Lumbar Disc Herniations

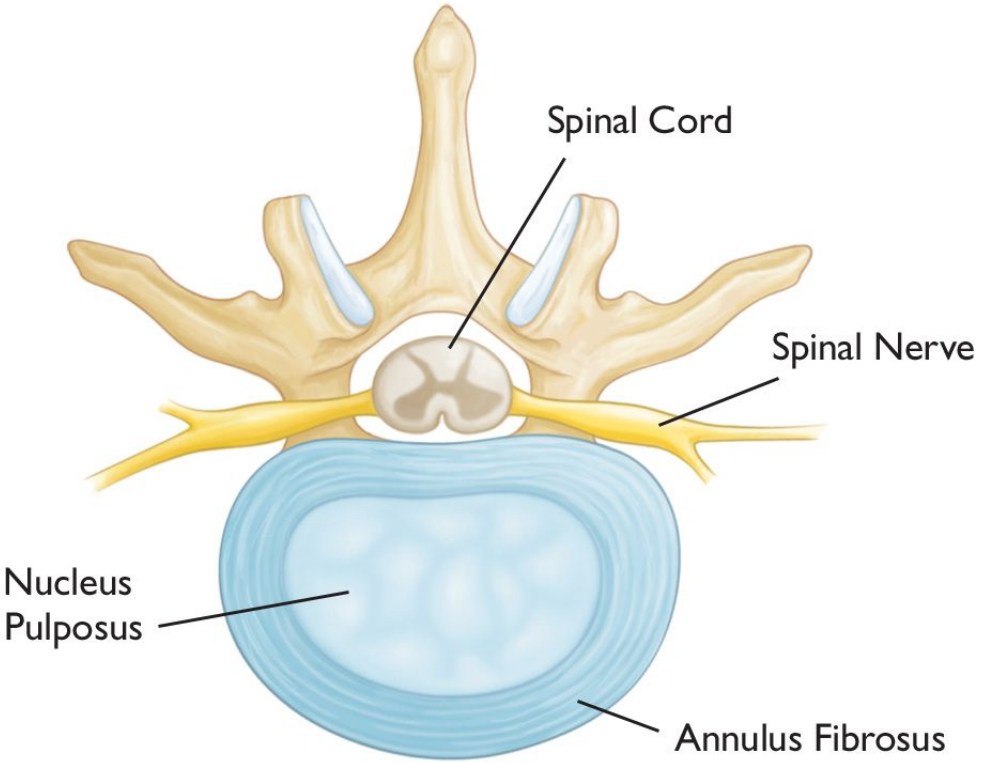
Nick Ghazarian, DO
Orthopedic surgeon
Spine surgeon

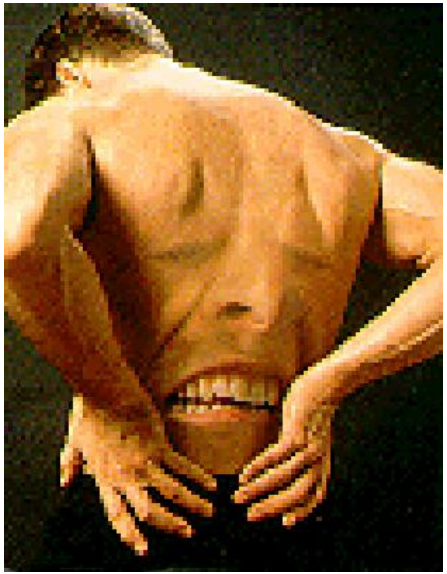
PRECISION
SPINE & ORTHOPEDICS

AAMS
ARMENIAN AMERICAN MEDICAL SOCIETY

Disclosure

None

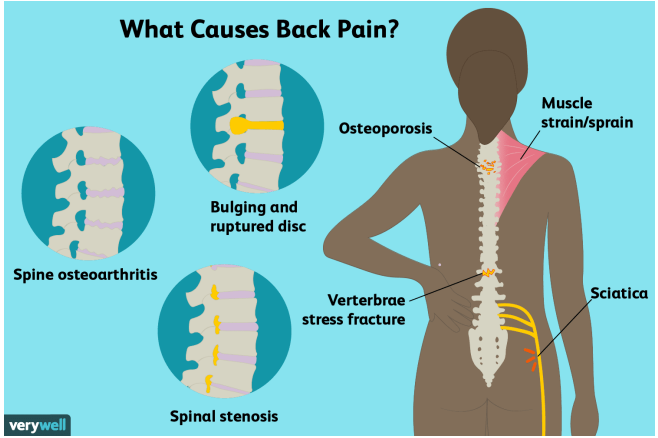




Impact of Pain

- Economic
  - 83 million Americans experience at least some pain
  - $50 million per day in lost productivity
  - $100 billion annually
  - 15 million annual office visits
  - Low back is most common cause of pain
- Non-economic
  - Quality of life
  - Loss of function
  - Risk of Suicide

