

Management of Back Pain

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Financial Disclosures

- ▶ Design Team & Adult Deformity Faculty Consultant – Depuy Synthes Spine

Learning Objectives

- ▶ Review anatomic consideration of the spine with respect to Lower Back Pain
- ▶ Review the literature guidelines of the work up of Lower Back Pain
- ▶ Review the correct imaging choices in patients with Lower Back Pain
- ▶ Review the Management of Lower Back Pain

Epidemiology

THE CHIROPRACTOR

I'VE BEEN
LOOKING FORWARD
TO THIS
ALL WEEK!



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Epidemiology

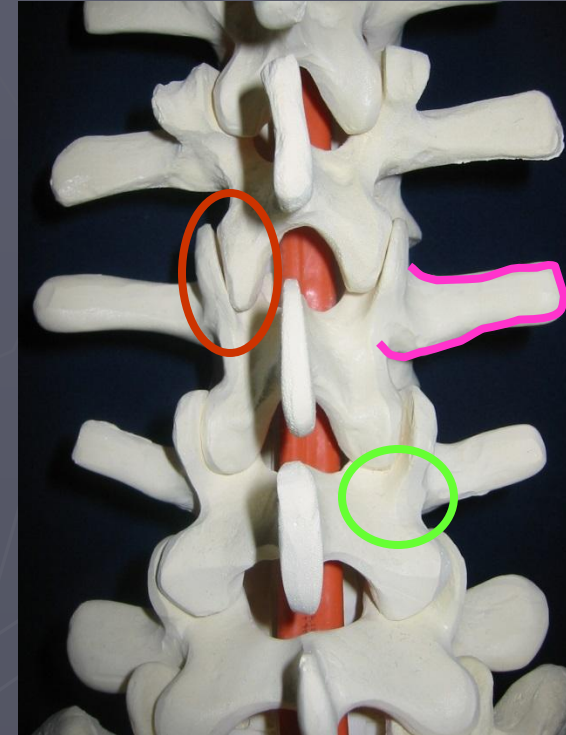
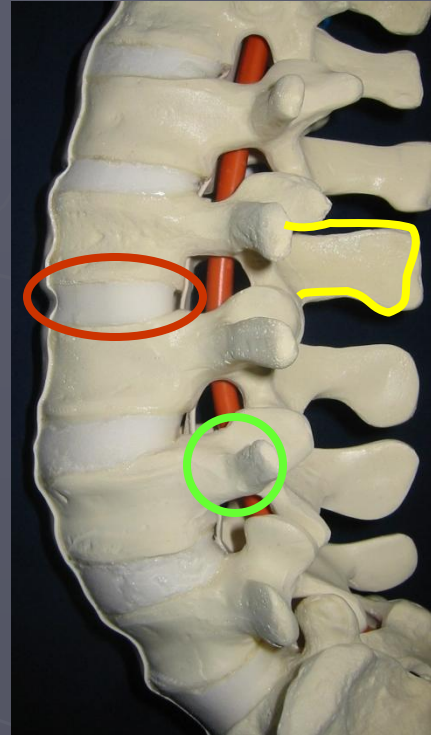
- ▶ Lower Back Pain will afflict 70-80% of us at some point in time.
- ▶ Incidence in the adult population is 15%
- ▶ Primary cause of disability in those under 50 years old
- ▶ J Am Acad Orthop Surg 2004;12:106-115

Epidemiology

- ▶ LBP is the 5th most common reason to visit a physician in the US
- ▶ Direct Health Care Costs – \$26.3 Billion
- ▶ Indirect Costs – 2% of the US work force is compensated for lost work
- ▶ 5% of people with LBP disability account for 75% of the costs
- ▶ Luo X, et al, Spine. 2004;29:79-86.
- ▶ Andersson GB. Lancet. 1999;354:581-5.
- ▶ Frymoyer JW, et al, Orthop Clin North Am. 1991;22:263-71.

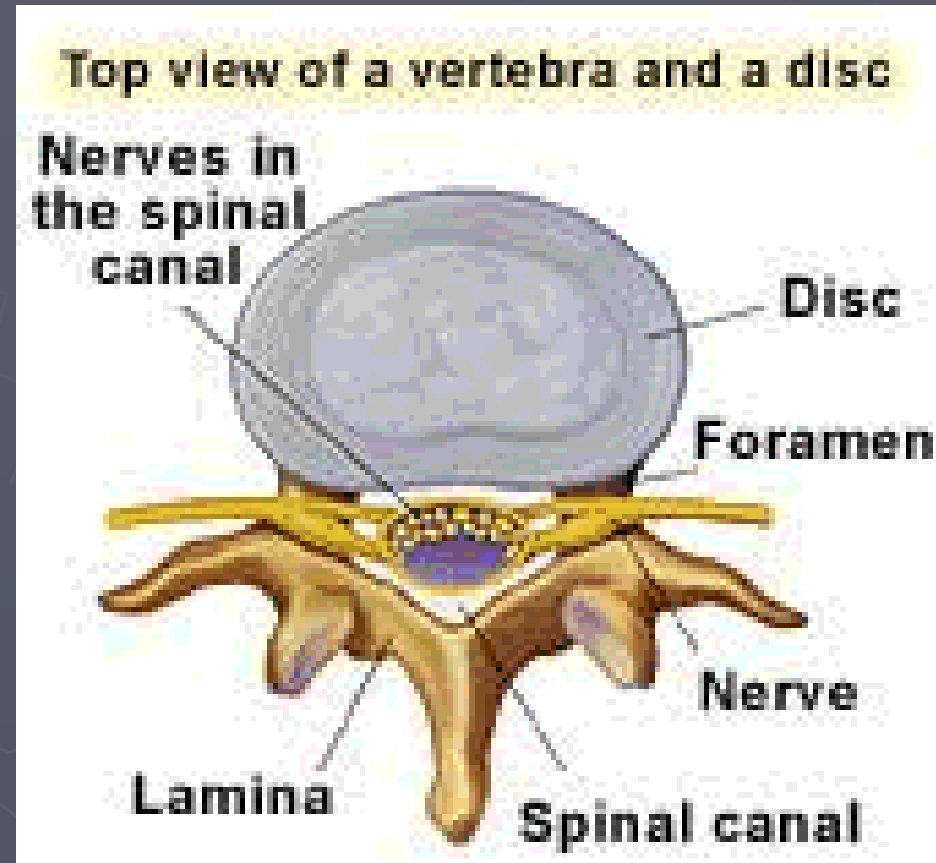
Anatomy - Bone

- ▶ Joints
 - Disc
 - Facet Joints
- ▶ Spinous Process
- ▶ Pars Interarticularis
- ▶ Transverse Process
- ▶ Pedicle



Anatomy - Disc

- ▶ **Annulus**
 - Outer Layers innervated via the sinuvertebral nerve
- ▶ **Nucleus Pulposus**
 - Filled with hydrophilic Proteoglycans
- ▶ **End Plate**
 - Hyaline Cartilage
- ▶ **Avascular**
 - Poor Healing Potential



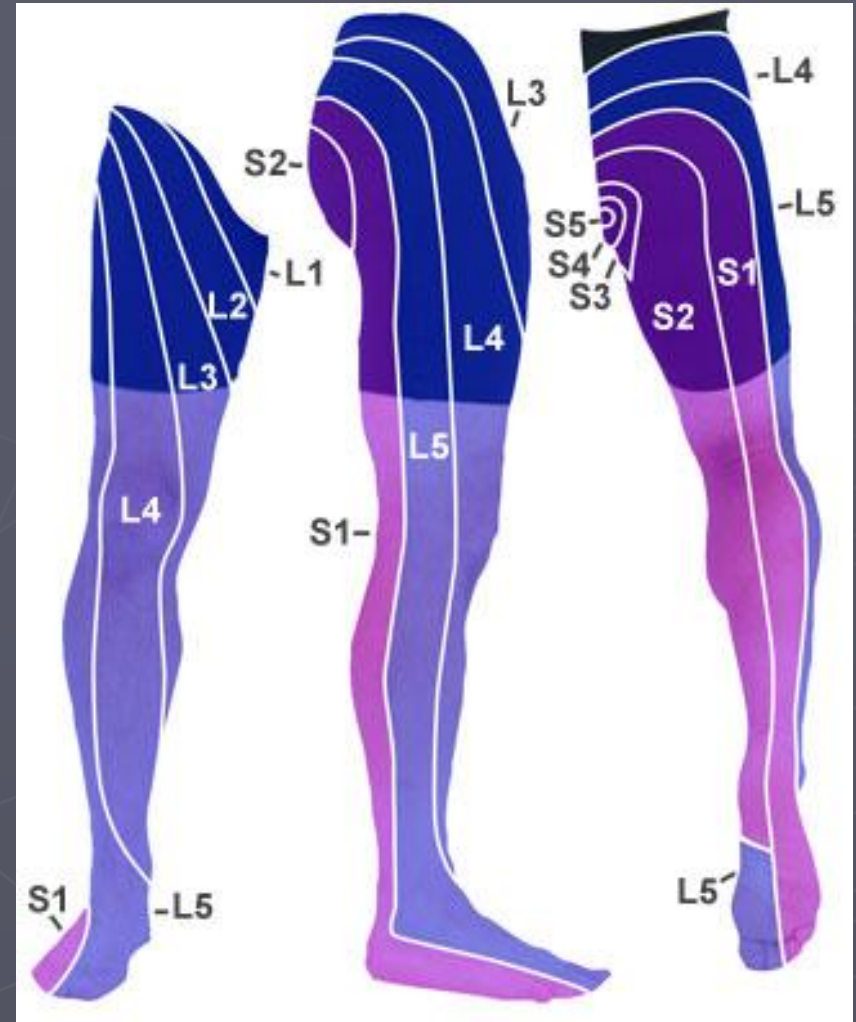
Anatomy

- ▶ Spinal Cord Ends at L1/2
- ▶ Cauda Equina travels freely in dural sac
- ▶ Neurologic deficits correlates with site of pathology



