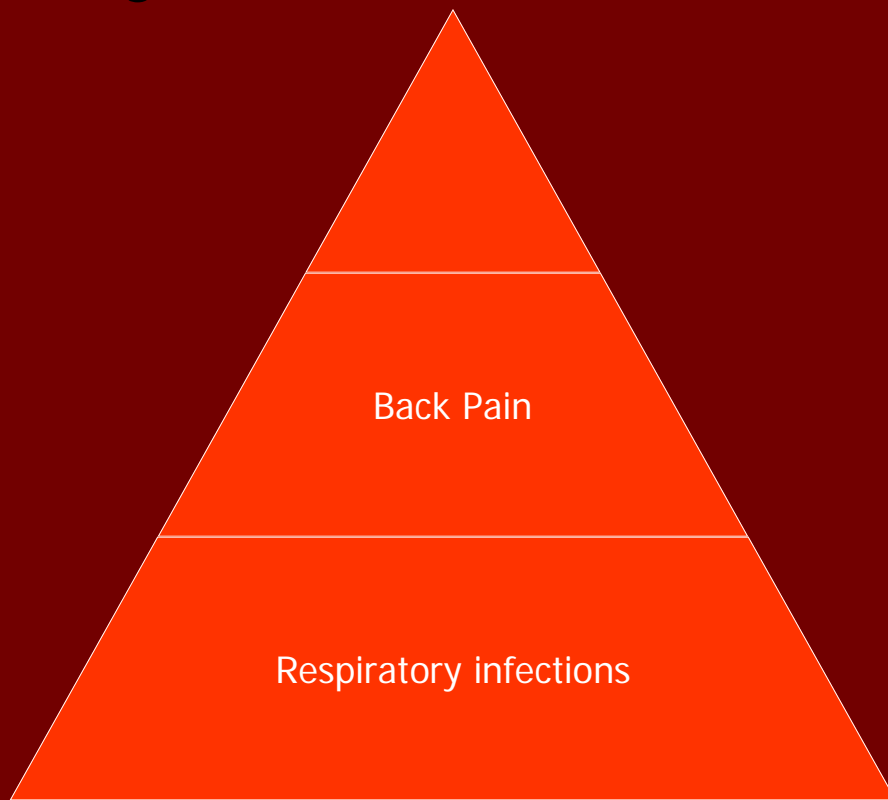
- Uses contrast to detect metabolic activity
- Sensitivity = .75-.98 Specificity = .64-.93
- + LR = 4-10 - LR = .1 - .3

## ■ MRI

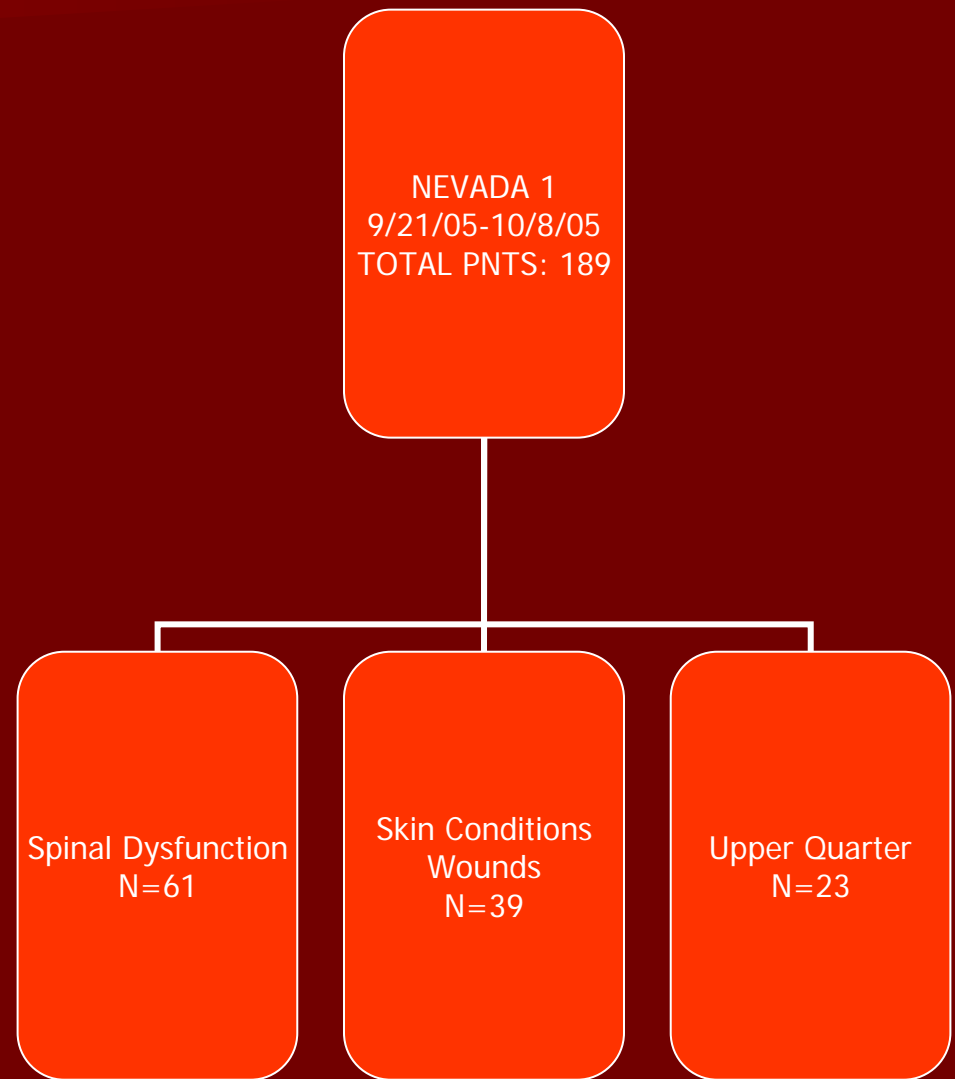
- Sensitivity = .83-.93 Specificity = .90-.97
- +LR = 8-31 - LR = ~0.1