Common Causes of Back Pain



- **Muscle or ligament strain**
- **Skeletal deformity**
  - (scoliosis, kyphosis, etc.)
- **Osteoporosis**
  - Compression fractures
- **Disc disease**
  - Degenerative disc disease
  - Disc herniation (focus of this lecture)

Prevalence

- Symptomatic lumbar disc herniations:

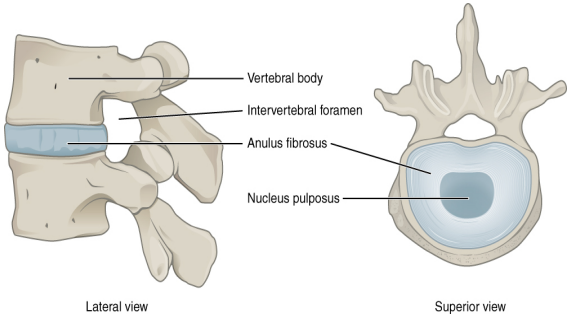
  ~ 2% general adult population

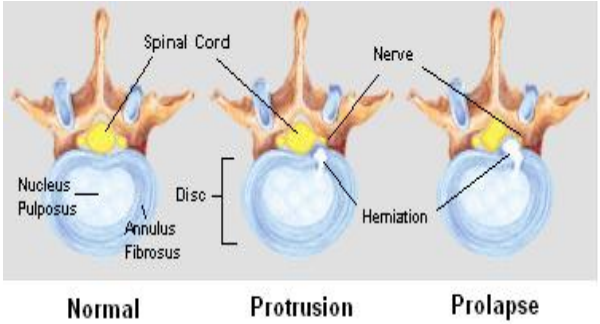
- Highest prevalence: 30-50 yrs old with M:F ratio ~ 2:1

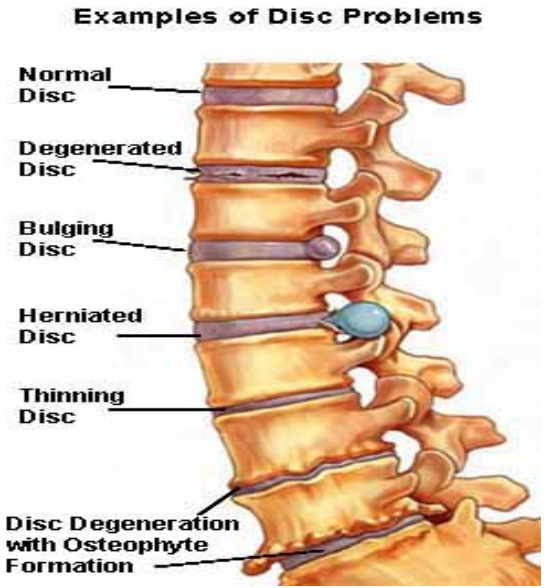
- 95% lower lumbar spine L4-L5 & L5-S1 in ages 25-55

Prevalence

- Above 55 yrs old: more common above these levels
- Can occur anywhere along the spine
- Less common in thoracic due to less motion and protection from ribs


Vertebral body
Intervertebral foramen
Anulus fibrosus
Nucleus pulposus
Lateral view
Superior view

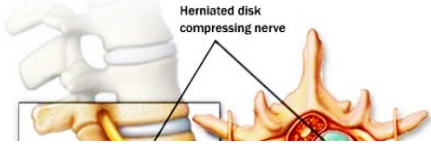

Spinal Cord
Nerve
Nucleus Pulposus
Disc
Annulus Fibrosus
Herniation
Normal
Protrusion
Prolapse