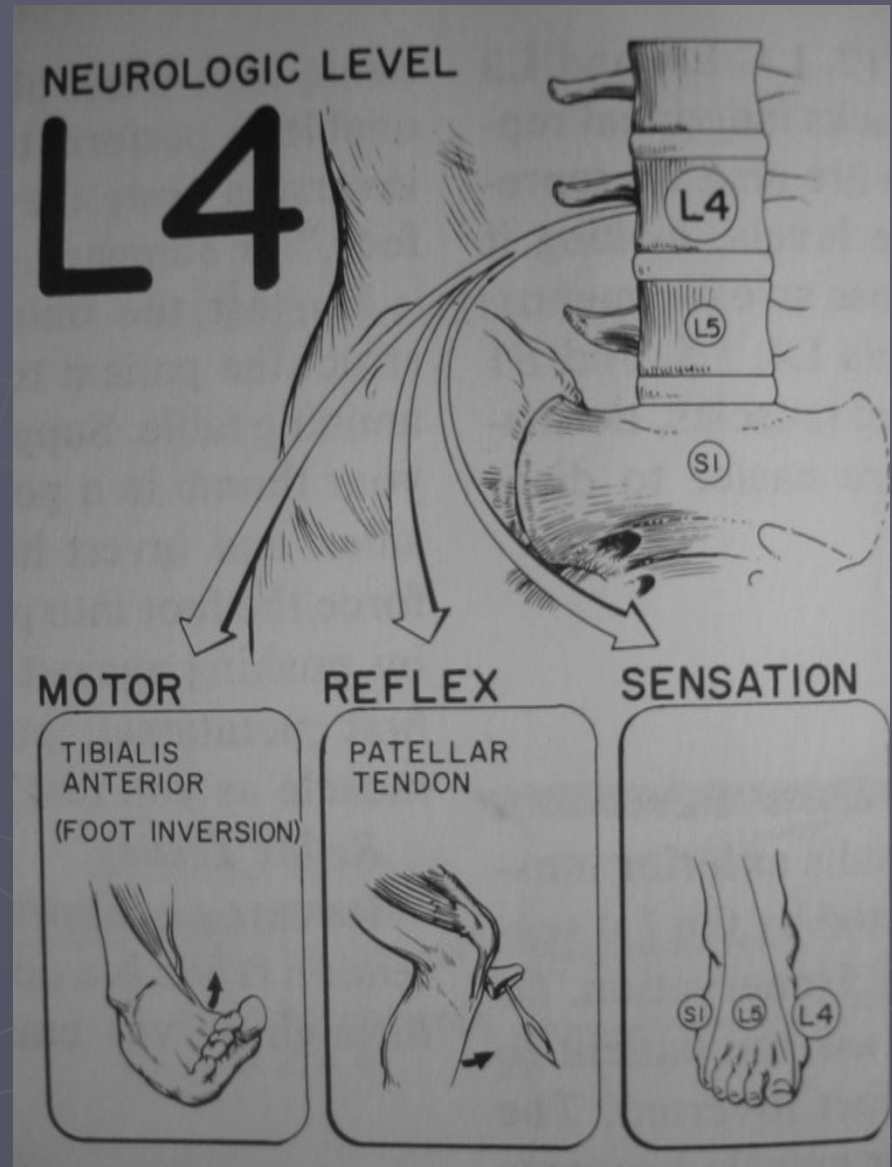
Neurologic Level T12-L3

- Sensation Thigh
- Motor
 - L1-3 Hip Flexors
 - L2-4 Quads/Adductors



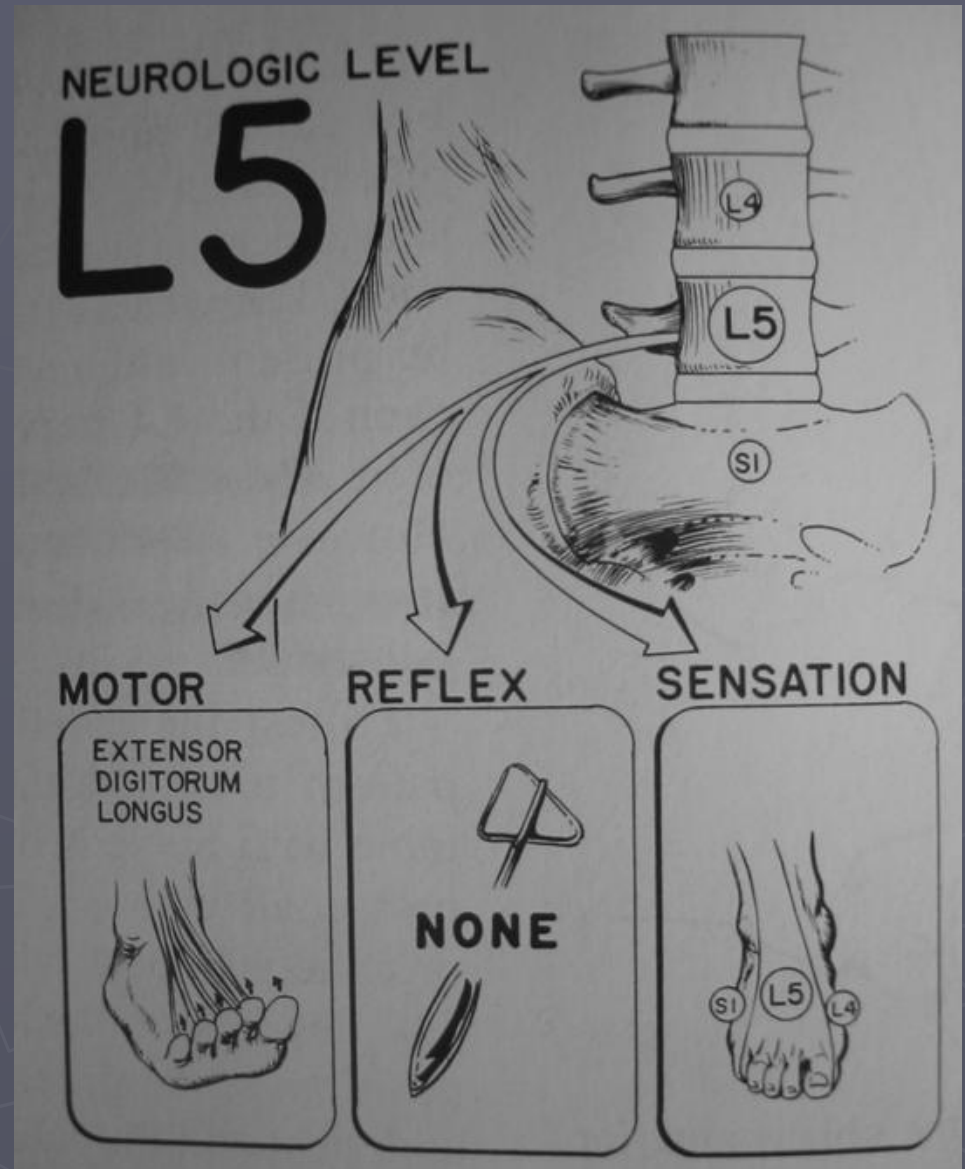
Neurologic Level – L4

- Sensation Medial Ankle/Great Toe
- Motor - Tibialis Anterior – Inversion
- Reflex - Patella



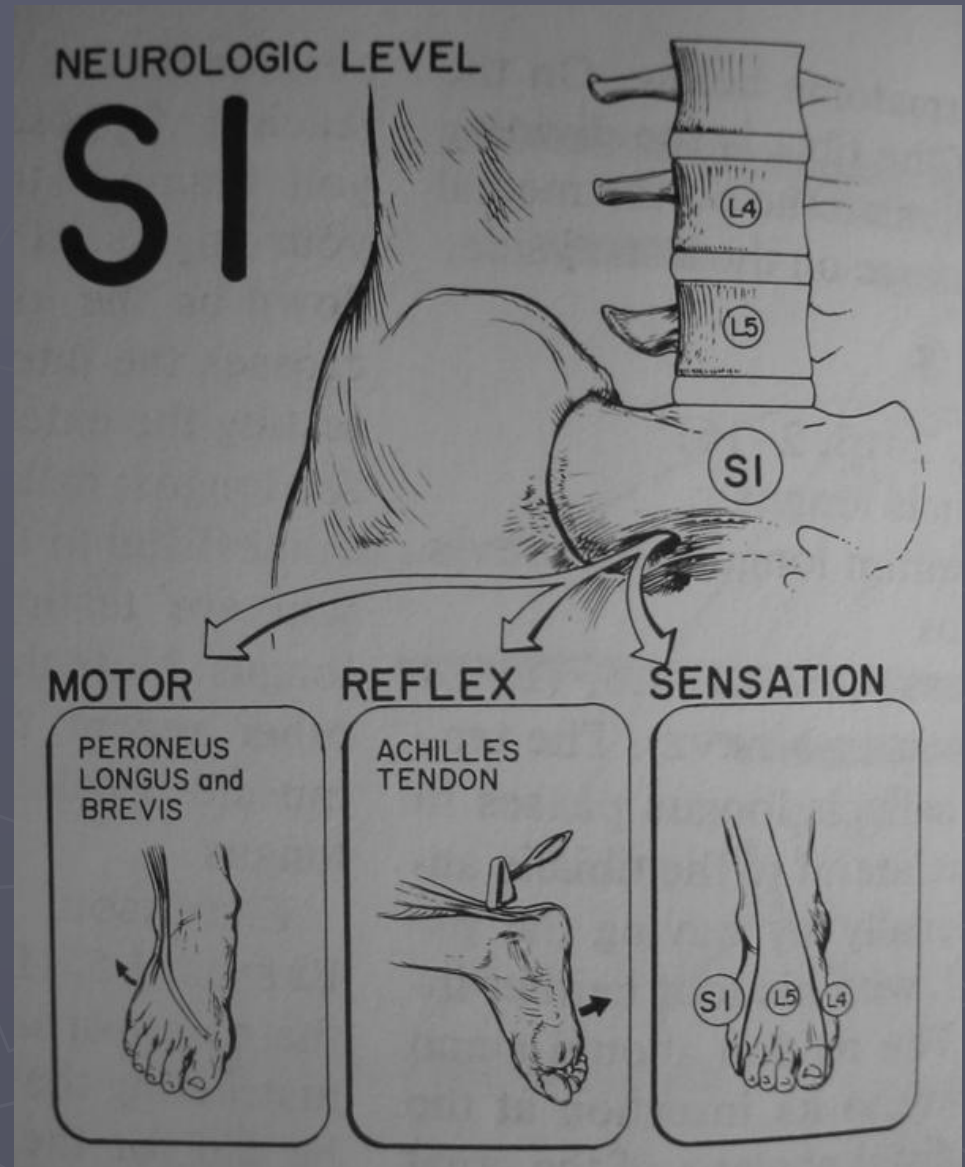
Neurologic Level – L5

- Sensation – Dorsum Foot
- Motor – Extensor Hallucis Longus
- Reflex - None



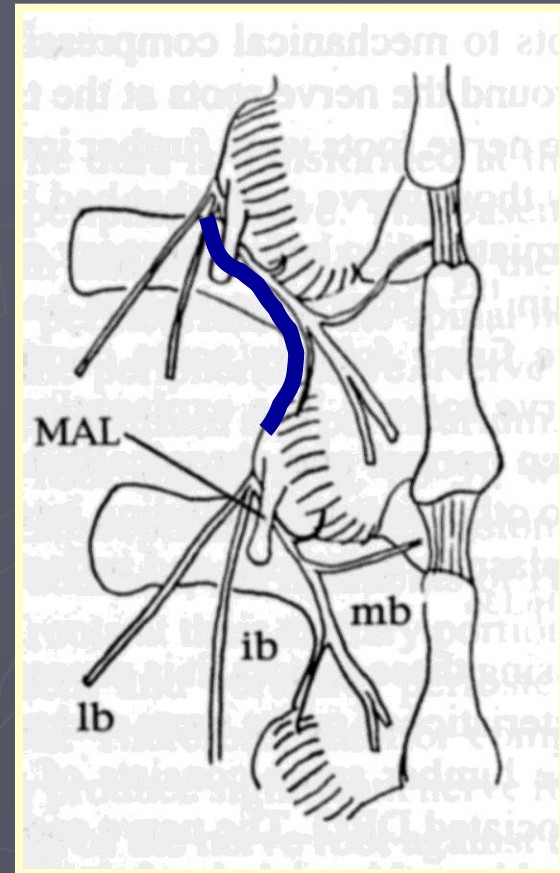
Neurologic Level – S1

- ▶ Sensation – Lateral Ankle/Foot
- ▶ Motor – Peroneals/Gastroc – Plantar Flexion
- ▶ Reflex - Achilles