# Focus today: Back pain

## ■ Why?



Reasons for primary care visit



# Evidence based practice

- Sensitivity : Snout
- Specificity: Spin
- Positive Likelihood Ratio
- Negative Likelihood Ratio

# Likelihood Ratios (LR)

- LRs  $>10$  or  $<.01$  cause large changes in likelihood
- LRs 5-10 or 0.1-0.2 cause moderate changes
- LRs 2-5 or 0.2-0.5 cause small changes
- LRs  $>2$  or  $>0.5$  cause tiny changes
- LRs of 1.0 cause no change at all

# Differential Chart Lurie et al

1. Regional Mechanical LBP (~90%)
  - Non-specific mechanical LBP, degenerative changes, osteoporotic compressions fx's, deformity, spondylolisthesis
2. Mech. LBP w/ Neurogenic Leg Pain (7-10%)
  - Disc herniation, spinal stenosis
3. Non-Mechanical Spine Disorders (~1%)
  - Neoplasm, infection (infective spondylitis, epidural abscess, herpes zoster), spondyloarthropathies (ankylosing spondylitis, Reiter's, irritable bowel syndrome)
4. Visceral Disease (1-2%)
  - Pelvic (prostatitis, endometriosis, pelvic inflammatory dz), renal (nephrolithiasis, pyelonephritis), aortic aneurysm, gastrointestinal (pancreatitis, cholecystitis, peptic ulcer)

# Serious low back pain

- 95% with benign musculoskeletal pain
- Walk the line – need to detect pathology without risking “over-medicalizing” the patient

# Low Back and Malignancy

- How do we determine which patients are zebras in a stampede of horses?
- Back pain is common, rarely it may be the 1<sup>st</sup> manifestation of cancer
- Metastatic cancer is the most common underlying disease of the spine and is typically associated with breast, lung, or prostate cancer



# How to rule out cancer as a possibility for causing back pain

- If none are present:
  - Age >50
  - History of cancer
  - Unexplained weight loss
  - Failure of conservative therapy
- Overall sensitivity: 100%
- Patients with a an ESR <20 mm/hr and radiographs without evidence of compression fx or lytic/blastic lesions have not had cancer



# Deyo et al JAMA 1988

- Goals of study:
  - Determine the prevalence of cancer in people with low back pain.
  - Develop an algorithm that would be close to 100% sensitive for cancer but minimize lab and x-ray use
- Study= n = 1975 subjects
- Deyo et al – 1,975 walk-in patients with c/o LBP and found .66% had underlying cancer (7/1000)

# Three categories of patients with low back pain

- 1. High risk: Prior history of cancer
- 2. Intermediate risk:
  - Age > 50
  - Failure of conservative management
  - Unexplained weight loss
  - Other signs of systemic illness
- 3. Low risk
  - <50 without history of CA, no weight loss or other signs of systemic illness and improved with therapy

# Findings Deyo et al

- 1/3 of patients with metastatic cancer had a prior history of CA
  - Clinical pearl- assume patient with cancer history has a metastatic lesion until proven otherwise
- No one with cancer had an ESR < 20 mm/hr and only 1 clinical finding
- No patient with cancer had both a normal x-ray and ESR

# Deyo et al Proposed Algorithm

■ Low back pain (N=1975)

↓  
History and Physical Examination

History of Previous  
Cancer (n=45)