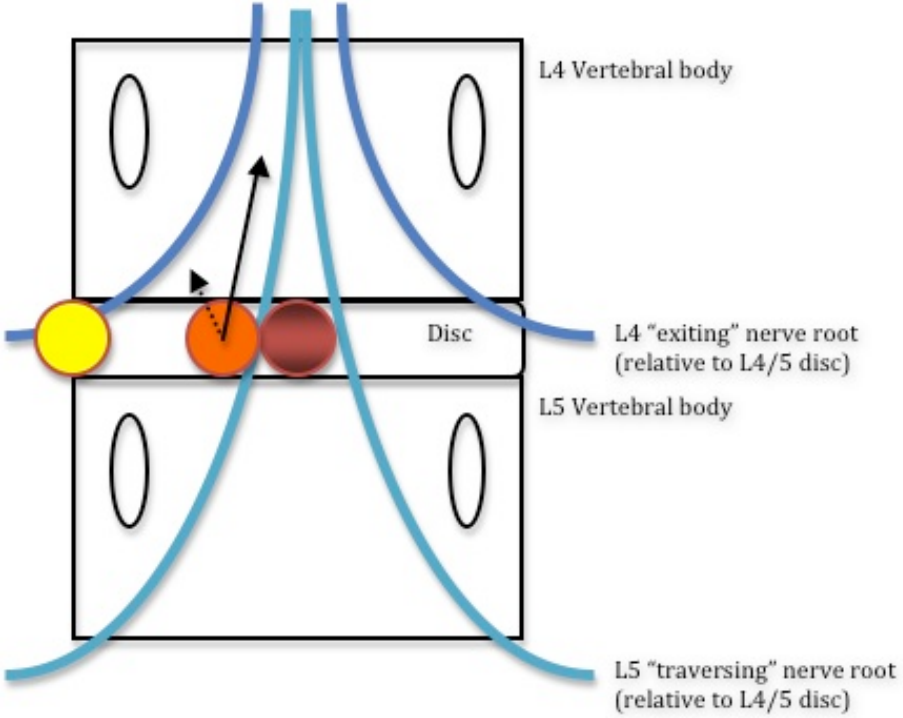

Examples of Disc Problems
Normal Disc
Degenerated Disc
Bulging Disc
Herniated Disc
Thinning Disc
Disc Degeneration with Osteophyte Formation

Anatomy

Etiology

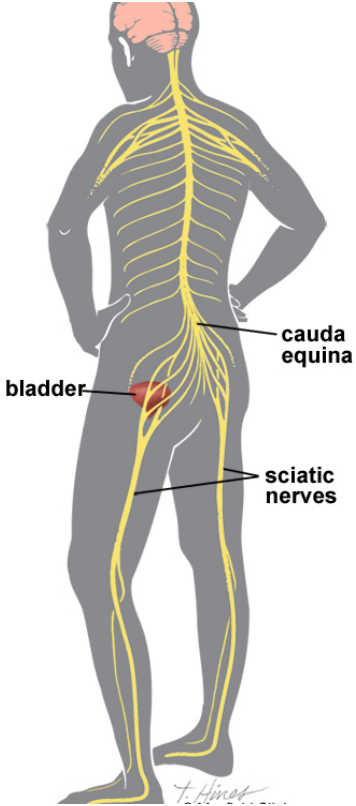
- Degenerative Disc Disease (Wear and Tear)
- Acute Trauma or Injury + Degeneration





Symptoms

- Usual presentation:
  - Lower back pain & radicular lower extremity pain
- **Cauda Equina Symptoms** (Be aware)
  - New **weakness** in legs
  - Altered **sensation** or **numbness** in the **"saddle region"**, which includes the groin, buttocks, genitals and upper inner thighs
  - Bladder or bowel incontinence or urinary hesitancy



History and Physical

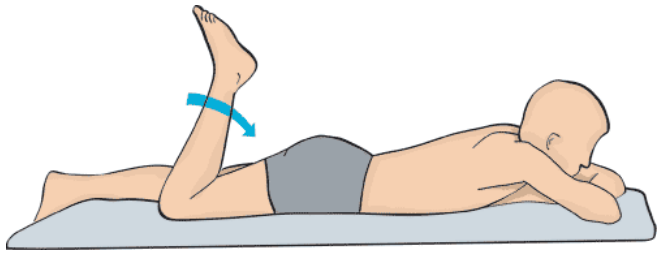
- **Common complaints:** muscle spasms & tenderness, positive tension signs, sensory disturbance, motor weakness
- **Presence of pain:** (mechanical, constant etc.)
- **Neural:** Myelopathy, radiculopathy, neurogenic claudication
- **Trauma:** Fracture
- **Infection:** Fevers, chills, travel
- **Tumor:** Red flags

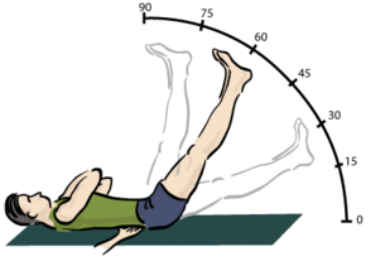
Red Flags

- Unrelenting night pain or pain at rest
- Hx or suspicion of cancer
- Fever > 38 deg C or > 100.4° F
- Osteoporosis or systemic diseases
- Neuromotor deficit
- Long Tract Signs
- Serious accident or injury
  - Not including twisting or lifting injuries unless other risk factors present (e.g., h/o osteoporosis)
- Clinical suspicion of ankylosing spondylitis
- Failure to respond to 4-6 weeks of conservative therapy
- Drug or alcohol abuse (increased incidence of osteomyelitis, trauma, fracture)

Physical Exam

- Perform motor exam
- Sensory testing (numbness)
- Deep tendon reflexes
- Special tests
  - Straight leg raise
  - Femoral stretch test
  - Clonus
- Gait analysis