Facet Joint Innervation

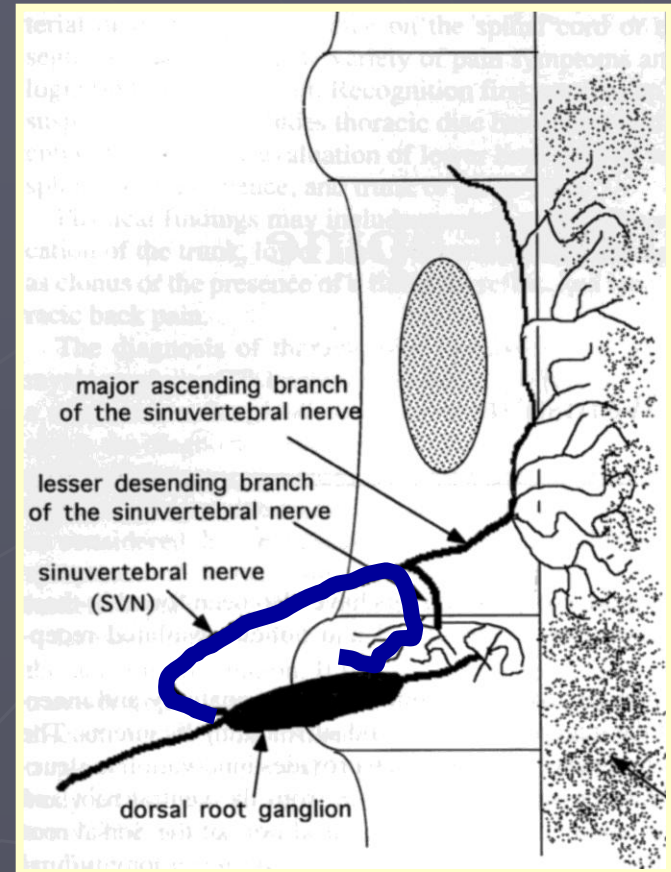
- ▶ Innervated by medial branches of dorsal 1° rami
- ▶ Facet joint capsule contains encapsulated, unencapsulated and free nerve endings



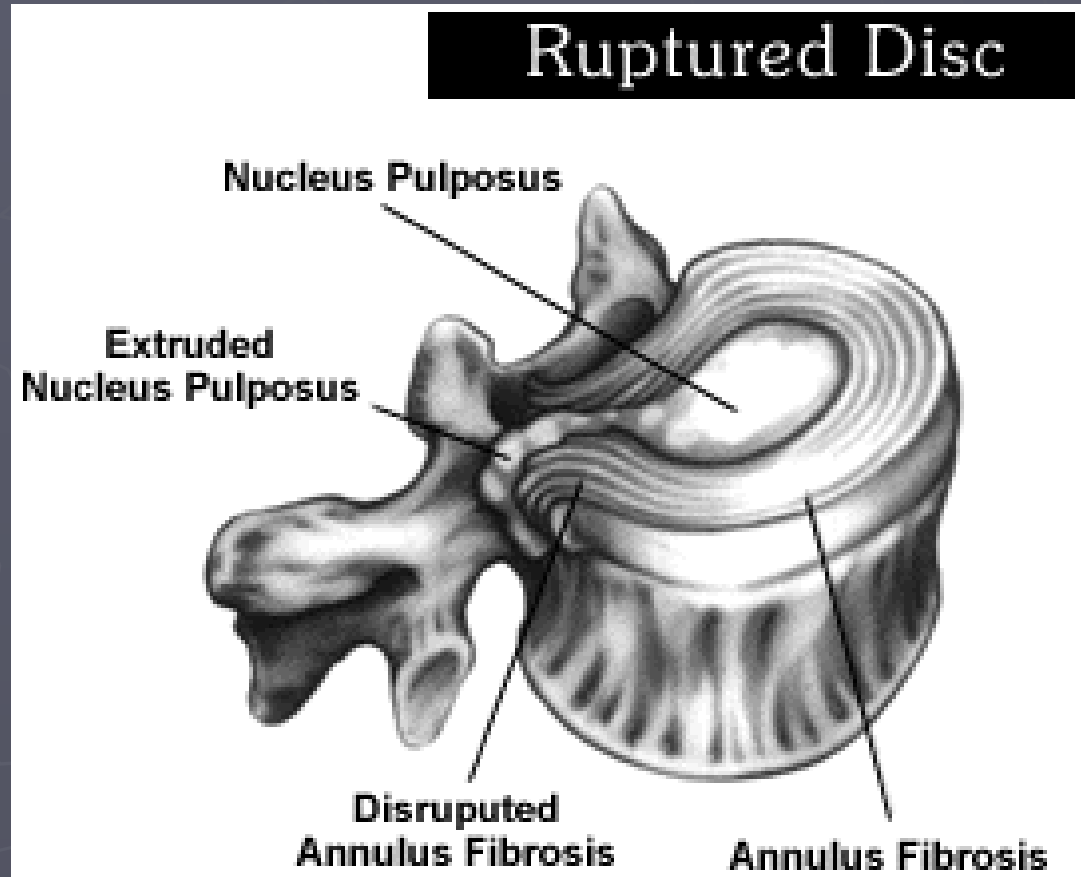
Innervation

► Sinuvertebral Nerve (SVN)

- Innervates PLL (greatest volume of nerve endings)
- Innervates Posterior annulus fibrosis

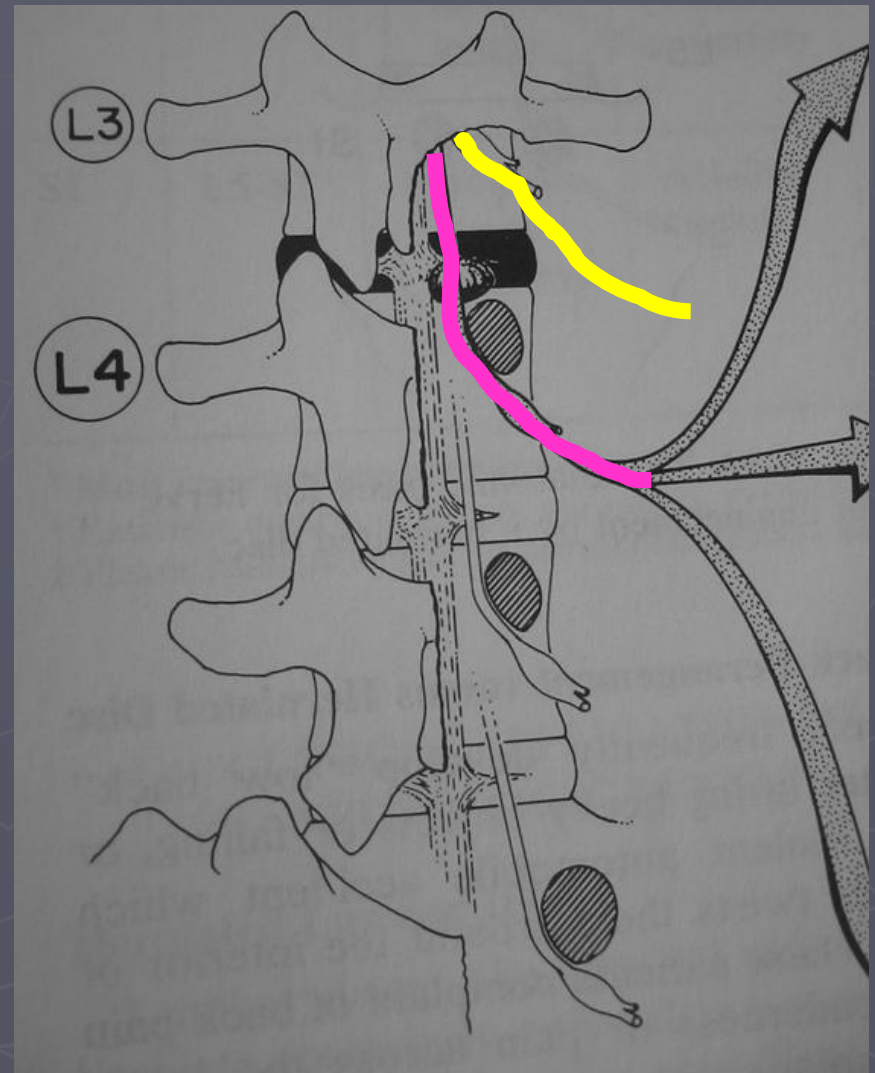


HNP



Pathophysiology - HNP

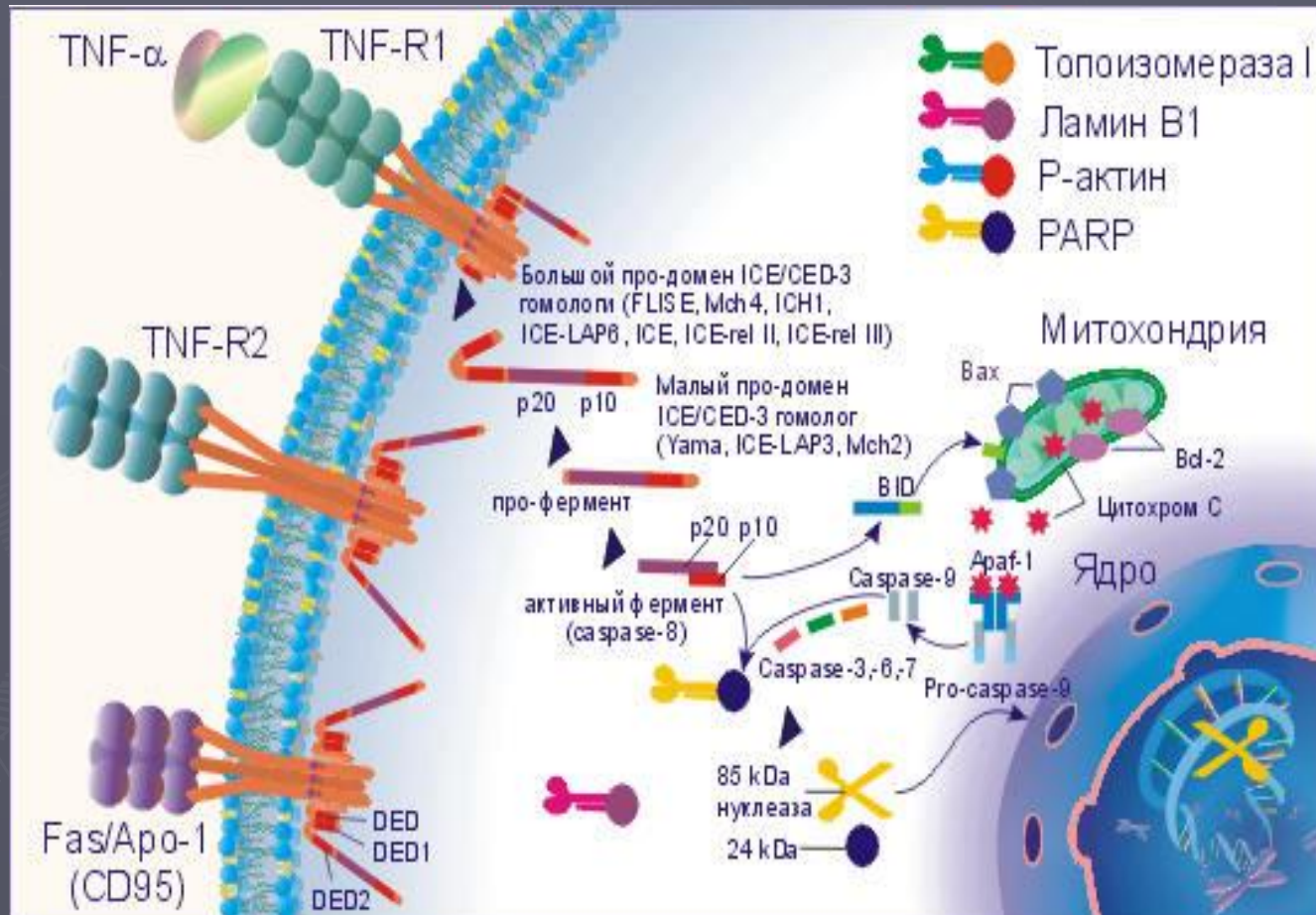
- ▶ Nucleus can extrude through tears in the annulus
- ▶ Mechanical symptoms based on location of HNP
 - Traversing root
 - Exiting Root



