Approach to Chronic Back Pain

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Back pain

- **Most common questions patients ask me in my office:**
- ***"Why is it bothering me?"***
- ***"Is there anything that can be done?"***

Objectives

- Background
- Anatomy
- Etiology
- Treatments

Background

- In United States –

- Approximately 10 million Americans are disabled from chronic low back pain
- 250 million workdays are lost per year due to chronic low back pain
- Annual incidence of 10-15% of adult population suffer moderate intensity low back pain
  - Typically self limited with > 90% recover over 3 months
  - Remainder 10% have intensive demands and utilize significant healthcare resources

"Management of Chronic Low Back Pain." Am. J. Phy. Med Rehabil. Vol 84, No. 3 (supplemental). March 2006

Costs

- **Low back pain – 5th most common reason for physician visits**
- **In 1998:**
  - **Total incremental direct healthcare costs due to low back pain were $26.3 billion dollars**
  - **Indirect costs from days lost from work: approximately 2% of US work force compensated for back injuries per year.**
- **Approximately 5% of patients with low back pain disability account for 75% of costs associated with low back pain**

"Diagnosis and Treatment of Low Back Pain: A Joint Clinical Practice Guidelines from the American College of Physicians and the American Pain Society.: Annals of Internal Medicine. Vol 147 No. 7. October 2007

Timing

- **Low back pain categorized –**
  - **Duration, location, etiology**
- **Acute – 2-4 weeks**
- **Subacute - < 12 weeks**
- **Chronic - > 12 weeks**

"Management of Chronic Low Back Pain." Am. J. Phy. Med Rehabil. Vol 84, No. 3 (supplemental). March 2006

Evaluation

- Focused history
  - Back pain
  - With or without leg pain
  - Other associated symptoms
- Assess risk factors
  - Medical comorbidities
  - Psychological factors
- Focused physical examination
  - Neurological deficits

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Evaluation

- *Eradication* of back pain is rare
- Psychological evaluation
  - Back pain is multifactorial
  - Emotional, cognitive, behavioral, social and employment

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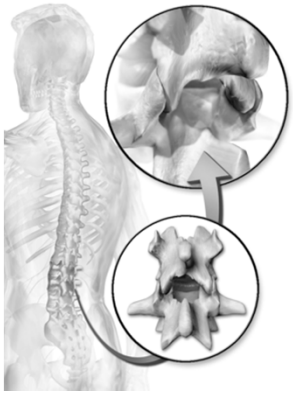
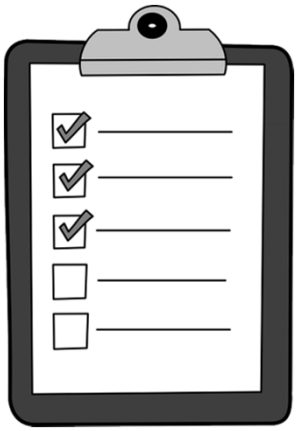
Anatomy

- **Spine is composed of 30 vertebra**
  - **Tripod structure: 2 facets and 1 disc**
- **Spine consists of the muscles, tendons and ligaments**
- **Pain can come from ANY of the structures**



Objectives

- **Background ✔**
- **Anatomy ✔**
- **Etiology**
- **Treatments**



Etiology

- Disc herniation
- Spinal stenosis
- Degenerative spondylolisthesis
- Spondylolysis with spondylolisthesis
- Lumbar sprain or strain
- Degenerative changes
- Fracture
- Tumor
- Infection

Nonspecific back pain

- Lumbar strain or sprain
- Degenerative changes

- Patient education imperative
  - Condition is self limited
  - Remain active

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Approach

- **Multidisciplinary approach**
  - **Physical therapist**
  - **Pharmacological treatment**
  - **Nonpharmacological treatment**
  - **Cognitive behavorial therapy**
  - **Invasive interventions**