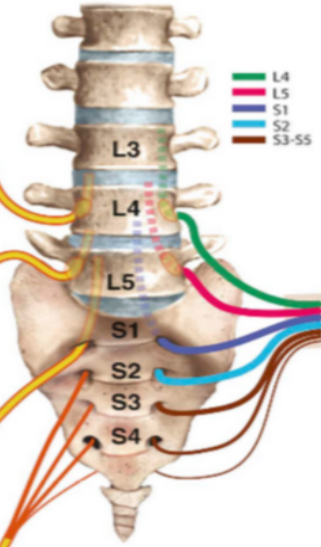




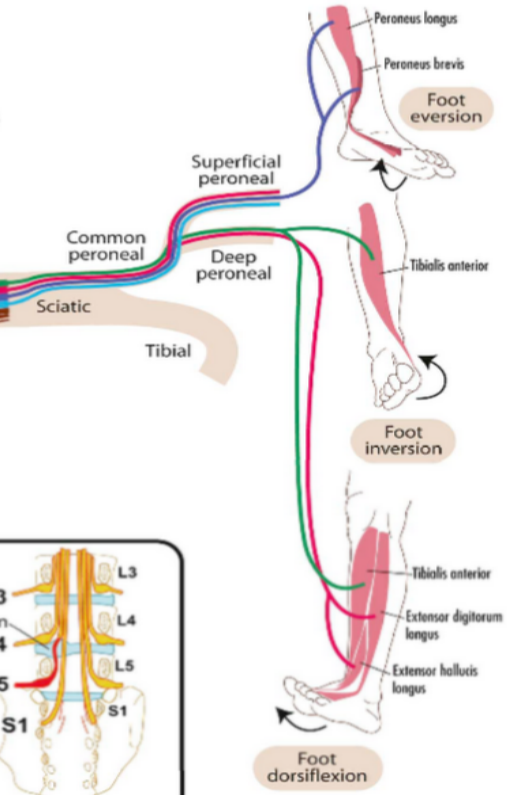
Lower Extremity Neurologic Examination

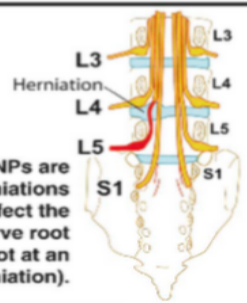
CLINICAL EVALUATION OF NEUROLOGIC LEVELS L4 to S1
(symptoms and signs in extremities)

Mnemonics	Motor	Reflex	Sensation	
L4	Tibialis anterior	Patellar tendon	L4	L4
L5	Extensor digitorum longus	None	L5	L5
achille S'-1 weak spot	Peroneus longus and brevis	Achilles tendon	S1	S1
	Clawing of toes	Anal "wink"	Anus S2 S3 S4 S5	S2 to S5



DIAGNOSTIC TESTS OF LUMBOSACRAL NERVE ROOTS





Most lumbar HNPs are paracentral herniations and thus affect the traversing nerve root (e.g., the L5 root at an L4-L5 herniation).

B

Imaging

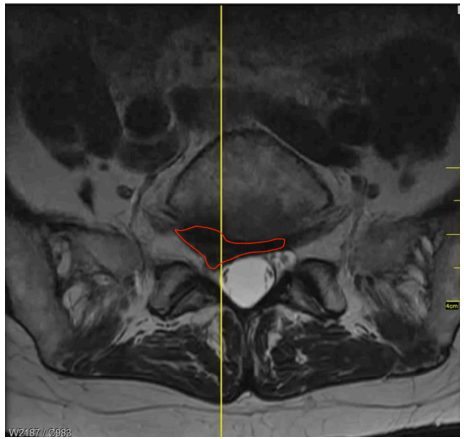
- X rays (4-views)

AP/Lateral/Flexion/Extension

- Determine stability of the level

Magnetic Resonance Imaging

- After approximately **6 weeks** of conservative care
- Exceptions are the presence of neurologic deficits
- Advantages:
  - Very sensitive
  - Dynamic films (rarely used)
- Disadvantage:
  - Findings do not always correlate with clinical condition
    - 41% of <u>asymptomatic individuals</u> age 60-80 have MRI evidence of spinal stenosis
    - 30% of all patients over 35 have evidence of DDD
- Not all MRIs are created equal
  - Beware of open MRI
  - Tesla > 1.0



Imaging

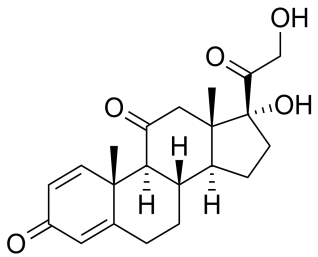
- **X-Ray**: can **NOT** detect herniated discs - can r/o other causes of back pain
- **MRI & CT**: **CAN** detect herniated discs
  - Determine level and nerves affected
- **MRI with contrast**: useful for revision surgery; determining post-surgical fibrosus