Pathophysiology - HNP

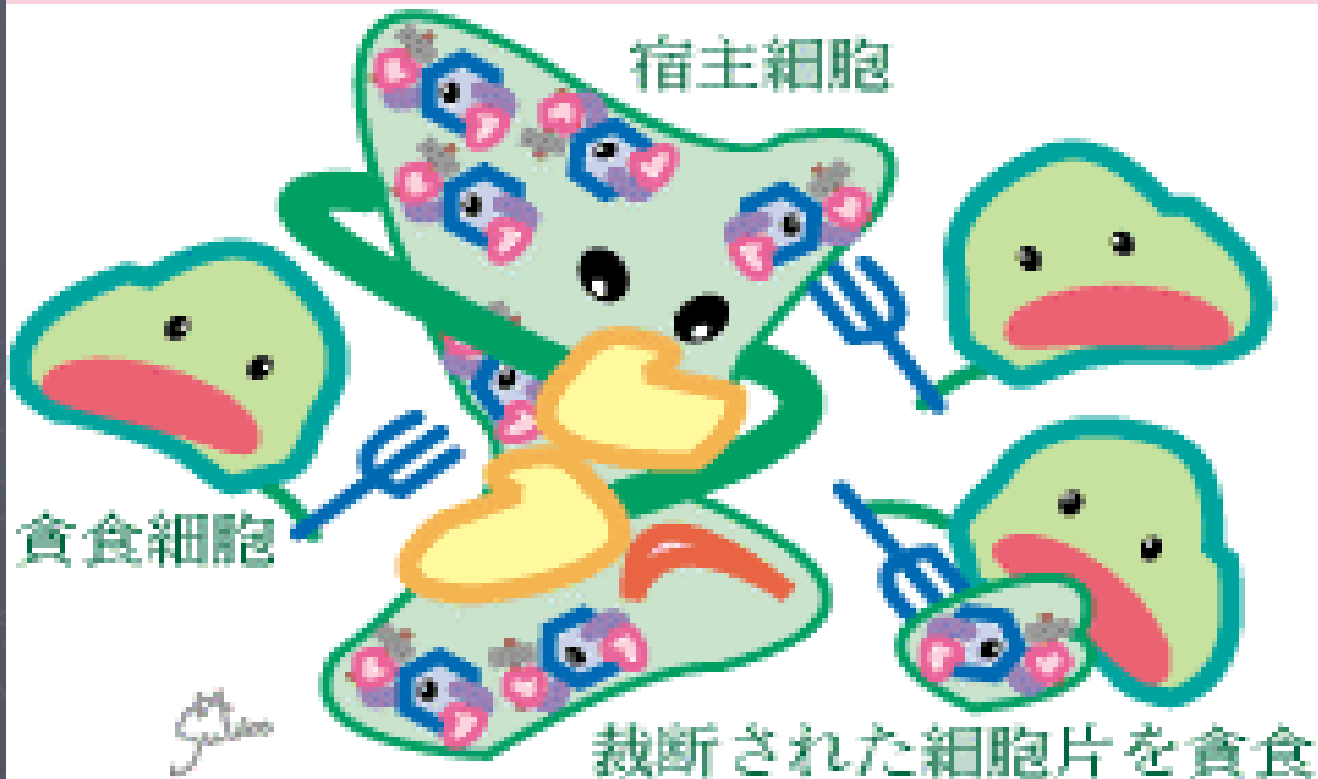
- ▶ The disc space is an immune privileged site
- ▶ Park JB et al. studied IL4 isolated from disc material
 - IL4 found to bind to T cells and contribute to inflammatory cascade
 - Spine 2002, 27(19).
- ▶ Inflammatory response of disc
- ▶ Aoki et al. studied cytokine expression in pigs
 - TNF alpha decreased NCV
 - Spine 2002, 28(8).

Disc Immunology Stuff



Disc Immunology

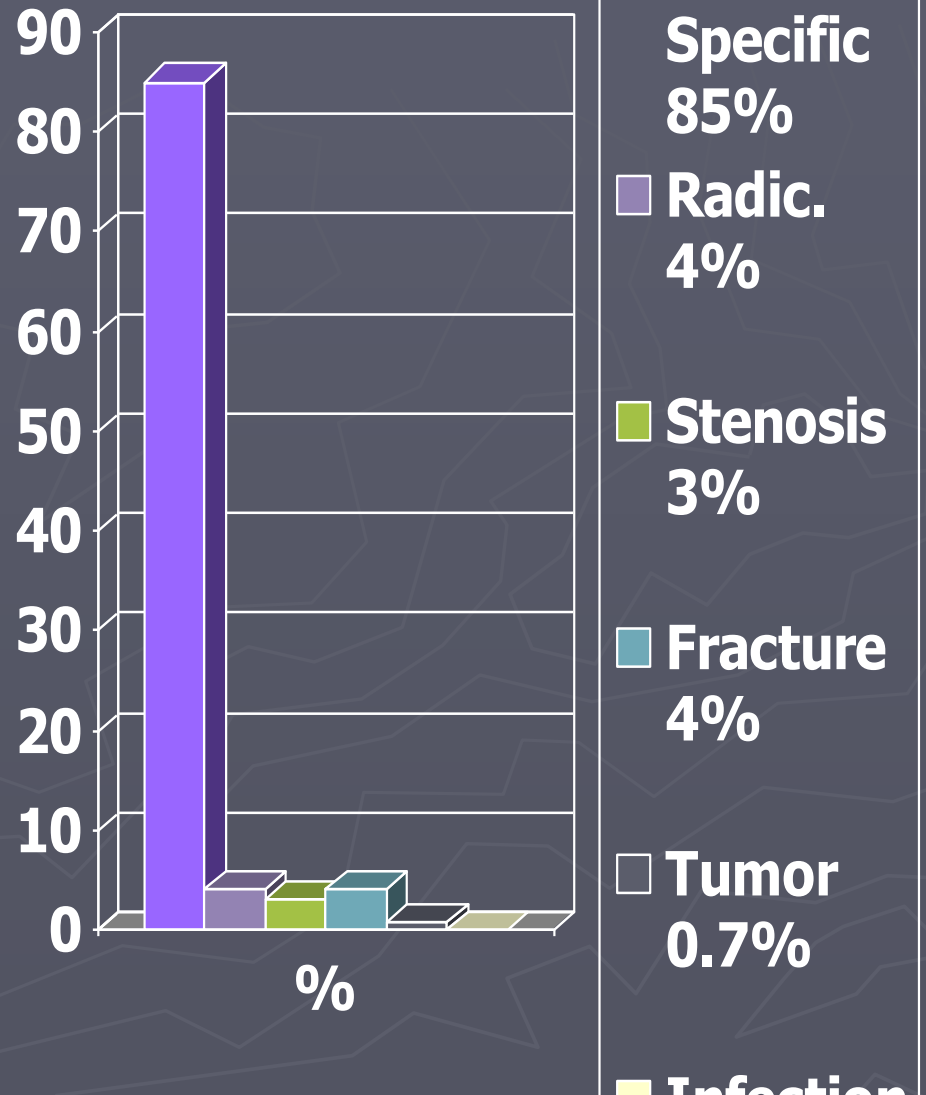
ウィルスはアポトーシスを阻害しようとする



宿主細胞はアポトーシスを誘導しようとする

Evaluation of LBP

- History & Physical
- Stratify the patients into 1 of 3 groups
 - Non specific LBP
 - LBP with Radiculopathy/Spinal Stenosis
 - LBP associated with other spinal causes