Age > 50 yrs

No findings

Or

Failure to improve

Or

Unexplained wt loss & systemic  
signs

↓  
ESR

Only 1 clinical finding & ESR < 20 =  
stop

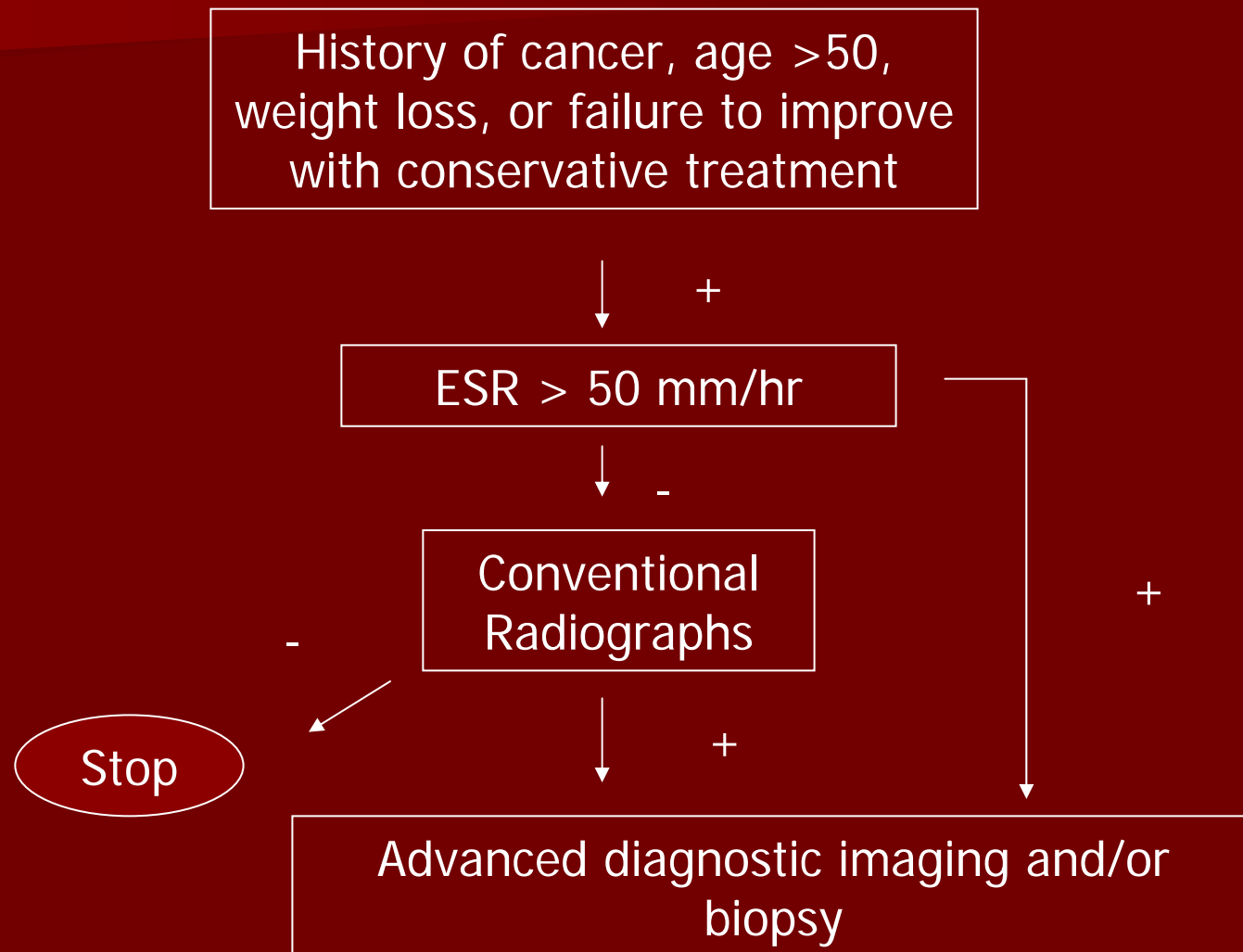
ESR > 20 or >1 clinical finding  
= x-ray

↓  
ESR, Spine films (9% w/ CA)

# Detecting cancer in patients with LBP Joines et al

- Ideal diagnostic strategy would detect the few cases of CA in patients w/ LBP while minimizing unnecessary testing
- Design: decision analysis and cost effectiveness analysis looking at various algorithms to detect cancer
- Sensitivity = .63
- Specificity = .99
- + LR = 67
- - LR = .33

# Joines algorithm



# Historical findings best to detect cancer

Condition	Sensitivity	Specificity	+ LR	-LR
Hx of CA	.31	.98	14.7	.70
Age >50	.77	.71	2.7	.32
Failure to improve	.31	.90	3.0	.77
Wt. loss	.15	.94	2.7	.90
Any 1 or more above	.91-1.0	.59	2.5	0
Bed rest w/o relief	.9-1.0	.46-.54	1.8	.11-.21
Sciatica	.58-.93	.78	N/A	N/A



# Physical findings best to detect cancer

Condition	Sensitivity	Specificity	+ LR	-LR
ESR > 20	.78	.33-.67	2.4	N/A
ESR >50	.56	.97	19.2	N/A
X-ray	.67-.70	.97	67	N/A
NMBS	.95	.70	64	N/A
MRI	.93	.97	N/A	N/A
Biopsy	.85	1.0	N/A	N/A
Weakness/ sensory loss	.40-.58	.8-.9	N/A	N/A
ttp midline	.15-.80	.60-.78	N/A	N/A

# Clinical Pearls Lurie et al

- Pain worse at night or with recumbency, particularly when person sleeps in a chair is very worrisome for malignancy or infection
  - Precise sensitivity and specificity unknown
- Most sensitive red flag: no relief with bed rest (.90)
- Pain eased with lying down decreases the chance of malignancy to about 1/5<sup>th</sup> the starting odds

# Detecting infection

- Prevalence: .1% of all back pain patients
- Risk factors: (.40 sensitivity, specificity ?)
  - Increases with age (>50 years old)
  - IV drug use
  - Urinary tract infection
  - Indwelling urinary catheter
  - Skin infections



# Detecting infection

Condition	Sensitivity	Specificity	+ LR	- LR
Fever	.50	.98	25	.51
Percussion	.86	.6	2.1	.23
+ IV drug use, skin infection, UTI, indwelling catheter	.40	N/A	N/A	N/A

# Detecting infection (Infective Spondylitis)

Test	Sensitivity	Specificity	+ LR	- LR
X-ray	.82	.57	2	.3
NMBS	.9	.78	4.0	.1
MRI	.96	.92	12	.04

# Cauda Equina – Medical Emergency

- Cause: Massive midline HNP, neoplasm, infection/epidural abscess
- Prevalence amongst back pain: .04%
- Key sign = urinary retention = very sensitive = without retention .999 chance they do not have cauda equina
- Signs/symptoms: unilateral or bilateral sciatica, sensory motor deficits, abnormal SLR (sensitivity >.80)