When to Order with Contrast

MRI without Contrast	MRI with and without Contrast
Degenerative Disease Disc Herniation Extremity Pain/Weakness Neck/Back Pain Radiculopathy Trauma Compression Fx Disc Herniation Stenosis	Discitis Mass/Lesion Osteomyelitis Post Lumbar Surgery (<10 yrs)

Diagnostic Tools

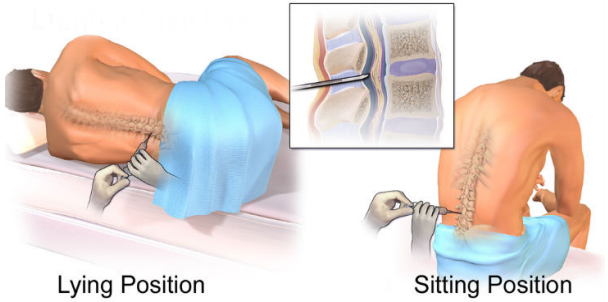
- Major Tools:
  - History and physical
  - X-rays: AP, lateral, flexion, extension
  - MRI
  - CT-scan ± Myelogram
  - EMG
- Warning:
  - High incidence of incidental findings!
  - Don’t order a test unless it will change the treatment plan!



Treatments

- Activity modification, PT, NSAIDS, muscle relaxants, oral steroid taper.
- **Synergy of multiple meds/treatments.**
  - *70% improve with conservative care*
- Epidural & selective nerve root block injections (diagnostic/therapeutic)

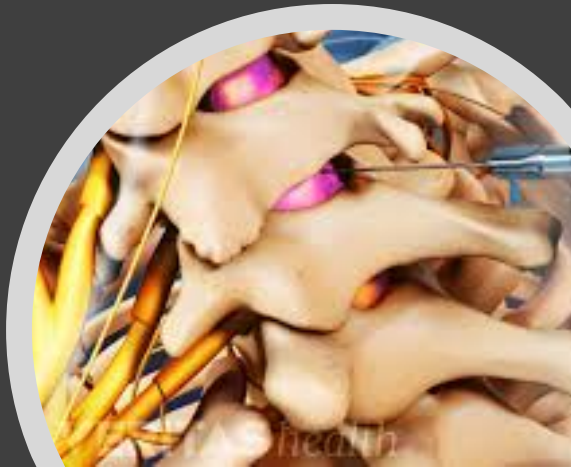
PRECISION
SPINE & ORTHOPEDICS



Treatment: Spinal Injections

- You can put a needle anywhere:
  - Epidural (buying time/effective short term)
  - Selective nerve root block (diagnostic)
  - Facets
  - Trigger points

- Diagnostic and Therapeutic
  - Local anesthetic ± steroid
    - Local anesthetic
    - Steroid: starts working 48-72 hrs
  - Max 3 in 6-12 months (different protocols)



Treatment: Physical Therapy

Multiple Goals

- Range of motion
- Flexibility
- Strength
- Endurance

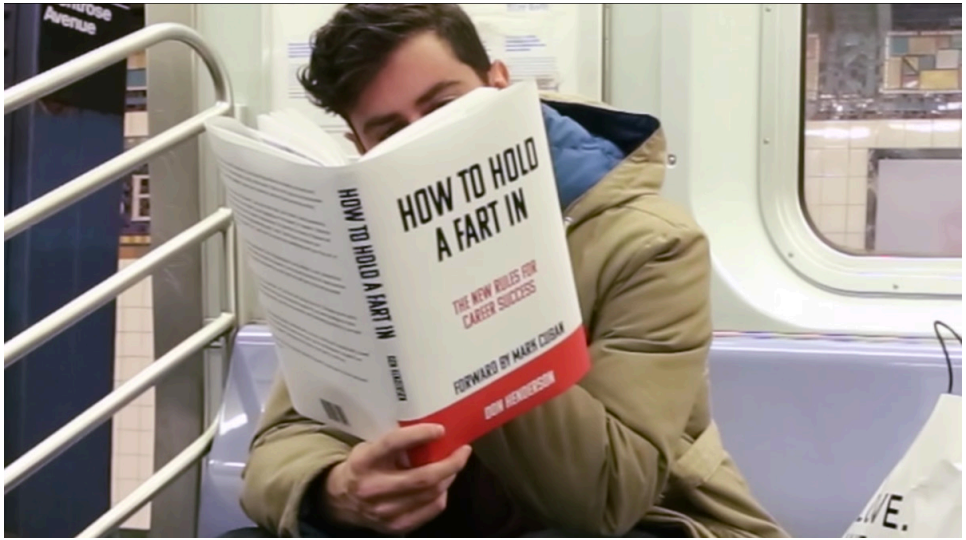
Address small and large muscle groups

Work conditioning

- Job training
- Subjective well-being
- Confidence

Frequency

- 2-3 times per week
- Transition to home program



What about patient education?