Evaluation of LBP

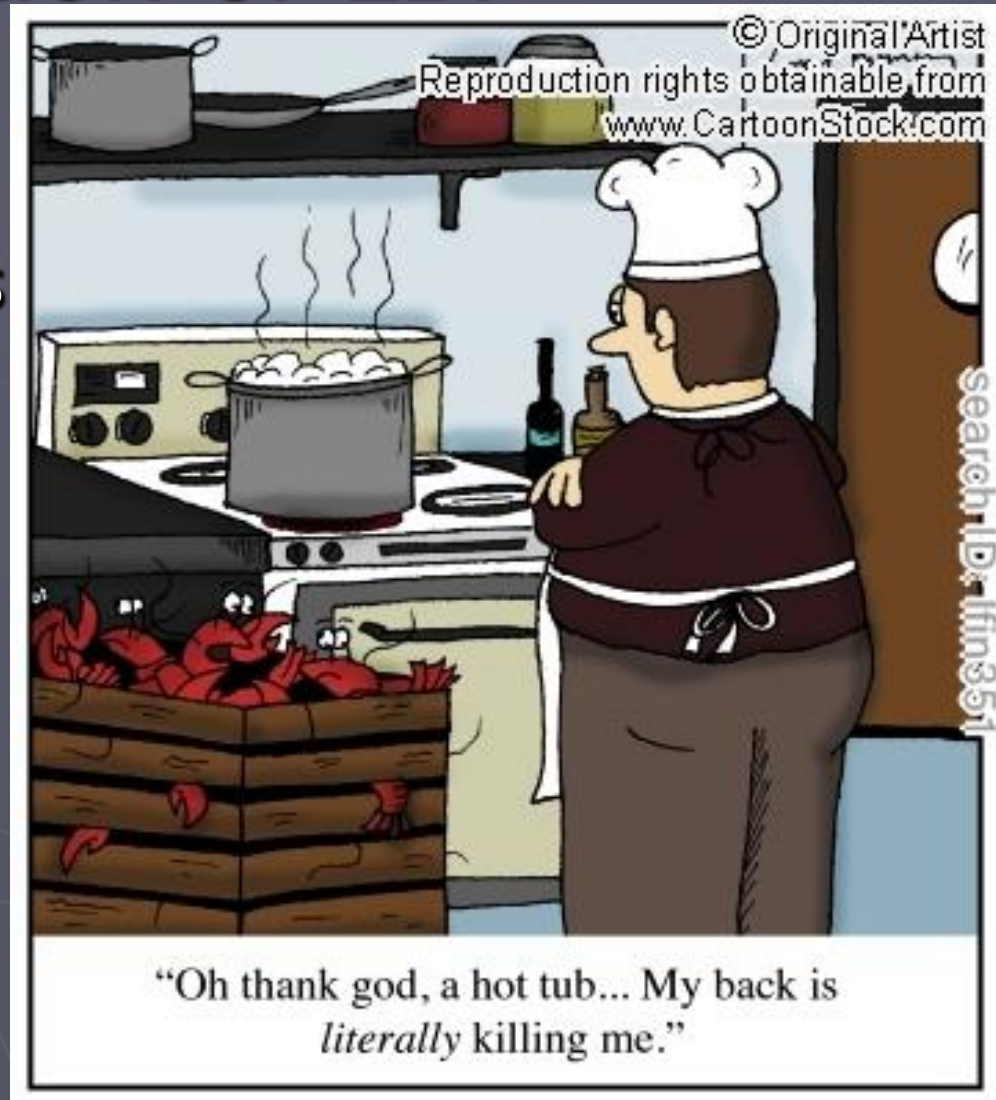
- ▶ Non Specific LBP – represents about 85% of the presenting patients
- ▶ van Tulder MW, et al. Spine. 1997;22:427-34.
- ▶ Reviewed the published observational studies and failed to find causal relationship between radiographs and non specific LBP

Evaluation of LBP

- ▶ LBP with Radiculopathy – 4%
- ▶ LBP with Stenosis – 3%
- ▶ Deyo RA, et al. JAMA. 1992;268:760-5.
- ▶ LBP other Spinal Causes
 - Fracture – 4%
 - Tumor – 0.7%
 - Infection – 0.01%
- ▶ Jarvik JG, et al. Ann Intern Med. 2002;137:586-97.

Evaluation of LBP

- ▶ History & Physical
- ▶ Duration of symptoms
- ▶ Location & Character of Pain
 - Axial vs. Radiating down the buttock/leg
 - Electrical sensation
 - Numbness/weakness



History with Radic/Stenosis

- ▶ Leg Pain
- ▶ Buttock Pain
- ▶ Numbness/Tingling
- ▶ Nerve Tension Signs



Evaluation of LBP

► Risk Factors – Fracture

- Age
- Osteoporosis Hx
- Steroid use
- Ankylosing Spondylitis



Evaluation of LBP

► Risk Factors – Cancer

- History of CA
- Wt. Loss
- Failure to Improve

► Risk Factors –Infection

- Fever
- Recent Infxn
- IVDA



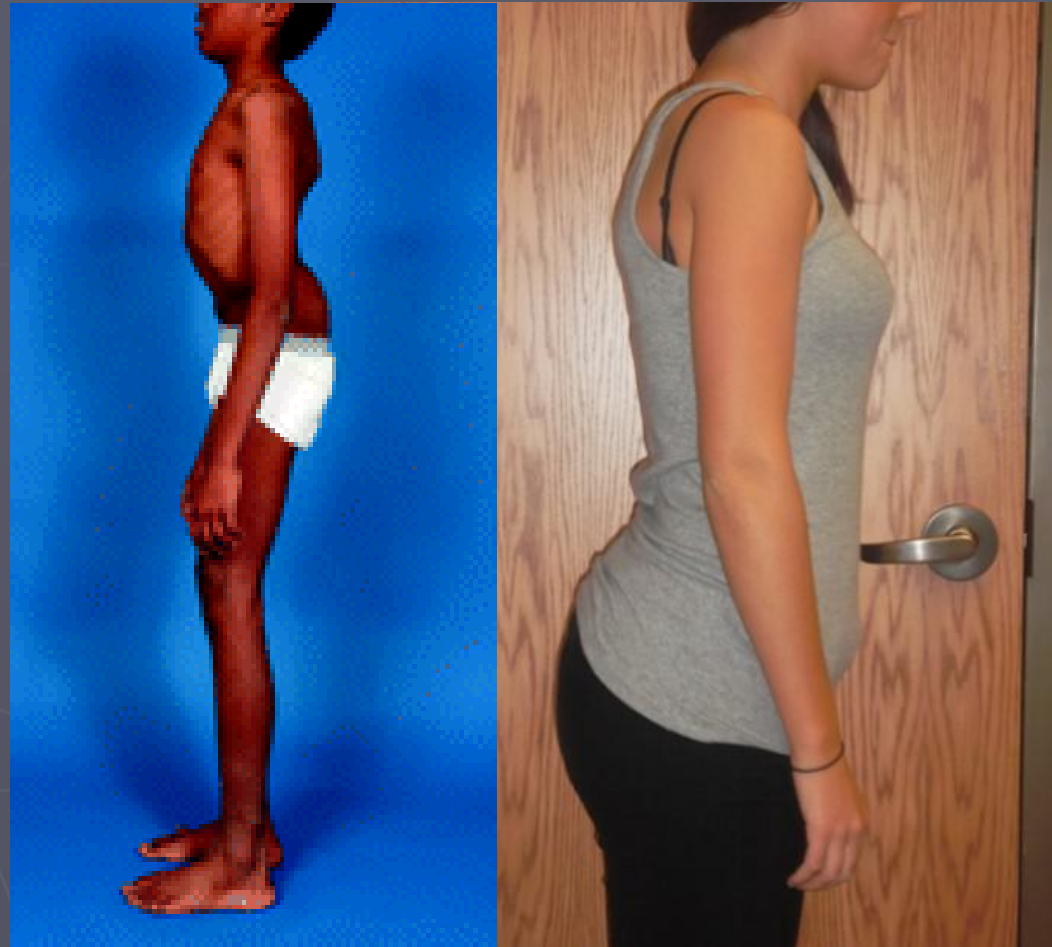
Physical Examination

- ▶ Inspection
 - ▶ New Scoliosis
 - ▶ Saggital balance
 - - hunched posture
- ▶ Observe gait



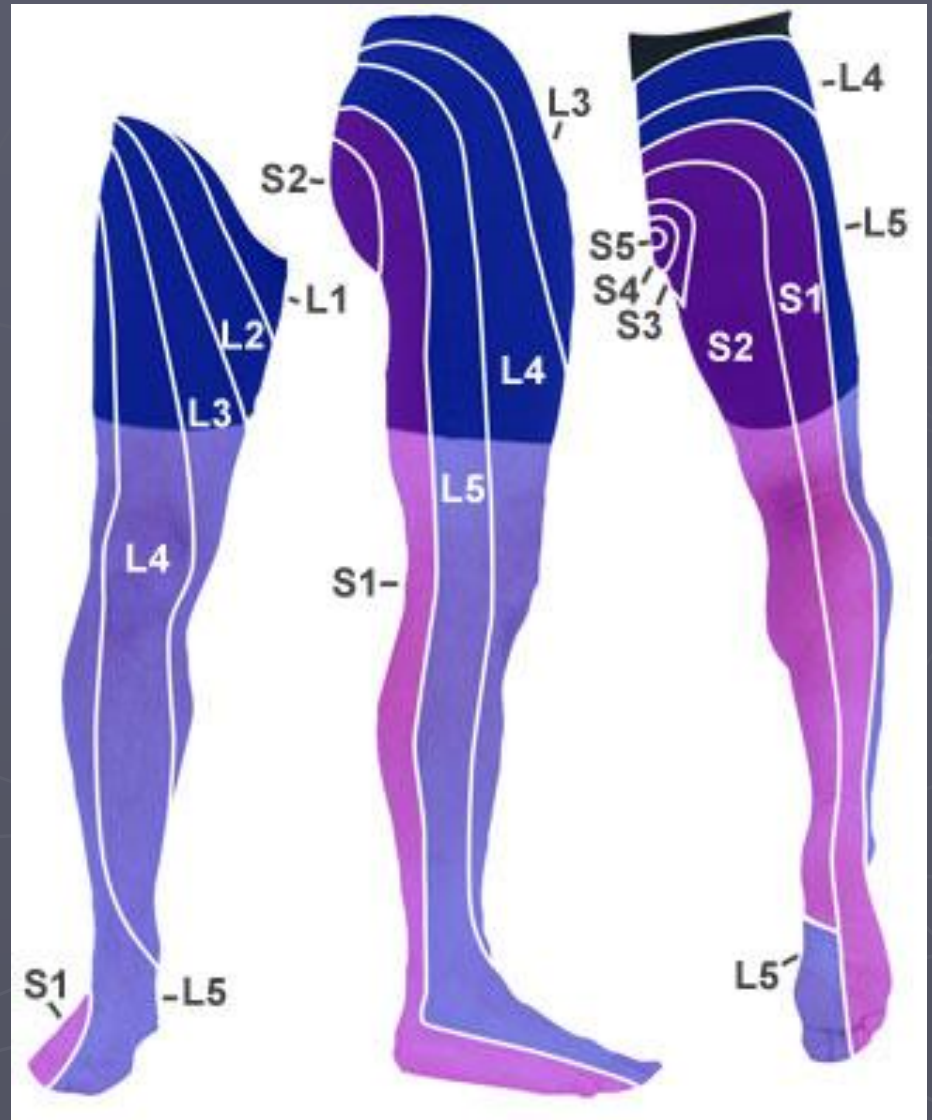
Palpation

- ▶ Lipomas common
- ▶ Step offs
- ▶ Generally diffusely tender or non tender
- ▶ ROM – often limited