# Cauda Equina



# Cauda Equina

- Most common sensory deficit is over the buttocks, posterior and superior thighs, and perineal regions (SADDLE ANESTHESIA) = sensitivity .75
- Key questions: urinary retention and saddle anesthesia
- Anal sphincter tone is decreased in 60-80%
- Frank incontinence = late finding



# Cauda Equina

Test	Sensitivity	Specificity	+LR	-LR
Urinary Retention	.90	.95	18	.1
Saddle Anesthesia	.75	-	-	-
↓ Anal sphincter tone	.6-.8	-	-	-

# Detecting Rheumatological Disorders: Ankylosing Spondylitis

- Prevalence: .3% of all patients with low back pain
- Risk factors:
  - Genetics (indicator (HLA-B27))
  - Young patient <40 years
  - Male



# Detecting Ankylosing Spondylitis

- Signs/Symptoms:
  - Male < 40 years old
  - Progressive, chronic back pain
  - Sacroiliac and costosternal/costovertebral symptoms not uncommon
  - Morning stiffness >30-60 minutes
  - Improved with exercise
  - Fatigue
  - Improves with corticosteroid use
- Hallmark: is radiographic evidence of bilateral sacroilitis

# EBP: Ankylosing Spondylitis (AS)

- 5 screening questions for AS
- (4 out of 5 + responses = .95 sensitivity and .85 specificity)
  - 1. Is there morning stiffness?
  - 2. Is there improvement with exercise?
  - 3. Are they less than 40 years old?
  - 4. Did the problem begin slowly?
  - 5. Greater than 3 months duration?

# EBP: Ankylosing Spondylitis (AS)

Condition	Sensitivity	Specificity
<40 years old	1.00	.07
Pain not eased in supine	.80	.49
Morning stiffness	.64	.59
↓ SIJ tenderness	.1-.27	.68
Schober's sign	.30	.86
Iritis	?	1.00
Thoracic pain	?	.97/ LR = 1.3
Thoracic stiffness	?	1.00
Heel pain	?	.90 / LR = 1.6
Family hx of AS	?	1.00

# Other factors to consider with AS

- Decreased lateral spinal mobility
  - Measurements unknown
  - Sensitivity = .52
  - Specificity = .82
  - + LR = 2.9
  - LR = .59
- Decreased chest expansion (<2.5 cm)
  - Sensitivity = .09
  - Specificity = .99
  - + LR = 9.0
  - LR = .92



# Imaging in ankylosing spondylitis

- Radiography – poor sensitivity at .25-.45, but highly specific
- CT scan with improved sensitivity but not useful in viewing active inflammation
- Bone scan: mixed results
  - Sensitivity = .48-.995
  - Specificity much better at .95-.97
- MRI is sensitive and specific for active sacroilitis (.995 sensitivity, >.95 specificity)

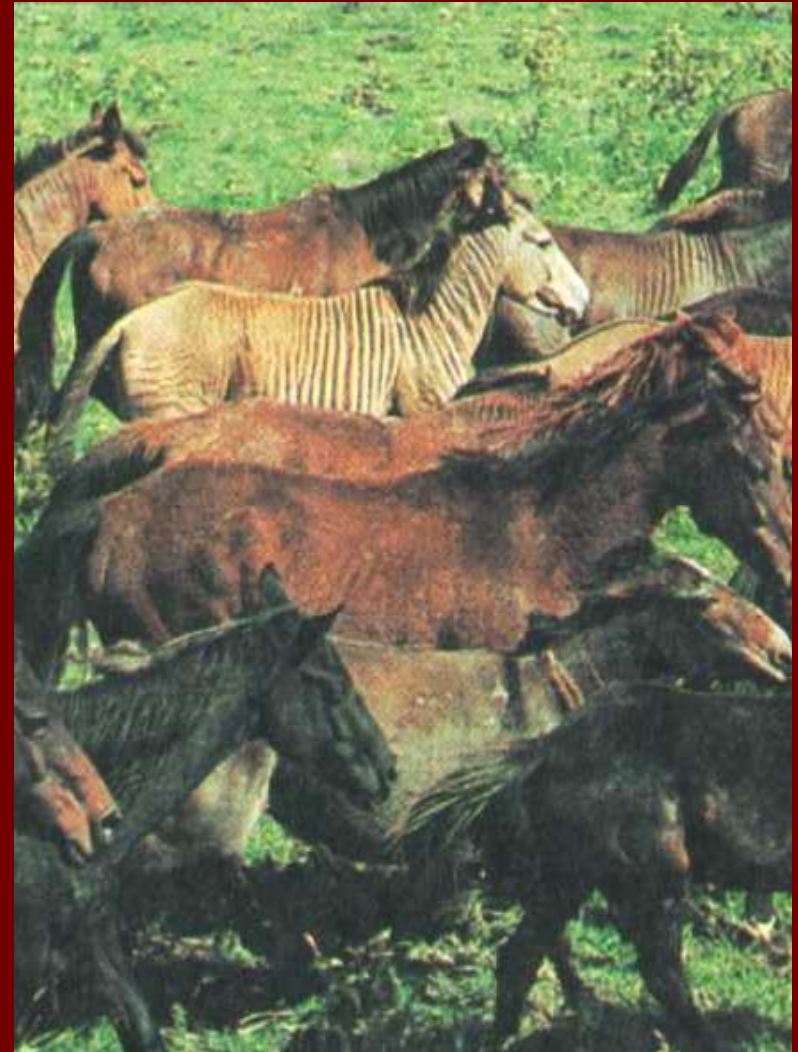
# When to image the back

- Quebec Task Force recommendations
  - Age  $>50$  or  $<20$
  - Fever
  - Trauma
  - Signs of Neoplasm or Spondyloarthropathy
  - No improvement despite conservative management x 4-6 weeks
- MRI/CT should be used primarily for surgical planning