Should we give detailed advice and information booklets to patients with back pain? A randomized controlled factorial trial of a self-management booklet and doctor advice to take exercise for back pain. (Little et al. 2001)

- Methods: Educational booklet and/or Advice (n=239, randomized controlled factorial study)
- Results: Significantly decreased pain ratings at 1 week for educational booklet alone and advice alone. Diminished effect when combined. At 3 weeks, no difference in pain ratings.
- Implication: Detailed informational booklet & Advice = not as helpful. Booklet OR Advice improves pain ratings immediately after consultation.

Can a patient educational book change behavior and reduce pain in chronic low back pain patients? (Udermann et al. 2004)

- Methods: "Treat Your Own Back" Educational booklet (n=48, longitudinal cohort study)
- Results: Significantly decreased ratings of lower back pain at 9 months and 18 months via structured telephone interview
- Implication: [illegible] has efficacy [illegible] decreasing pain and frequency, however conclusions are hard to draw ([illegible] founding variables).

The back home [illegible]al: [illegible] ge back [illegible] 02

- Methods: A[illegible]
- Results: Significant difference at 2 weeks and 3 months for knowledge (sitting pos[illegible]e) and [illegible]ehavior (lumbar lordosis support) when observed (unaware) at home visit . [illegible]nificant difference at up to 12 months for behavior of wide base of support when lifting. No sig. diff. [illegible] functional outcomes.
- Implications: Written advice may be helpful by changing some aspects of behavior regarding acute LBP management. (helpful)

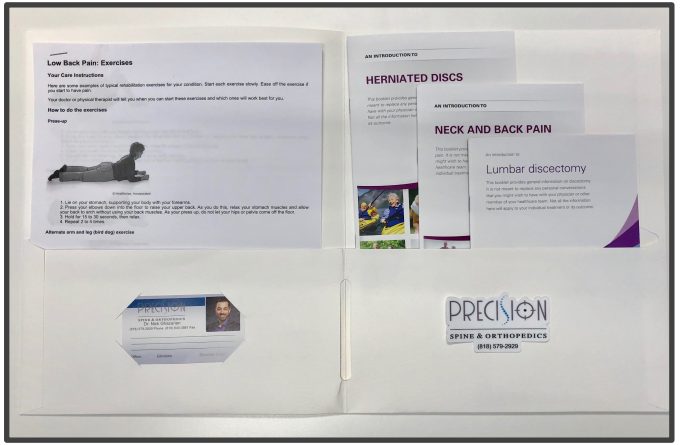
Pitfalls of patient education. Lim[illegible] pri[illegible] (C[illegible]in et al. [illegible]

- Methods: Educational booklet OR [illegible] / c[illegible] [illegible] low [illegible]
- Results: Significant difference at 1 week for nurse-intervention in self-reported exercise, patient satisfaction, and higher perceived knowledge. No sig. differences (including control) in worry, symptoms, functional status, or health care. At 7 weeks, no factor was significant except patient satisfaction.
- Implications: Challenges [illegible] in [illegible]ucati[illegible]al booklet [illegible] of f[illegible] acute [illegible] ck [illegible] no di[illegible]e i[illegible]mpto[illegible] despi[illegible] [illegible]n self-reported exercise at 1 week)

Effect of Intensive Patient Education vs Placebo Patient Education on Outcomes in Patients With Acute Low Back Pain: A Randomized Clinical Trial. (Traegar et al. 2018)

- Methods: Two 1-hr sessions of patient education (info. on pain and biopsychosocial contributors + self-management techniques like remaining active) & placebo patient education (active listening, no info. or advice) (n=202, randomized, placebo controlled clinical trial)
- Results: No difference in Intensive patient education vs. placebo patient education at reducing pain intensity at 3 months. Small effect of intensive patient education on secondary outcome of disability at 1 week and 3 months. No difference at 6 or 12 months.
- Implications: Questions effect of patient education on pain outcomes on patients with acute LBP.

Outcomes, pain scores, narcotic use, etc.. ALL OVER THE PLACE



Effectiveness of Patient Education

- Increased satisfaction
- Better functional outcomes
- Fewer pain episodes
- Movement safe pain: self-management

When do we do surgery?