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Physical therapy

- **Physical therapy**
  - **Reconditioning**
  - **Strengthening**
  - **Range of motion**
  - **Low impact aerobic activity**
  - **Williams's flexion exercises, McKenzie exercises**
  - **Aqua therapy**
  - **Heat/cold modalities**
  - **Bracing**

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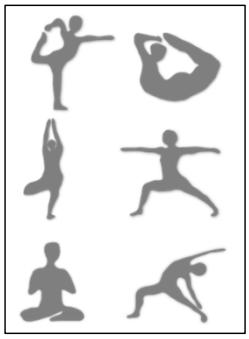
Adjunctive therapies

- Adjunctive therapies
  - Acupuncture
  - Transcutaneous electrical nerve stimulation (TENs)
  - Massage therapy
  - Behavioral therapy/biofeedback
  - Yoga/traction



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Medications

- Pharmacologic management
  - Nonsteroidal anti-inflammatory drugs (NSAIDs)
  - Nonopioid analgesics
    - Tylenol, tramadol
  - Opioid analgesics
  - Antidepressants
    - Tricyclic antidepressants
      - Affect serotonin and noradrenaline
  - Muscle relaxants
  - Gabapentin

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Procedures

- **Invasive procedures**
  - **Epidural steroid injections**
  - **Facet joint injections**
  - **Trigger point injections**
  - **Radiofrequency procedures**
  - **Sacroiliac joint procedures**

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- **Surgery typically not beneficial for nonspecific back pain**

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- Disc herniation
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- ~~Lumbar sprain or strain~~
- ~~Degenerative changes~~
- Fracture
- Tumor
- Infection

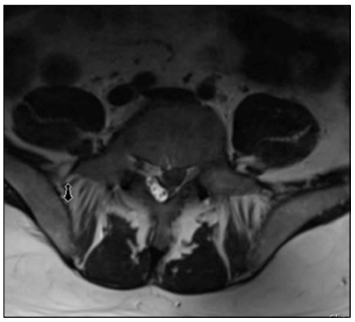
Disc herniation

- Extrusion of disc material with compression of nerve

- Presentation includes:
  - Leg pain in the distribution of nerve that is under compression
  - With or without complaints of weakness in myotomal distribution

Disc herniation

- **Physical examination findings:**
  - **Assess straight leg raise**
  - **Assess sensation**
  - **Assess strength**

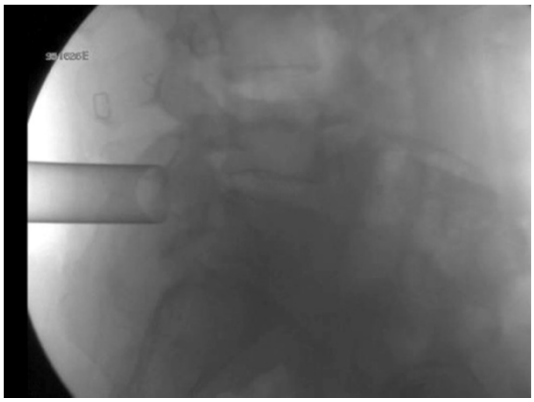


Disc herniation…Treatment

- **Nonoperative treatment**
  - **No significant weakness on examination**
  - **Physical therapy**
  - **Medications**
  - **Injections**
- **Typically 6 weeks**

Disc herniation

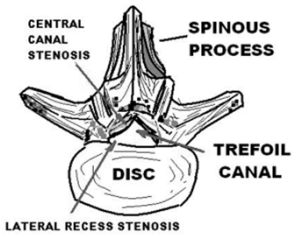
- **Operative treatment**
  - **Microdiscectomy**



Lumbar spinal stenosis

- **Compression of the caudal nerve roots**

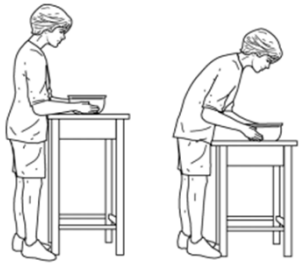
- **Etiology**
  - **Degenerative**
  - **Congenital**



