Patient Selection and Lumbar Operative Interventions

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Low back pain is a symptom not a diagnosis
Epidemiology of LBP

**General Facts**

- 80% of population experiences LBP
  - 60% in the past year
- Most resolve rapidly & without sequelae
- Most have no pathoanatomic diagnosis
- Mixter & Barr discover “ruptured disc” in 1934
- LBP is the most common reason to visit PT 7 2nd most common to miss work
Surgical Indications

**General**

- Not the mere persistence of pain
- Patient motivation critical
- Radiographic findings consistent with clinical findings
- Subjective vs. objective findings
- Red flag diagnosis
3 Common Surgical Diagnosis

- Isthmic spondylolisthesis
- Spinal stenosis
  - Degenerative spondylolisthesis
  - Degenerative scoliosis
- Disc herniation

“degenerative disc disease”
Isthmic Spondylolisthesis

**Etiology/Prevalence**

- Usually L5-S1
- Acquired vs congenital
  - Not a traumatic fracture
- Associated anomalies such as spina bifida occulta
- Extension posturing
- Youngest 4mo (5-7 and 11-16 years)
Isthmic Spondylolisthesis

Clinical Presentation

- LBP
- Vague leg symptoms
- 5-10% incidence
- <10% slip; incidence LBP=general population
- <25 years more likely cause of LBP than >40 year old
Isthmic Spondylolisthesis

Treatment Principles

- Patient education
- Exercise & therapy
- Bracing
- Surgery to repair defect or fuse the motion segment
Spondylolysis

- 18 baseball pitcher
- Gradual onset lbp over late summer baseball prior to senior season
- Failed variety nonop measures including various injection
- No specific diagnosis
3 consecutive cuts

Good to assess disc health

Not good to identify pars defect
Bone scan
Bilateral pars repair
6 month followup
On Div I baseball scholarship

15.2% of stress fractures in high school athletes lumbar spine
More Common Presentation

- 45 male persistent LBP & right L5 radiculopathy
- Has had favorable response to PT and root blocks but keeps recurring & more severe, difficult to resolve
35 male
Prison guard

LBP and bilateral buttock, posterior thigh pain

Occasional L5 radiculopathy

Several years nonoperative treatment, intermittently

High Grade Spondylolisthesis
Degenerative Spondylolisthesis

Presentation

- Women 5:1 Men
- Usually L4-L5
- Older patient
- Seldom >25% slip
- Associated with stenosis
- Pars intact, occur via facets
Dynamic Problem

64 female LBP & left leg
Spinal Stenosis

Radiographic vs Clinical Diagnosis
Clinical Findings

History

- Buttock & thigh pain with ambulation relieved with sitting
  
  "neurogenic claudication"

- Paresthesias, sense of weakness

- Associated back pain common
Clinical Findings

History

- Grocery cart sign
- Worse downhill than uphill
- Overall medical condition!!!

Natural History

- 19 pts, 31mos
- Partial-block
  - 26%-worse
  - 32%-same
  - 42%-improved
- Johnson *Spine* 1991
Clinical Findings

Physical Exam

- Forward stooped stance
- Paucity of neurological hard findings (motor or sensory)
- Hyporeflexia
- Palpable stepoff spinous processes
- Nonorganic findings less common than in other lumbar disorders
Operative Indications

- Progressive neurological deficit - Rare!
- “Unacceptable quality of life despite nonoperative measures”
- Medical condition not prohibitive (may alter extent of procedure)
- Is the magnitude of the surgery reasonable?
Spinal Stenosis
Decompression
Decompression Alone
When is Fusion Considered?
Degenerative Spondylolisthesis

L4-5
L3-4
Degenerative Spondylolisthesis
Degenerative Scoliosis

Bilateral buttock, posterior thigh worse over course of day

Starts to bend forward more as day goes on
Compare to Nonoperative Treatment
SPORT trial

Surgical versus nonsurgical therapy for lumbar spinal stenosis.


- at least 12 weeks of symptoms
- 289 pts in randomized cohort or 365 pts in observational cohort, multi-center
- Stenosis, no listhesis
- decompressive surgery or usual nonsurgical care
Sport trial

- Bodily pain & physical function SF 36 and ODI
- As-treated analysis
  - combined both cohorts
  - adjusted for potential confounders
  - significant advantage for surgery by 3 months for all primary outcomes
  - changes remained significant at 2 years
Surgical versus nonoperative treatment for lumbar spinal stenosis four-year results of the Spine Patient Outcomes Research Trial.  

Weinstein et al  Spine  2010

Results of SPORT trial held up at 4 year follow-up
Lumbar Disc Herniation
What does lumbar disc herniation mean?

Radiologist report?

Patient with only axial low back pain & radiographic findings

Radiculopathy

- Classic dermatomal pattern & SLR
- Buttock into thigh
- Buttock only
- How much associated lbp?
Herniated Nucleous Pulposis

- Leg pain in radicular distribution
- Correspond symptoms, weakness, reflex
- Younger patient
- Tension signs
- Imaging studies confirmatory
Incidental finding on radiology report

- Abnormal magnetic-resonance scans of the lumbar spine in **asymptomatic** subjects. A prospective investigation.


- <60 years of age
  - 20% have **herniated nucleus pulposus**

- >60 years of age
  - 57% have **herniated nucleus pulposus**

- Age 20-39
  - 35% at least 1 **DDD or disc bulging**

- 60-89 years of age
  - All but one have at least 1 **DDD or disc bulging**
Is it an Injury?

- Disc “rupture”
- I “blew out my discs”
- My report says I herniated all my discs

The Twin Spine Study: contributions to a changing view of disc degeneration.

Disc degeneration primarily the result of genetic predisposition with only small component from physical activity

HNP part of the degenerative cascade
Herniated Nucleous Pulposis

Types

A. Prolapsed

B. Extruded

C. Sequestrated
Imaging

Types of herniation

- Protrusion
- Extrusion
- Sequestration

- L5-S1 significantly better than L4-5
- Extruded & sequestered disc significantly better than protrusions
- Beware of protrusions with substantial lbp, smoking, and work restrictions
Imaging

Posterolateral herniation vs Far lateral herniation

L4-5, L5 radiculopathy
Traversing root

L4-5, L4 radiculopathy
Exiting root
Understand the patient’s problem
Not just the radiographic diagnosis

**L4-5 disc herniation**
- Predominantly leg pain fits L5 root distribution
- Slight EHL weakness
- Continues to work but struggling
- Wants to discuss treatment options as related to return to function

**L4-5 disc herniation**
- No leg pain, only longstanding lbp
- No objective neuro findings
- Last worked 2 years, applying for disability
- Wants to discuss his narcotic needs
Microscopic discectomy

- 85-90% good-excellent results
- Direct visualization
- Gold standard
- Same day safe
In a combined as-treated analysis at 4 Years (not intent to treat)

Surgery greater improvement than nonoperative all primary & secondary outcomes except work status.
Microscopic discectomy

Unanswered Questions

Postoperative restrictions?

Activity restrictions after posterior lumbar discectomy. A prospective study of outcomes in 152 cases with no postoperative restrictions.


• Return to work improved 98%, ave 1.2 weeks
• No increases in recurrent hnp at 2 years
Summary

- Most lumbar spine patients don’t “need” surgery
  - Nonoperative treatment remains the mainstay of therapy
- Radiographic diagnosis must be correlated with the clinical picture
- Surgeons are much better at helping the neurological complain (“leg pain”) than the axial LBP complaint
- Surgery can be very effective if it is
  - The right patient
  - The right diagnosis
  - The right surgery