# Clinical Points – Detecting a Zebra in a Herd of Horses

- Use aids to assist in expediting history taking to identify systemic indicators of disease
- Taking time to complete the body chart can identify suspicious areas of symptoms or interrelationships
- Person with personal history of cancer, assume metastasis until proven otherwise
- Keep in mind, radiographs are not sensitive to disease



Thank You  
The End



# Addendum

# The Shoulder/Upper Quarter

- Many pathologies can mimic musculoskeletal dysfunction in the shoulder
- Referral sources: viscera in chest and upper abdomen, cervical spine, axilla, thorax, thoracic spine, and chest wall
- “Differential diagnosis of shoulder pain is sometimes especially difficult, because any pain that is felt in the shoulder will affect the joint as though the pain were originating in the joint” Mennell 1964

# Shoulder non-musculoskeletal referral sources

- Visceral Referral
- Neoplasm
- Infection
- Myositis
- Rheumatological conditions

# Shoulder yellow flags

- Signs of systemic visceral illness:
  - Pleuritic component:
    - Persistent cough
    - Blood-tinged sputum
    - Sx's aggravated by respiratory movements
    - Chest pain
  - Exacerbation by recumbency
  - Coincidental sweating/diaphoresis
  - Coincidental nausea, vomiting, dysphagia

# Shoulder/chest pain stemming from the lung

- Extensive disease may occur in the lung without pain until the process extends to the parietal pleura
- Pleural irritation results in sharp, localized pain that is aggravated by a respiratory movement such as deep breathing, laugh, or cough.

# Shoulder/chest pain stemming from the lung

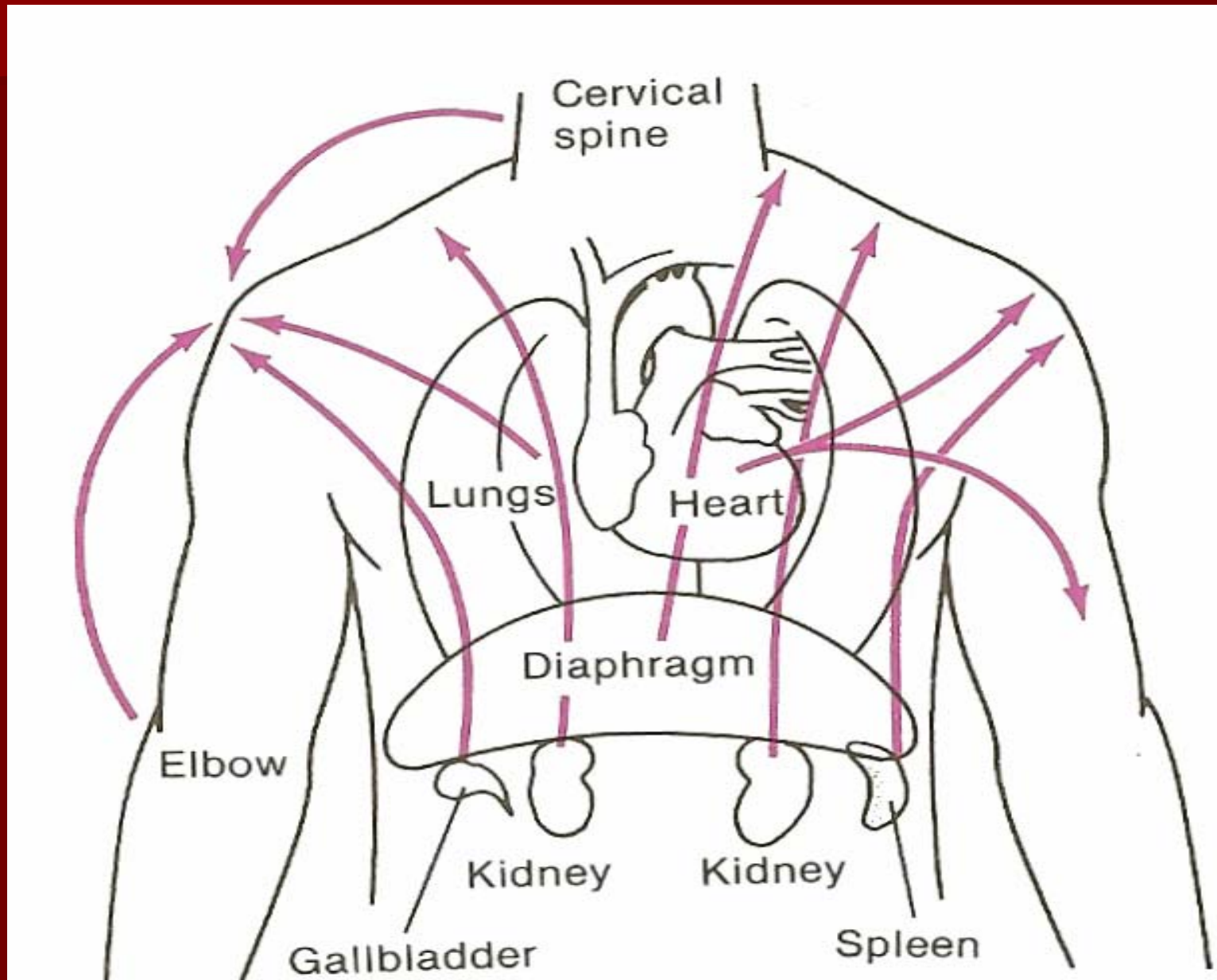
- Patients will often remark that it is more comfortable to lie on that side (“autosplinting”), of course with true shoulder pain lying on the symptomatic side would typically exacerbate symptoms.