- **Anatomy**
  - **Disc protrusion**
  - **Ligamentum flavum hypertrophy**
  - **Facet hypertrophy**

Lumbar stenosis

- **Presentation includes:**
  - ***Neurogenic claudication***
  - **Buttock and leg pain and/or paresthesias with standing/walking**
  - **Decreased walking tolerance**
  - **Improvement with sitting or forward flexion**



- **Red flags for cauda equina:**
  - **Bowel incontinence**
  - **Overflow urinary incontinence**
  - **Weakness bilateral lower extremities**
  - **Saddle anesthesia**

Lumbar stenosis

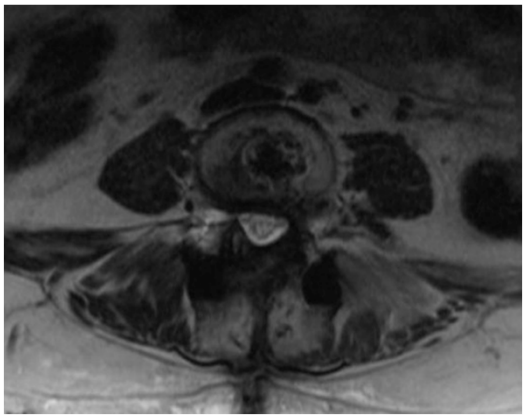
- Physical examination findings:
  - Often normal physical examination

Lumbar stenosis…Treatment

- Nonoperative treatment
  - No significant weakness on examination
  - Physical therapy
  - Medications
  - Injections
- Typically 6 weeks

Lumbar stenosis

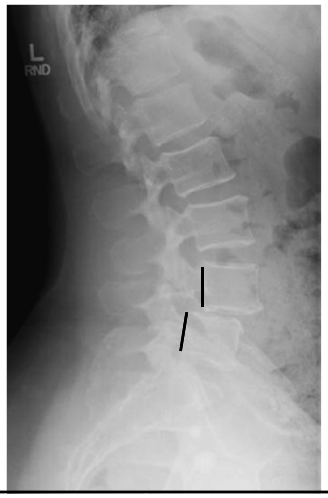
- **Operative treatment**
  - **Laminectomy**