Radiculopathy:

- **70%** get better with non-surgical treatment
- Surgery reserved for those:
  - No improvement after 6-12 weeks with nonsurgical treatment
  - Progressive neurologic deficits
  - Bowel/bladder changes

A good surgeon knows how to operate

A better surgeon knows when to operate

The best surgeon knows when not to operate

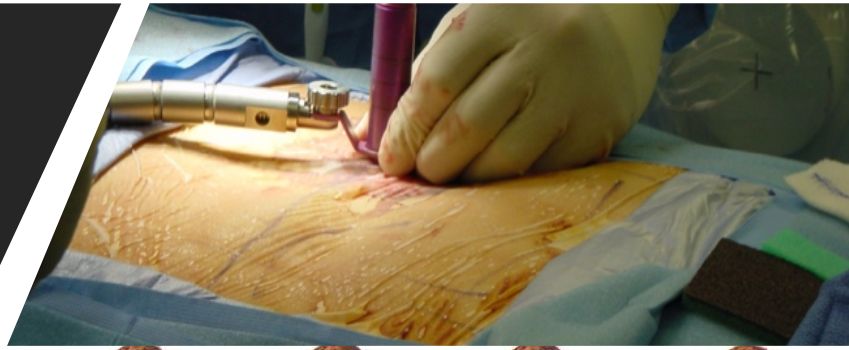
Treatments (Surgical)

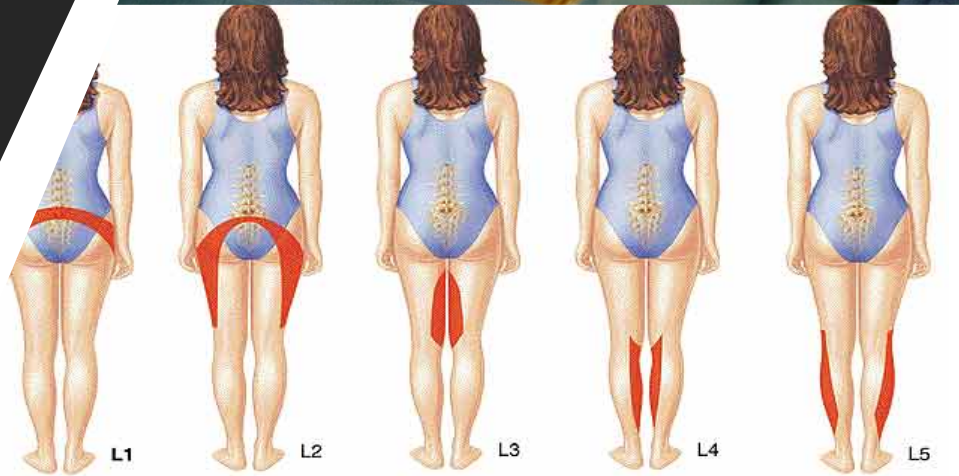
Can be done with:

minimally invasive techniques

Advantages:

- lowered risk of infection
- shorter hospital stay



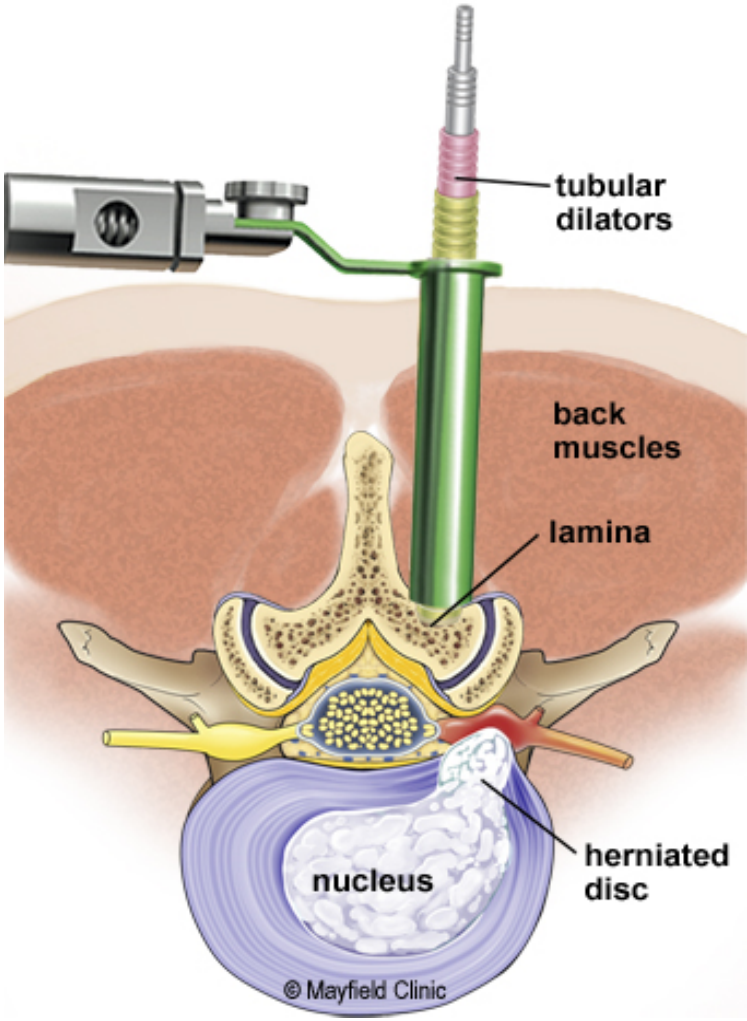


Treatments (Surgical)