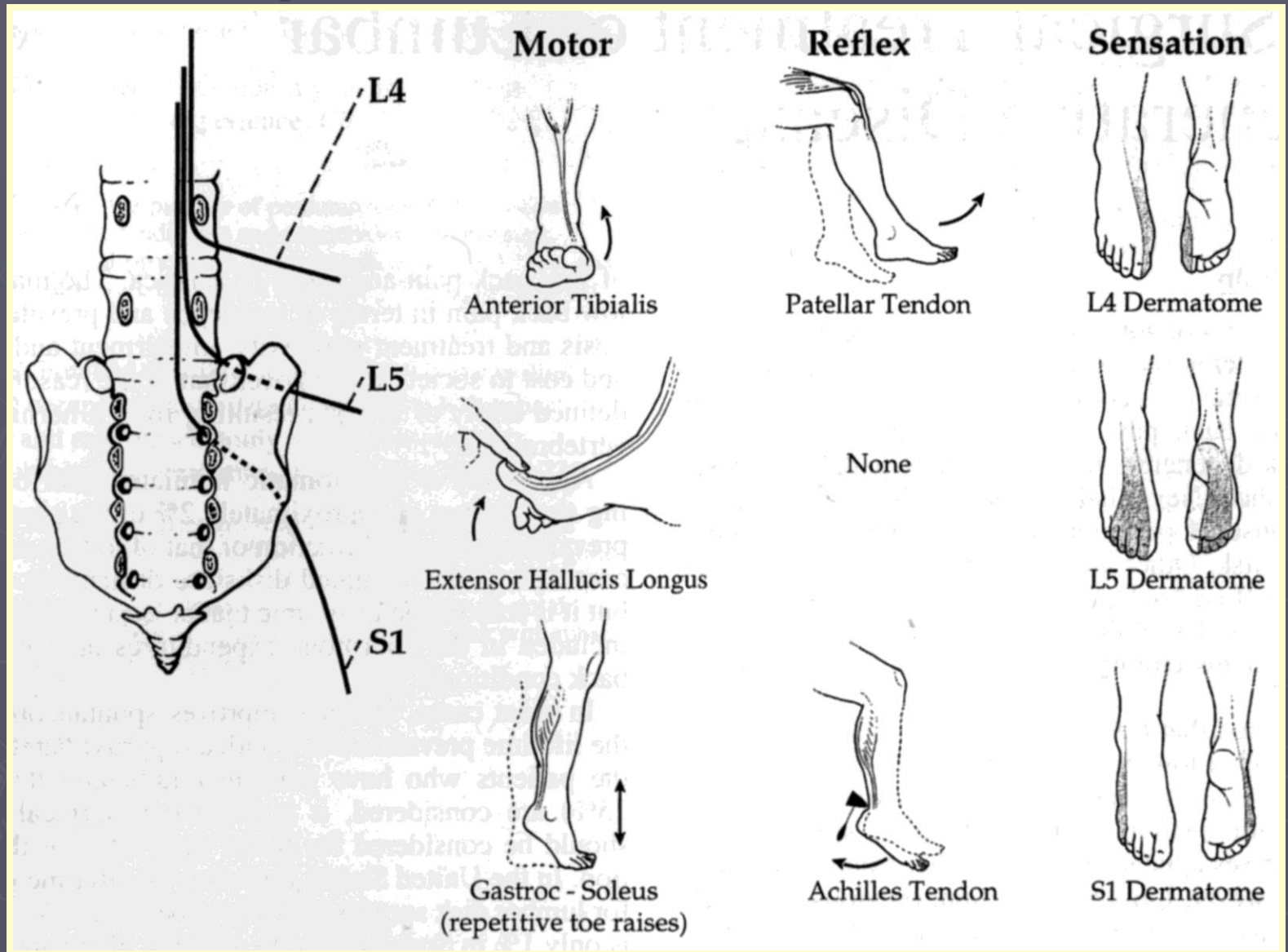


Neurologic Exam

- ▶ Sensory testing
- ▶ Motor Testing
- ▶ Nerve Tension Signs
- ▶ Reflexes

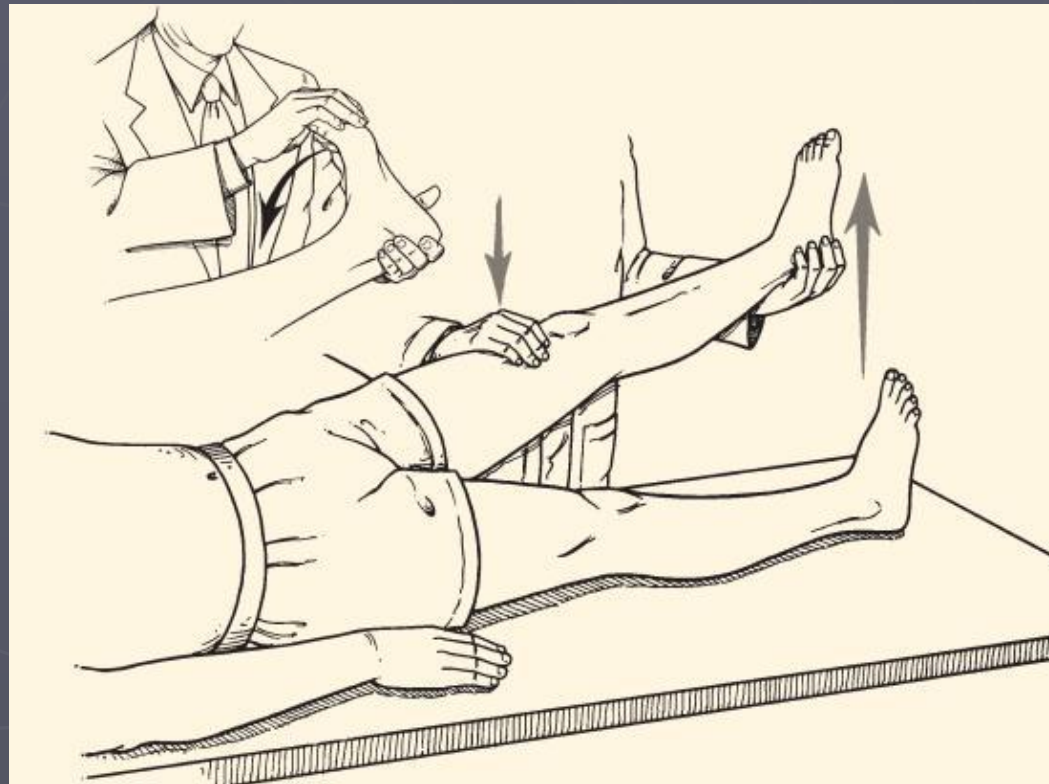


Physical Examination



Neuro Examination

- ▶ Back and Leg Pain in particular distribution seems to have high sensitivity but poor specificity for HNP
 - 90% occur at L4/5 or L5/S1
- ▶ Straight Leg Raise is also sensitive but not specific 20%
- ▶ Contralateral Straight Leg Raise raises that specificity to 88%



Physical Exam

► Waddell's Signs

- Tenderness
 - Superficial/nonanatomic
- Simulation
 - Axial loading/rotation
- Distraction
 - Straight leg raising
- Regional
 - Weakness/sensory
- Overreaction



Psychological Evaluation

- ▶ Psychosocial issues that might predict poor outcomes
 - Secondary Gain
 - Depression
 - Job Dissatisfaction
- Pincus T, et al. Spine. 2002;27:E109-20.

To Image or Not to Image

- ▶ Non specific LBP
 - Plain film imaging in the first 6 weeks of little value
- ▶ Kendrick D, et al. BMJ. 2001;322:400-5.
 - 421 patients with LBP for median of 10 weeks
 - Not associated with improved function, severity of pain, or health status
 - Did find patients were more satisfied with imaging



To Image or Not to Image

- ▶ IMAGE
- ▶ LBP and severe/progressive neuro deficit
- ▶ LBP and serious underlying condition suggested by history
- ▶ Delay can result in poorer outcomes
- ▶ MRI is generally the most useful as it provides information about the marrow, soft tissues and spinal canal



Imaging - MRI

- ▶ Soft Tissue Detail
- ▶ Spinal Canal Evaluation
- ▶ Marrow Signal



Imaging - CT

- Provides bony detail
- Easier for patients to tolerate
- Downside is increased radiation



To Image or Not to Image

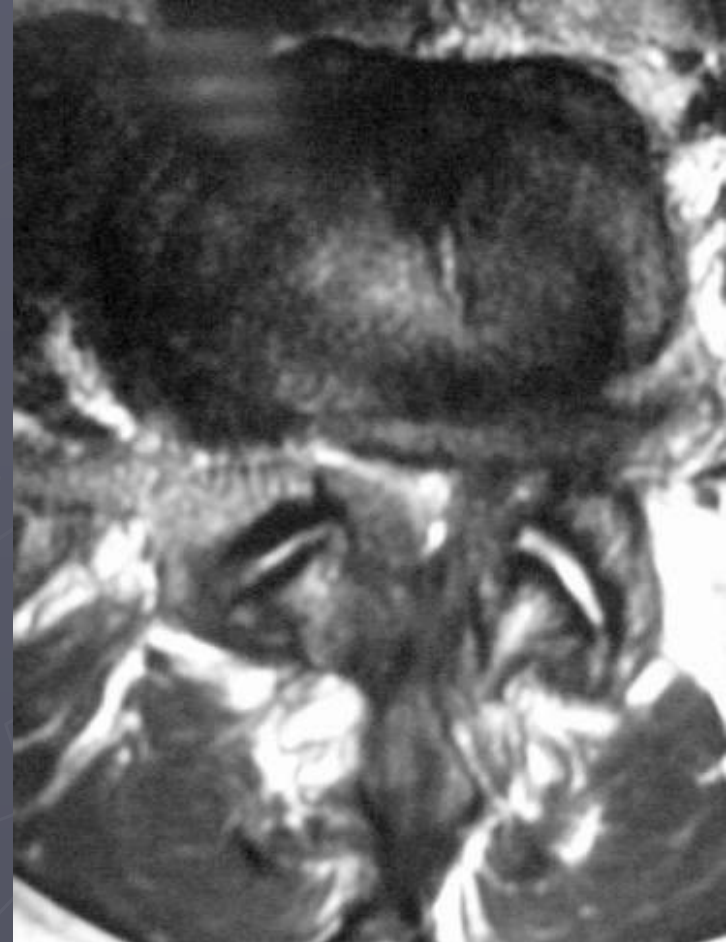
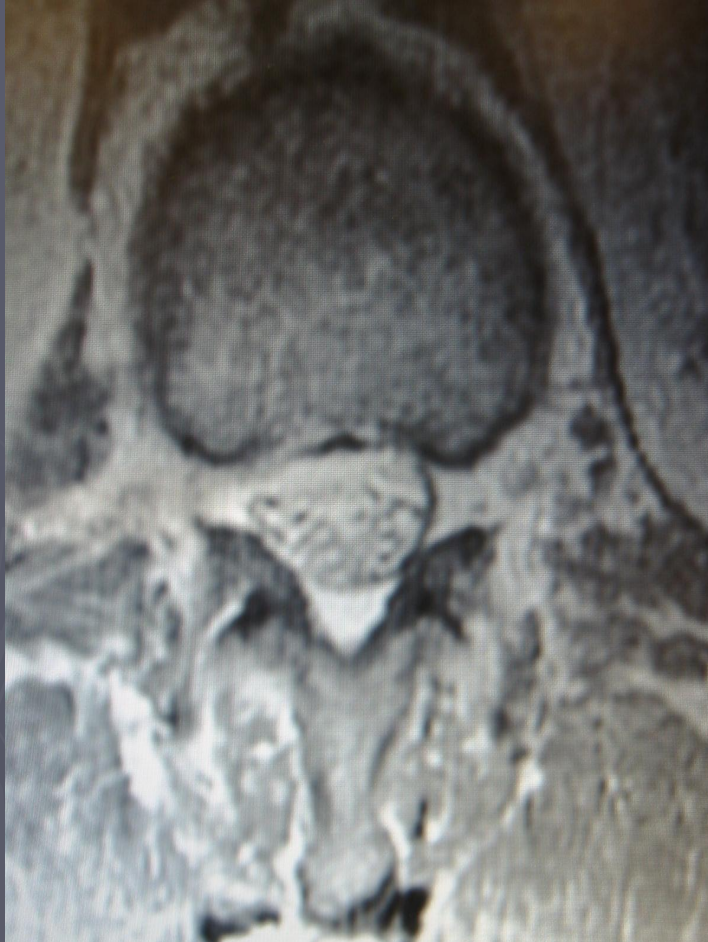
- ▶ Those patients with radicular symptoms but preserved neurologic exam should not receive initial imaging
- ▶ Does not alter initial management options
 - Rest
 - NSAIDS
 - Therapy