Degenerative spondylolisthesis

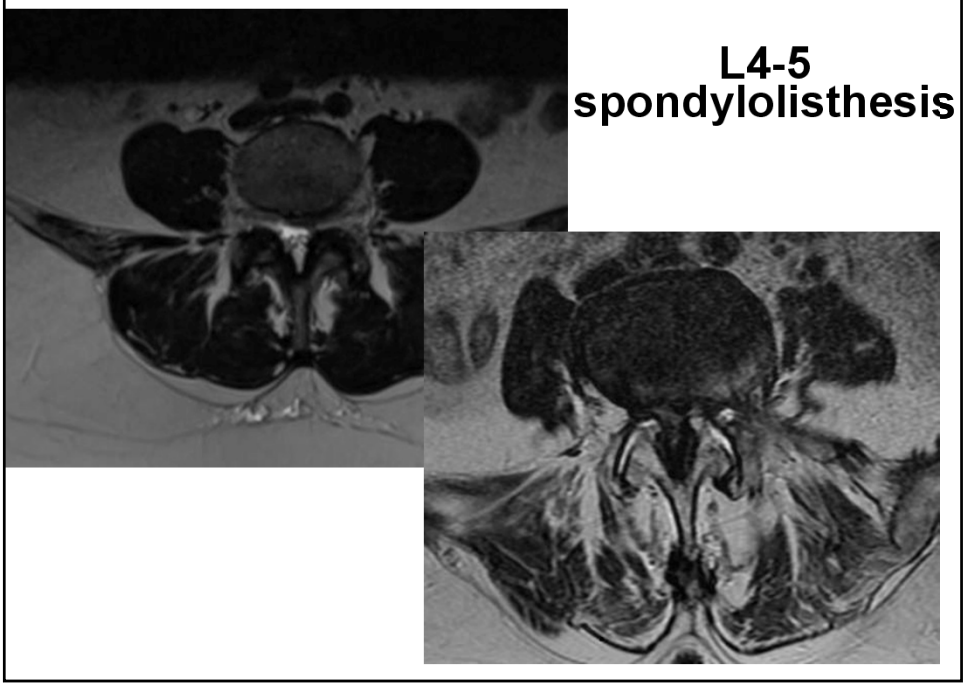
- **Anterolisthesis of lumbar spine**

- **Etiology**
  - **Degenerative**
  - **Congenital**
  - **Pathologic**
  - **Traumatic**
  - **Iatrogenic**
  - **Pars defect**



Degenerative spondylolisthesis

- **Presentation includes:**
  - **Start up pain**
  - **Leg pain secondary to radiculopathy**
  - **May have symptoms of neurogenic claudication**



L4-5 spondylolisthesis

Degenerative spondylolisthesis

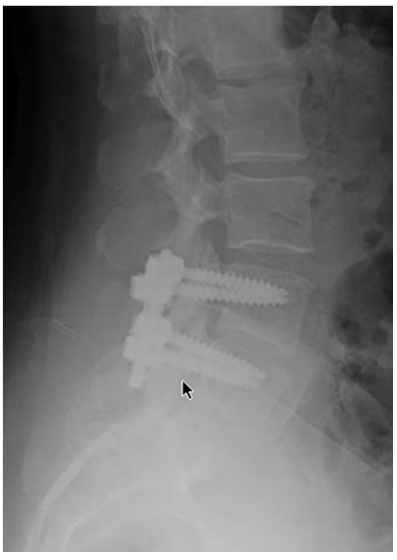
- Physical examination findings:
  - Positive straight leg raise
  - Pain and/or paresthesias
  - Possible weakness

Treatment

- Nonoperative treatment
  - No significant weakness on examination
  - Physical therapy
  - Medications
  - Injections
- Typically 6 weeks

Degenerative spondylolisthesis

- Operative treatment
  - Decompression with stabilization
  - Fusion is the biologic process
- Various surgical approaches
  - Posterior decompression with instrumented fusion
  - Lateral decompression with instrumented fusion
  - Anterior decompression with instrumented fusion



SPORTs trial

- Spine Patient Outcomes Research Trial
- Multicenter study with 13 sites
- 3 conditions studied
  - Disc herniations
  - Degenerative spondylolisthesis
  - Lumbar spinal stenosis
- Studied nonoperative vs. operative treatment
- Began March 2000

SPORTs trial

- Two armed study
  - Randomized arm
    - Patients watched shared decision making video and agreed to be put into randomized study
  - Observational arm
    - Patients unwilling to be randomized but did agree to participate in follow up evaluations

SPORTs trial

- **Nonoperative treatments**
  - **Active physical therapy**
  - **Education with home exercise instruction**
  - **NSAIDS if tolerated.**

SPORTs trial

- **Operative treatments**
  - **Disc herniation: microdiscectomy or standard discectomy**
  - **Lumbar spinal stenosis: posterior decompressive laminectomy**
  - **Degenerative spondylolisthesis: Laminectomy with or without fusion**
    - **With or without iliac crest autograft**
    - **With or without instrumentation**

SPORTs trial

- Objective outcome measures
  - SF-36
    - Physical function, mental health, general health, pain, physical limitations, emotional limitations, social functioning, vitality.
    - Higher scores indicate better outcomes
  - ODI
    - 10 questions: pain, getting dressed, lifting, walking, sitting, standing, sleeping, social, traveling, sexual activity
    - Higher scores indicate more disability