# Shoulder yellow flags

- Signs of systemic visceral illness:
  - GI complaints:
    - Anorexia
    - Early satiety
    - Epigastric pain or discomfort
  - Exacerbation by exertion unrelated to shoulder movement
  - Urologic complaints
  - Jaundice
  - Both shoulders affected or more than one joint arthralgia

# The Shoulder



# Unilateral shoulder pain & visceral referral

- Esophageal
- Pericardial or myocardial
- Aortic dissection
- Diaphragmatic irritation
  
- Typically the history will allude to a non-musculoskeletal origin
  
- Many visceral diseases may present as unilateral shoulder pain. Especially, esophageal, pericardial, or myocardial diseases, aortic dissection, and diaphragmatic irritation.

# Myocardial or Pericardial

- Pain often experienced in the shoulder
- Supplied by C5-C6 spinal segment
- Endocarditis
- Pericarditis
- Myocardial Infarction

# Endocarditis

- Most common complaint -- joint pain
- Proximal joints typically
- Most often affects the shoulder, followed by the knee, hip, wrist, ankle, MTP, and MCP joints.
- Typically 1-2 painful joints.

# Endocarditis

- Pain is accompanied by sudden onset of warmth, tenderness, and redness.
- One helpful clue to differentiate from a rheumatologic condition which may present similarly, is to question them about morning stiffness.

# Pericarditis

- Fluid in the pericardial sac and prevents the heart from expanding fully
- Acts similar to an MI.
- Often substernal, worse with a cough, and may radiate to the shoulder
- Relief positions: getting on all fours or leaning forward
- MI: pain unaffected by position

# Myocardial Infarction

- Chest/substernal pain
- Not uncommon to experience left shoulder pain with symptoms in the ulnar distribution of the left upper extremity
- Neck and mandibular pain are also common
- Occasionally symptoms may be felt in the ulnar distribution of the right arm and mid-scapular area



# Myocardial Infarction

- Pain is viselike, squeezing, heavy, and patient often has symptoms such as feeling dizzy, faint, nauseous, diaphoresis, pallor, and dyspnea
- They are unlikely to have aggravating and easing factors

# Aortic Dissection

- Aortic aneurysm
  - Sudden severe chest pain
  - Pain may extend to the neck, shoulders, lower back, or abdomen
  - Rarely distal from central joints
  - Isolated shoulder pain is not common
- aortic aneurysm should be suspected in a patient with cardiac risk factors, especially if they complain of feeling a pulsing sensation in their abdomen

# Aortic Dissection

- Detecting an aortic aneurysm
  - Palpation can be useful in early detection of an aneurysm
  - When a throbbing mass is palpable along an artery, an aneurysm should be suspected and immediate referral to their physician is warranted
  - abdominal aortic aneurysm can be palpated with a 2-hand technique above the belly button

# Aortic Dissection

- A normal aortic pulse should be felt up to 2 inches outward from the midline
- If the spread is wider, but the pulsation continues, an aneurysm is suspected

# Aortic Aneurysm



# Diaphragmatic irritation

- Spinal segments C3-C5 (C6 also)
- Any abdominal disease applying pressure to diaphragm can refer to the ipsilateral shoulder
  - Ex: kidney disorders, laparoscopy
- Typically, associated with chest or abdominal pain

# Organs causing right shoulder pain

- Liver, gallbladder, and common bile duct
- Location: midback, scapular, and right shoulder region
- Typically, shoulder motion is not limited and local ttp is not present, however if prolonged, spasm and guarding may create a musculoskeletal pattern
- Referred pain in shoulder may be only symptom of hepatic or biliary disease

# Ruling out the liver as cause of shoulder pain

- Ask about: a sense of fullness in the abdomen, anorexia, nausea or vomiting
- Pnt may be jaundiced due to the increased serum bilirubin levels – strong indicator
- Acknowledge complaints of swelling and especially right upper quadrant
- Look for paleness, bruising, spider angiomas (branched dilatation of the superficial capillaries), redness of the palms, or enlargement of the breast tissue in men.



# Ruling out the gallbladder as a cause of shoulder pain

- Signs of gallbladder disorder could also include c/o right upper abdominal pain, jaundice, fever, chills, indigestion, pain worse a couple of hours after a meal, nausea, intolerance of fatty foods, and even sudden excruciating pain in the midepigastrium
- referral to the back scapular area and right shoulder

# Neoplasm

- Questions to ask:
  - Any pain with respiratory movements
  - Difficulty swallowing
  - Numbness/tingling
  - Sleep difficulties
  - Previous history of cancer
- Check for:
  - Lymph node involvement
  - Palpable tumor
  - Muscle wasting in bizarre pattern
  - warmth

