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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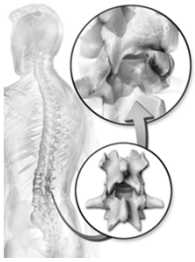
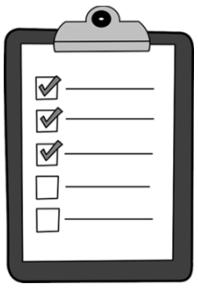
Anatomy

- 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




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

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

Etiology

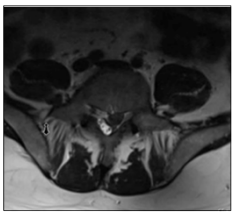
- Disc herniation
- Spinal stenosis
- Degenerative spondylolisthesis
- Spondylolysis with spondylolisthesis
- ~~Lumbar sprain or strain~~
- ~~Degenerative changes~~
- Fracture
- Tumor
- Infection

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

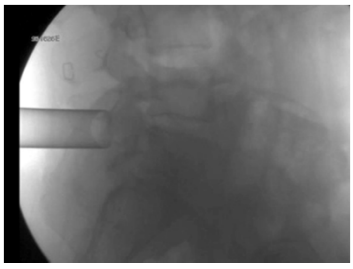


Disc herniation…Treatment

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

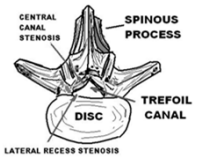
Disc herniation

- Operative treatment
  - Microdiscectomy

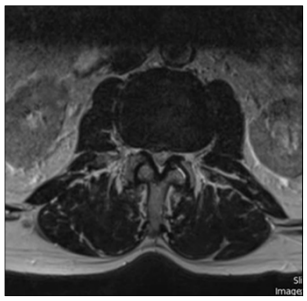


Lumbar spinal stenosis

- Compression of the caudal nerve roots
- Etiology
  - Degenerative
  - Congenital

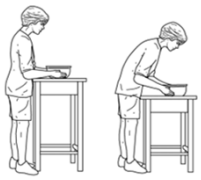


- Anatomy
  - Disc protrusion
  - Ligamentum flavum hypertrophy
  - Facet hypertrophy



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

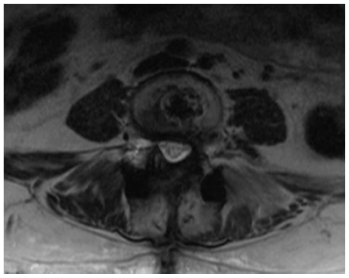
- **Physical examination findings:**
  - **Often normal physical examination**

Lumbar stenosis…Treatment

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

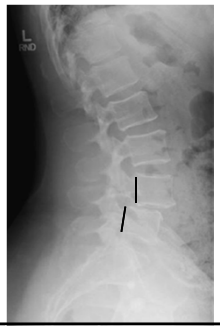
Lumbar stenosis

- Operative treatment
  - Laminectomy



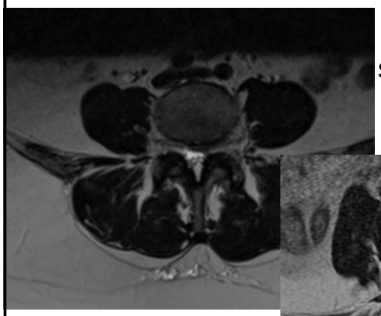
Degenerative spondylolisthesis

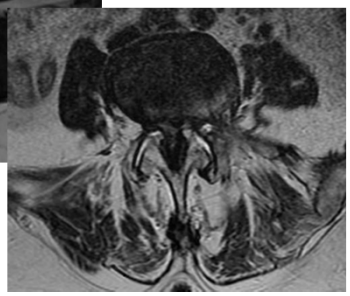
- Anterolisthesis of lumbar spine
- Etiology
  - Degenerative
  - Congenital
  - Pathologic
  - Traumatic
  - Iatrogenic
  - Pars defect



Degenerative spondylolisthesis

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





L4-5 spondylolisthesis

Degenerative spondylolisthesis

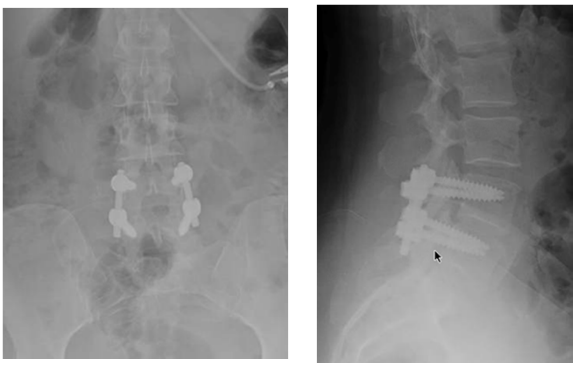
- Physical examination findings:
  - Positive straight leg raise
  - Pain and/or paresthesias
  - Possible weakness

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.
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- *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.
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- "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

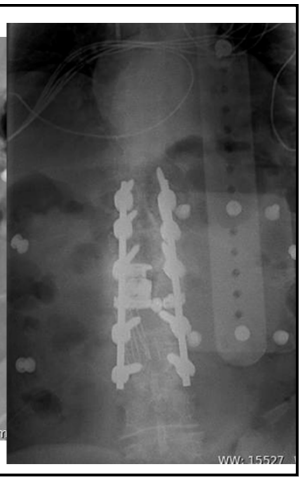
Additional…

- …causes of back pain

- Fracture
- Tumor
- Infection

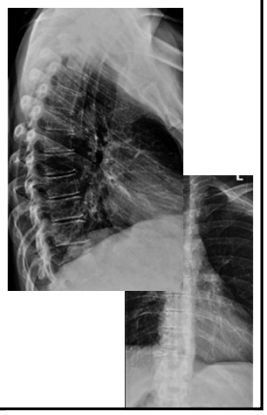
Subacute L1 burst fracture

- 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