SPORTs trial

- Secondary outcomes measures
  - Preference based measures of current health
  - QALYs
  - Resource utilization
  - Direct inpatient costs
  - Direct outpatient costs
  - Indirect costs

SPORTs trial…Summary

- Disc hernation
  - Significant crossover in the randomized group
  - Both treatment groups maintained improvement at 8 year period
  - Patients who underwent surgery had significantly better self-reported outcomes than those with non-operative care in all categories except work status

SPORTs trial…Summary

- Degenerative spondylolisthesis
  - Patients improve with surgery more than with non-operative care at 4 years period
  - Use of instrumented fusion less clear in terms of overall benefit
  - Surgery for spondylolisthesis is more invasive, associated with higher blood loss and more complications

SPORTs trial…Summary

- Lumbar spinal stenosis
  - Surgery was advantageous and results are persistent at 4 years period
  - Significant crossover in the randomized group

SPORTs trial…Secondary outcomes

- For each group, cost per QALY (quality-adjusted life year) gained for surgery compared to nonoperative care improved at 4 years
- QALY is a complex calculation based on multiple assumptions
- The SPORT trial has been a valuable study even though crossover has affected the design

SPORTs…Reference

- ***SPORT Outcomes: Herniated Disc***
- **"Surgery Vs Non-Operative Treatment for Lumbar Disk Herniation: The Spine Patient Outcomes Research Trial: A Randomized Trial" JAMA 296(20):2441-2450, 2006.**
- **"Surgery Vs Non-Operative Treatment for Lumbar Disk Herniation: The Spine Patient Outcomes Research Trial Observational Cohort" JAMA 296(20):2451-2459, 2006.**
- **"Surgery Vs Non-Operative Treatment for Lumbar Disk Herniation: Four-Year Results from the Spine Patient Outcomes Research Trial (SPORT)" Spine 33(25):2789-2800, 2008.**
- **"Surgery Vs Non-Operative Treatment for Lumbar Disk Herniation: Eight-Year Results from the Spine Patient Outcomes Research Trial (SPORT)" Spine 39(1):3-16, 2014.**
- ***SPORT Outcomes: Degenerative Spondylolisthesis***
- **"Surgery Vs Non-Operative Treatment for Lumbar Degenerative Spondylolisthesis" NEJM 356(22):2257-2270, 2007.**
- **"Surgical Compared With Non-Operative Treatment for Lumbar Degenerative Spondylolisthesis: Four-Year Results in the Spine Patient Outcomes Research Trial Randomized and Observational Cohorts" JBJS 91:1295-1304, 2009.**
- ***SPORT Outcomes: Spinal Stenosis***
- **"Surgical Vs Nonsurgical Therapy for Lumbar Spinal Stenosis" NEJM 358(8):794-810, 2008.**
- **"Surgical versus Non-Operative Treatment for Lumbar Spinal Stenosis: Four-Year Results of the Spine Patient Outcomes Research Trial (SPORT)" Spine 35(10), 2010.**
- ***SPORT Outcomes: Cost Effectiveness Analyses***
- **"The cost effectiveness of surgical versus nonoperative treatment for lumbar disc herniation over two years: evidence from the Spine Patient Outcomes Research Trial (SPORT)" Spine. 2008;33(19):2108-15**
- **"Surgical treatment of spinal stenosis with and without degenerative spondylolisthesis: cost-effectiveness after 2 years" Ann Intern Med. 2008;149(12):845-53.**
- **"Comparative effectiveness evidence from the spine patient outcomes research trial: surgical versus nonoperative care for spinal stenosis, degenerative spondylolisthesis, and intervertebral disc herniation." Spine 2011;36:2061-8.**

Etiology

- ~~**Disc herniation**~~
- ~~**Spinal stenosis**~~
- ~~**Degenerative spondylolisthesis**~~
- ~~**Spondylolysis with spondylolisthesis**~~
- ~~**Lumbar sprain or strain**~~
- ~~**Degenerative changes**~~
- **Fracture**
- **Tumor**
- **Infection**