LBP with Radicular Symptoms



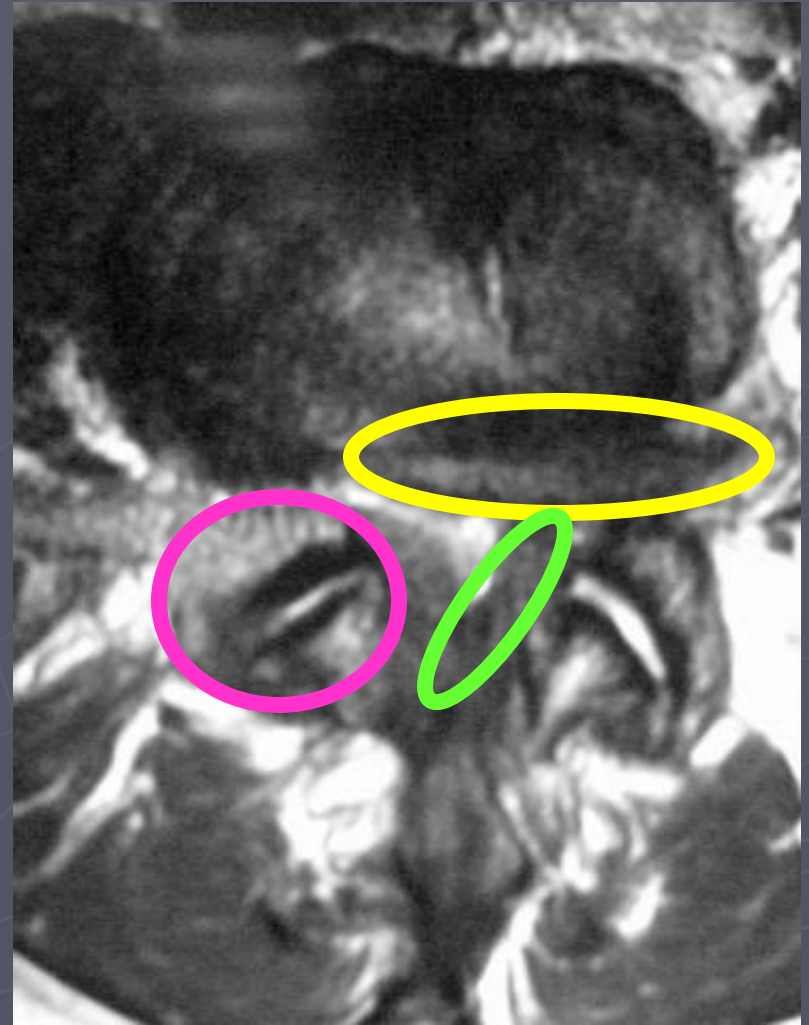
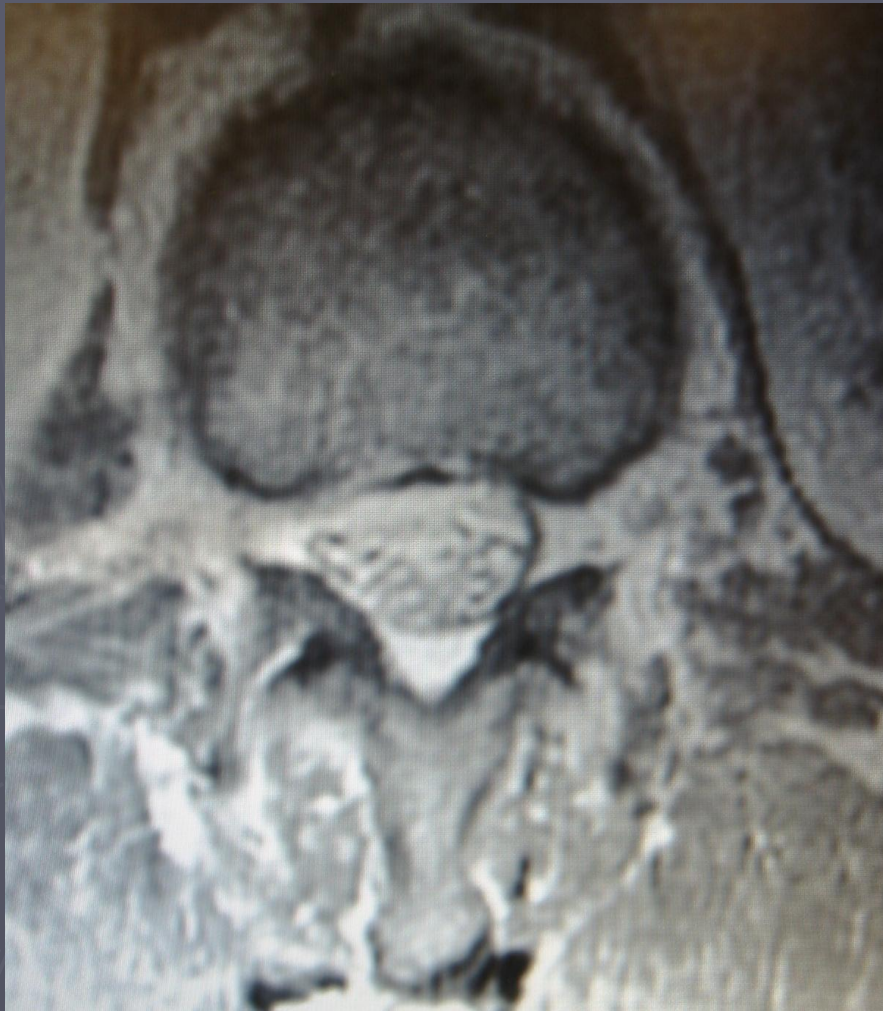
- ▶ When symptoms continue to persist MRI is preferred method of imaging

LBP with Claudication

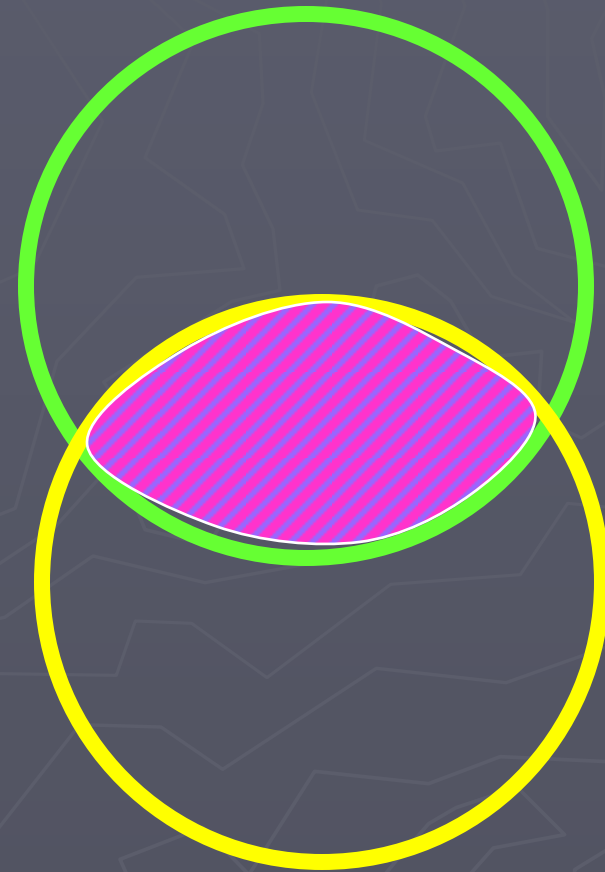
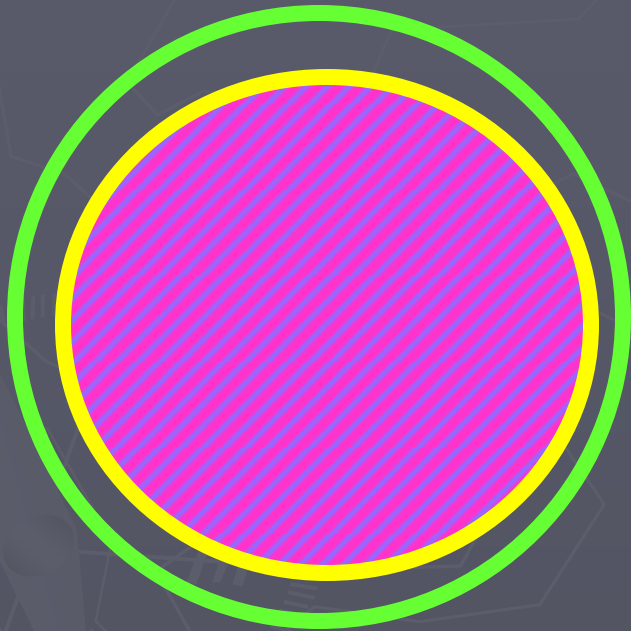


- ▶ MRI provides evaluation of the spinal canal
- ▶ Value – depends on ability to act further

Spinal Stenosis - MRI



Spondylolisthesis



Treatment

► Self Care

- Time
- Activity Modification
- Local Measures – Heat/Ice
- Hamstring Stretching
- Abdominal Strengthening

► Pengel LH, et al. BMJ. 2003;327:323.

► Found symptoms generally improved in one month

► Important to note that resolution often took longer than one month.