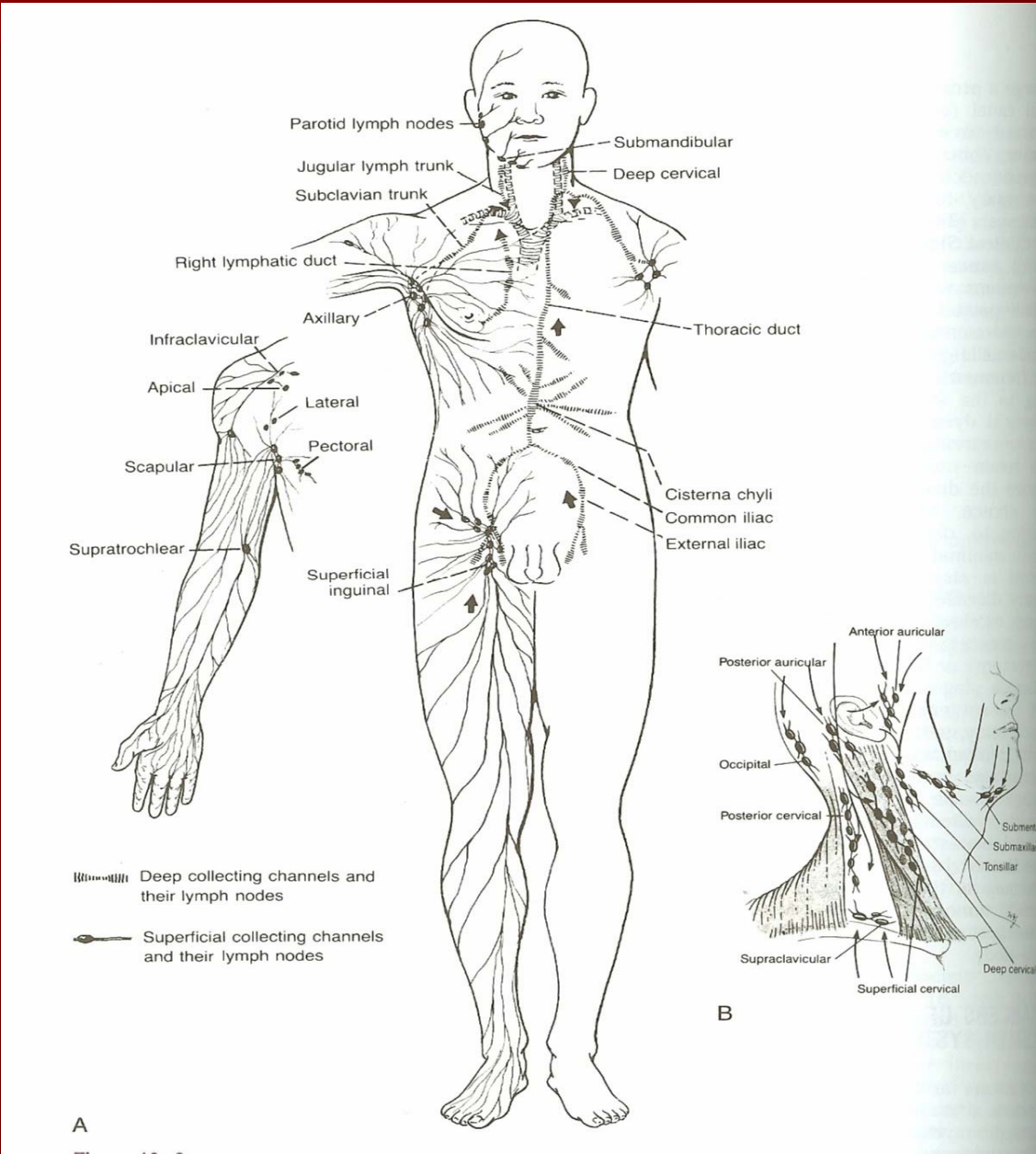
# Neoplasm

- Lung cancer (i.e. Pancoast's tumor)
  - Pancoast's tumor of the lung apex
  - No symptoms until mass has grown beyond pulmonary parenchyma
  - Infiltration
  - Shoulder pain and occasional C8 and T1 nerve involvement
  - Night pain, bone pain
  - General systemic signs often present

# Normal lymph node

- Inflamed lymph nodes may suggest the presence of infection or neoplasm
- Lymph nodes of up to 1 cm are considered normal, but are often not tender to palpation
- Caveat: Lymph nodes swollen due to malignancy are often not tender

# Lymph Nodes



# Palpating axillary lymph nodes



# Infection

- Joint with warmth, erythema, possibly swollen
- Suspicions rise when:
  - Recent steroid injection
  - HIV positive

# Bilateral shoulder pain

- Be mindful of:
  - Adhesive capsulitis
  - Spondyloarthropathies
  - Rheumatoid Arthritis
  - Statins (Lovastatins, etc)
- Inflammatory response, likely systemic
- Be weary if c/o: fatigue, malaise, other joint symptoms



# Bilateral shoulder pain

- Ankylosing spondylitis: involvement of the shoulder closely mimics shoulder impingement due to enthesiopathies at the deltoid origin and insertion and the supraspinatus insertion
- 22.4% of patients with AS will have rotator cuff enthesiopathy.

# Bilateral Shoulder Pain

- Statin medications may cause myositis and even lead to rhabdomyolysis
  - Ex. Lovastatin
- Contact physician
- Check renal function, CPK levels
- Reduce or terminate statin medication

# Rheumatological Conditions

- Conditions affecting shoulder:
  - AS: absence of sig. RC injury and presence of enthesal bone marrow edema strongly suggest AS
  - RA
  - Polymyalgia Rheumatica
  - Polymyositis

# RA Diagnostic Criteria

- American Rheumatism Association
- 4 or more of the following must be met:
  - Morning stiffness > 1 hour > 6 weeks
  - Swelling of 3 or more joints > 6 weeks
    - PIP, MCP, wrist, elbow, knee, ankle, & MTP joints
  - Swelling of the PIP, MCP, or wrist jts > 6 weeks
  - Symmetric joint swelling for > 6 weeks
  - Rheumatoid nodules
  - Serum rheumatoid factor
  - Radiographic erosions or periarticular osteopenia in hand/wrist joints