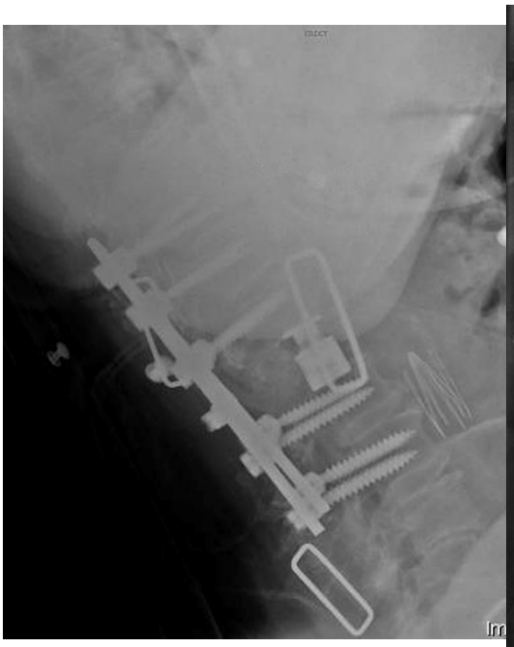
Additional…

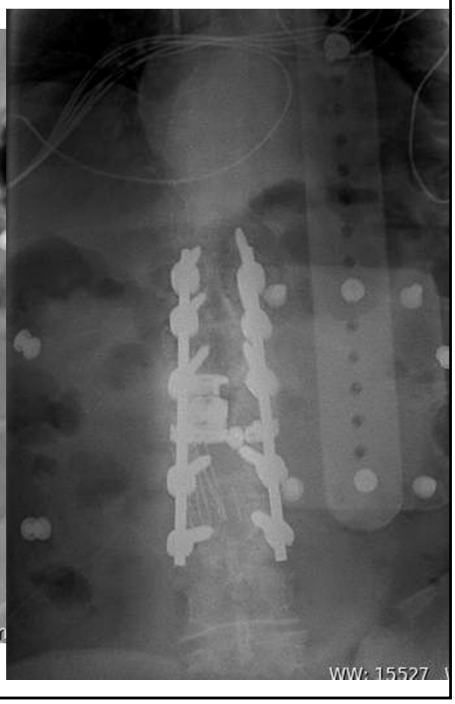
- …causes of back pain

- Fracture
- Tumor
- Infection

Subacute L1 burst fracture

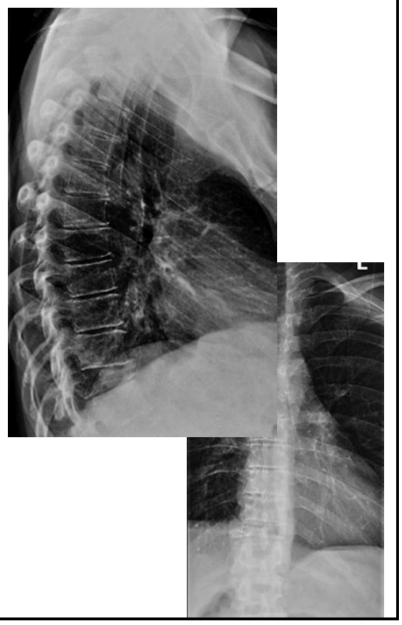
- 76 year old female who presents with 100% low back pain
- History reveals a fall 6 weeks ago with onset of back pain





Tumor

- **50 year old male who presents with 3 months history of low back pain and bilateral rib pain**
- **History reveals weight loss**



Infection

- Typically insidious onset of back pain
- Risk factors predisposing to infection
  - Immunosuppression
  - Transplant
  - IV drug use

Summary

- Approach to back pain is multifaceted
- Identifying the etiology is important
- Education of the patient is necessary