Treatment

- ▶ Acetaminophen
- ▶ NSAIDS
- ▶ Tramadol
- ▶ Opioids
- ▶ Benzodiazepines can have short term value, but risk of abuse
- ▶ Tricyclic Antidepressants can be considered in chronic cases.
- ▶ American College of Physician Guidelines 2007
- ▶ Systemic Steroids not shown to be better than placebo
 - Spine 2006 – randomized controlled study of short term sciatica
- ▶ SSRi & Trazadone not shown to be effective
 - Spine 2003
- ▶ Gabapentin – weak evidence to support use in acute sciatica
 - The Pain Clinic 2001



Treatment - Therapy

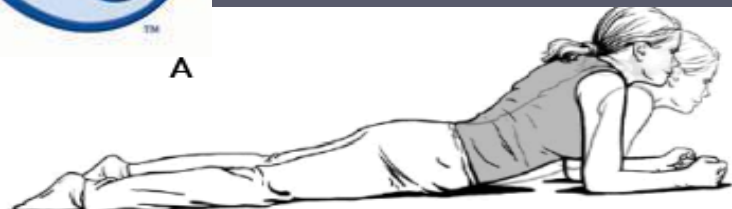
- ▶ Physical therapy
 - Effective at improving subacute pain
 - Centralizing pain to reduce radicular symptoms first
 - “Core Strength” to improve axial symptoms
 - ▶ Hamstring Stretching
 - ▶ Abdominal Strengthening





Treatment - Therapy

A



B





Therapy

- ▶ Earlier therapy is effective at managing acute LBP, and suggestive that can avoid more chronic pain
- ▶ Fritz JM, et al. Spine. May 2012, epub.
- ▶ Therapy can lead to earlier return to work and decrease absenteeism
- ▶ Karjalainen K, et al. Cochrane Collaboration Back Review Group. Spine. 2001
- ▶ Control Radicular Symptoms
- ▶ Hamstring Stretching
- ▶ Abdominal Strengthening
 - Particularly Lower Abs
- ▶ Weight Control



Alternative Treatments

- ▶ Acupuncture
- ▶ Chiropractic Care
- ▶ Massage Therapy

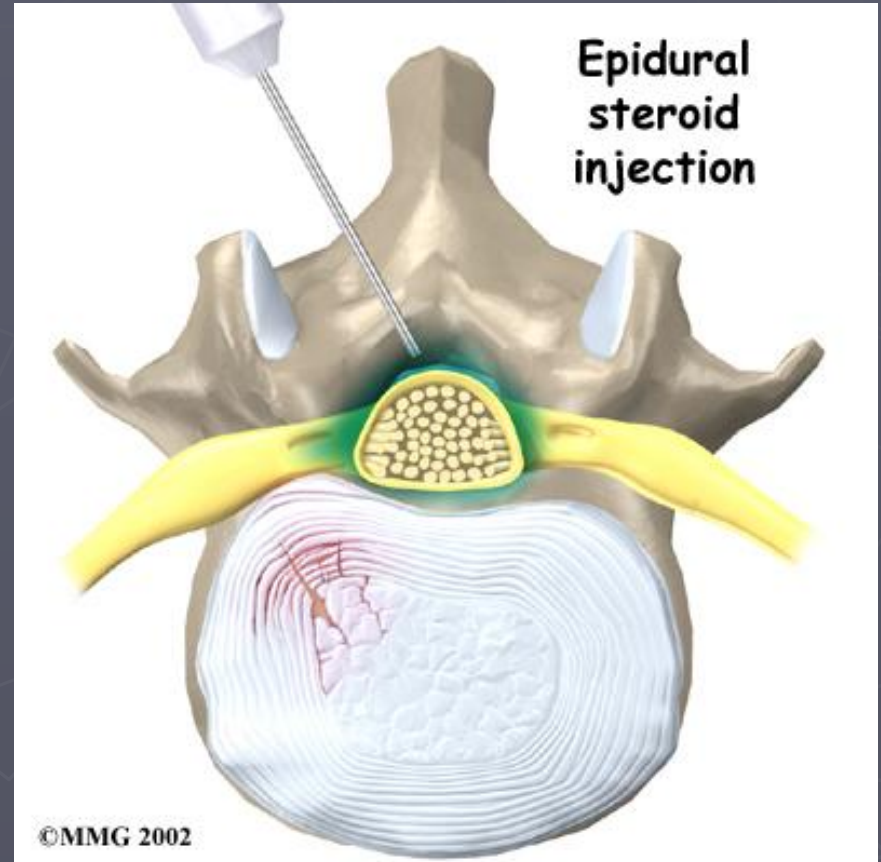
- ▶ Vroomen PC, et al. J Spinal Disord. 2000; 13:463-9.
- ▶ Insufficient data to recommend these modalities



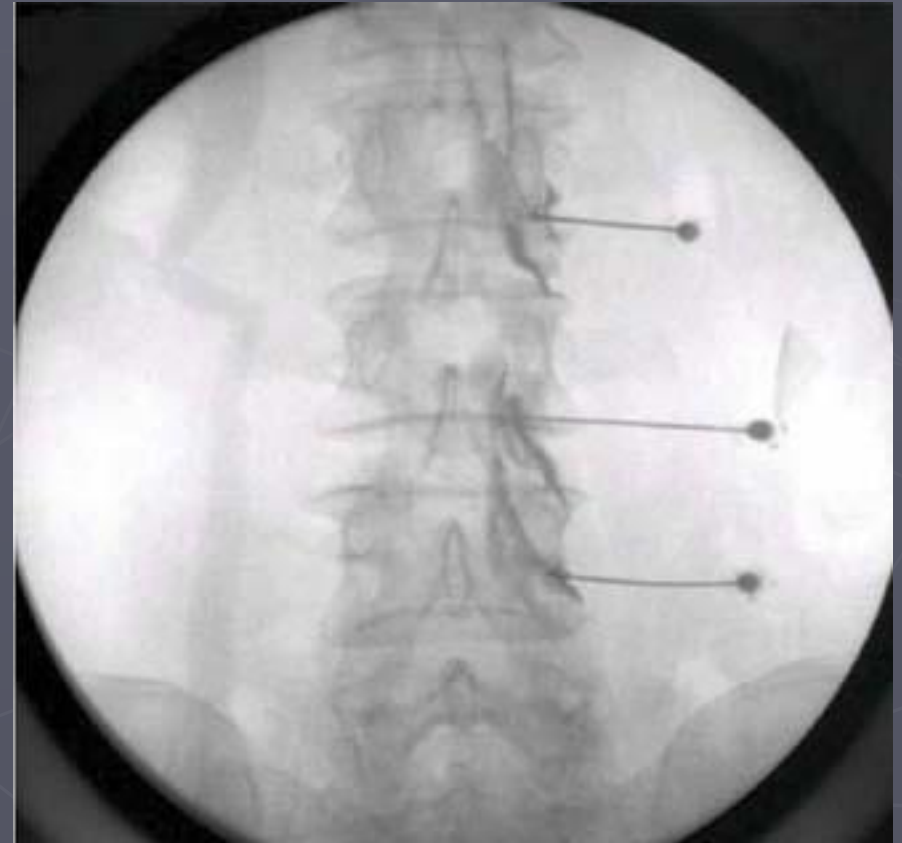
Treatment - Injection

- ▶ Good evidence to control radicular symptoms from HNP
- ▶ Fair evidence to control radicular symptoms from spinal stenosis
- ▶ Limited evidence to control axial back pain

Manchikanti L, et al. Pain Physician. 2012 May-Jun;15(3):E199-245.



Treatment - Injection



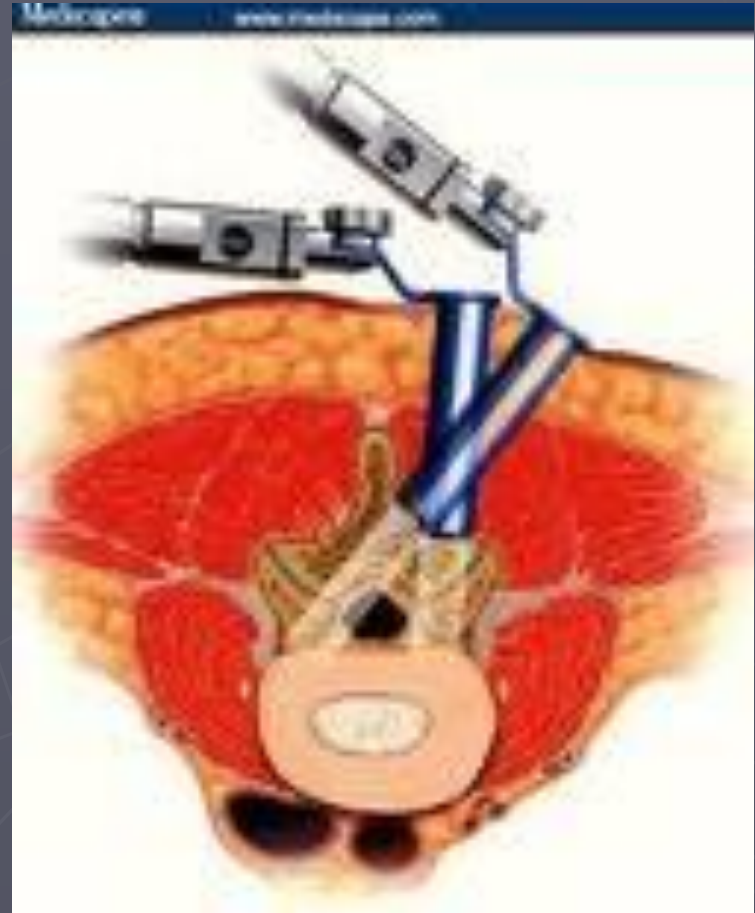
Treatment - Surgery

- ▶ Acute Non specific LBP
- ▶ Herniated Disc
- ▶ Spinal Stenosis
- ▶ Spondylolisthesis



Surgery – Herniated Disc

- ▶ NIH funded study
- ▶ 743 patients in multicenter study
- ▶ Patients that failed non operative care improved with surgery vs. those that did not undergo surgery at 2 year follow up
- ▶ Weinstein JN, et al., JAMA, 2006 Nov 22;296(20):2451-9



Surgery - Stenosis

- ▶ 289 patients randomized, 265 observational cohort
- ▶ Surgically treatment patients did significantly better than those treated non surgically
- ▶ Little harm noted in either the surgically or non surgically treated group.
- ▶ Weinstein, JN et al. NEJM 2008, Feb 21; 358(8): 794-810.

Surgery - Spondylolisthesis

- ▶ 304 patients randomized, 303 observational cohort.
- ▶ Significant advantage to surgery that remained over time vs. non op.
- ▶ Weinstein, JN et al. N Engl J Med. 2007 May 31; 356(22): 2257–2270



Surgery – Cost Effective?

- ▶ Evaluated 1-2 level spinal stenosis and spondylolisthesis treated with decompression and fusion in relation to outcomes seen with total joint arthroplasty
- ▶ Found HQROL and Cost Effectiveness studies to be similar
- ▶ Rampersaud YR, et al. Spine J. 2011 Nov;11(11):1033-41

Recommendation – Work Up

- ▶ H&P to determine the character (strong recommendation)
- ▶ Don't image in the first 6 weeks unless serious neuro deficit or serious etiology (strong recommendation)
- ▶ Do image when serious etiology or neuro deficit (strong recommendation)
 - MRI is preferred modality
- ▶ Image when patients are actually candidates for intervention – injection or surgery (strong recommendation)

Recommendation - Treatment

- ▶ Self care initially as most will resolve (strong recommendation)
 - Rest
 - Ice/heat
 - Activity Modification
- ▶ Pain control with medication appropriate for the individual situation (strong recommendation)
 - Acetaminophen/NSAIDS are preferred
 - Opioids used judiciously are acceptable
 - TCA can be considered in chronic situation
 - Gabapentin has only weak evidence to support use

Recommendations - Treatment

- ▶ When not improving consider the role of therapy (weak recommendation)
- ▶ Surgery – proven role in cases with appropriate pathology