# Primary Cancers

# Lung Cancer

- 169,400 diagnosed per year
- Risk factors: smoking, TB, asbestos
- Signs/symptoms: persistent cough, bloody sputum, recurrent pneumonia
- Screening: none
- 5 year survival: 13%
- Metastatic lesions: most commonly to brain and then spinal cord

# Colorectal Cancer

- 148,300 diagnosed per year
- Risk factors: High fat, low fiber diet and genetic factors
- Screening:
  - >40 yrs old digital rectal exam (DRE)
  - >50 yrs old stool specimen
  - Sigmoidoscopy
- Signs/sx
  - Rectal bleeding
  - Bowel changes
- In combination, digital rectal exam, stool specimen, and sigmoidoscopy have good sensitivity for detecting colorectal cancer

# Breast Cancer

- 205,000 diagnosed per year
- Risk factors
  - Age, genetic factors
  - Estrogen exposure (more, more likely) early menses, late menopause, BCPs, hormone replacement therapy
- Screening: mammogram and manual breast exams
- Signs/symptoms
  - Lump, thickening
  - Discharge, tenderness
  - May present with shoulder pain or axillary pain



# Prostate Cancer

- 189,000 diagnosed per year
- Risk factors:
  - Age, race, genetics
- Screening:
  - 40+ annual DRE
  - 50+ annual Prostate Specific Assay (PSA)
- 33% will have a normal DRE
- Of the 30% with a normal PSA most will have a + DRE
- May c/o LBP

# Pancreatic Cancer

- Risk factors: age, smoking, race, dietary fat, ? Alcohol and coffee
- Screening: none
- Symptoms: none until late stages
  - May be jaundiced
  - May produce back pain which is better when they lean forward

# Lymphoma

- Hodgkin's and non-Hodgkin's
- 60,900 diagnosed per year
- Risk factors:
  - Weakened immune system
  - Viruses
  - Pesticides and solvents
- Screening: none
- Signs/sx:
  - Enlarged lymph nodes, itching, fever, anemia, malaise/fatigue, weight loss

# Leukemia

- Risk factors
  - X-rays, radon, benzene, HTLV-1-virus
- Screening: none
- 30,800 diagnosed per year
- Signs/Sx
  - Fatigue, paleness
  - Weight loss, repeated infections, bruising, nosebleeds

# Brain Cancer

- 17,000 diagnosed per year
- Risk factors: ? Genetics
- Screening: none
- Signs/Sx
  - Headaches, nausea, vomiting
  - Visual or auditory changes
  - Dysarthria
  - Seizures
  - Mental status changes/Personality changes
  - Changes in strength, coordination, sensation

# Kidney Cancer

- Risk factors: obesity, smoking, heavy use of ibuprofen
- Screening: none
- Symptoms
  - Back, flank, or abdominal pain
  - Hematuria

# Bladder cancer

- Risk factors: chemical exposure, smoking
- More common in men
- Screening: none
- Symptoms
  - Hematuria
  - Urgency
  - Burning with urination

# Osteosarcoma

- Most common primary bone sarcoma
- Malignant
- Peak age: 2<sup>nd</sup> decade of life, males 2:1
- Involves metaphyseal area of long bones, most in the knee joint
- Nonspecific pain, becomes constant, and worse at night. May have weight loss and malaise.



# Multiple Myeloma

- Most common primary malignant neoplasm of the spine!
- 53,600 diagnosed per year
- Men over 40-50 peak incidence at 50-70
- Backache
- Strong constitutional signs
- Sudden onset of strong pain due to pathological fractures

# Multiple Myeloma

- Diagnosis:
  - Serum protein electrophoresis-elevated serum protein
  - X-rays: lytic lesions
  - Bone scan may be negative due to lack of bone regeneration
  - Increased ESR

# Benign Neoplasms

- Osteoid osteoma
  - Males 15-25 years old
  - Spasm and scoliosis
  - Slowly progressive
  - Worse at night
  - Pain is severe
  - Relieved by aspirin
  - Diagnosis: by x-ray with a dense sclerotic area
  - Treatment: excision surgically

# Benign neoplasms

- Osteochondroma – most common benign tumor
- Metaphysis of long bones or in spine
- Usually asymptomatic, may be irritated in the area of a tendon or muscle, may limit joint ROM
- X-ray appearance- protrudes from a bone on a bony stalk and the outer surface is rounded

# Signs/ symptoms requiring immediate referral!

(Koopmeners, MD)

- Suicidal ideation
- Severe depression symptoms
- Rebound abdominal tenderness
- One-sided facial pain/intractable headache
- Vaginal bleeding w/ acute pelvic pain
- Unstable angina
- New onset atrial fibrillation
- HTN: >180/110
- Acute abdominal pain w/ abdominal bruit aneurysm
- New onset pulse >100 at rest
- Black tarry stool
- Dark bloody stool
- Acute change in mentation
- Pelvic pain, fever, and unusual discharge
- Foul odor in non-healing wound
- Intractable pain any location
- Imminent suicide
- Morbid depression
- Appendicitis/peritonitis
- Temporal Arteritis
- Ectopic pregnancy
- Impending MI
- Increased risk stroke
- Increased risk stroke
- Abdominal aortic
- Atrial fib/tachycardia
- GI bleed
- GI bleed
- stroke/aneurysm/overdose
- PID
- Infection/Gangrene
- 2. Emergent condition