***GOAL**: neural decompression while minimizing soft tissue disruption*

Laminotomy & Microdiscectomy

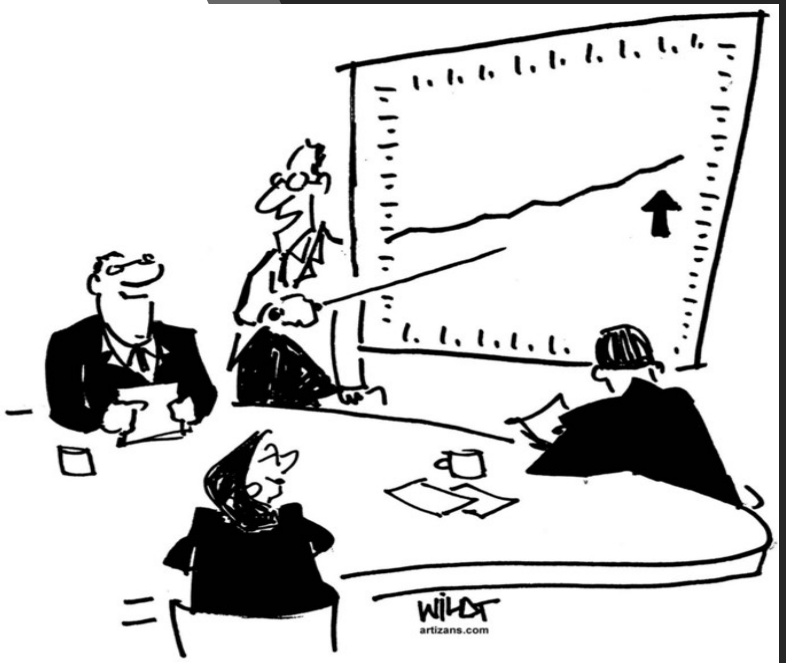
- Minimally invasive
- Herniated portion of disc removed
- Highly Effective at relieving radicular pain (sciatica)
- **~85%** show long term improvement



Treatments (Surgical)

Spinal Fusion

- Indicated when: spinal instability
- Repeat herniations (2x)
- Uncommon (~5% of cases)



"Regarding this positive trend, rest assured we are doing everything we possible can to not do anything."

Long Term Outcomes

- Significant Improvement w/ surgery **(~90% long lasting**) when:
  - chief complaint: leg pain
  - (+) straight leg raise
  - weakness in legs & MRI shows nerve impingement

- Improvements w/ non-operative treatment:
  - **~70%** have some degree of improvement
  - **~50% long lasting** improvement

Conclusion

- Disc herniation's are common and with substantial patient and financial morbidity
- Don’t forget the x-rays
- Advanced imaging after failed conservative care
  - UNLESS progressive neurologic deficits or cauda equina
- Role of injections
  - Diagnostic and therapeutic
- Role of surgical treatment
  - Advances in treatment options

Thank you

For more information contact:

P: (818) 579-2929

www.SpinePrecision.com

References

1. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2907819/
2. https://www.orthobullets.com/spine/2035/lumbar-disc-herniation
3. https://www.mayoclinic.org/diseases-conditions/herniated-disk/diagnosis-treatment/drc-20354101
4. https://www.spineuniverse.com/conditions/herniated-disc/exams-tests-herniated-disc
5. https://spineprecision.com/patient-care/patient-education
6. https://www.google.com/url?sa=i&source=images&cd=&cad=rja&uact=8&ved=2ahUKEwi_-fu41PngAhXnCDQIHaaCDIoQjRx6BAgBEAU&url=https%3A%2F%2Fmayfieldclinic.com%2Fpe-hldisc.htm&psig=AOvVaw0USbEB1E5EEVEfu-F8ftes&ust=1552378915803109
7. https://residentalien.blogs.com/.shared/image.html?/photos/uncategorized/spine_1.jpg
8. https://www.google.com/url?sa=i&source=images&cd=&cad=rja&uact=8&ved=2ahUKEwiBgMH72_ngAhWwIjQIHWHDCkcQjRx6BAgBEAU&url=https%3A%2F%2Fwww.spine-health.com%2Fvideo%2Flumbar-laminectomy-surgery-video&psig=AOvVaw2ig8bJJJ-uJi6A6UPMvfwl&ust=1552380923743387
9. https://www.google.com/url?sa=i&source=images&cd=&cad=rja&uact=8&ved=2ahUKEwiE5p64-__gAhUVsZ4KHWM6CtgQjRx6BAgBEAU&url=https%3A%2F%2Fen.wikipedia.org%2Fwiki%2FStraight_leg_raise&psig=AOvVaw02AzOfLVjmxSlfyYu-8hS8&ust=1552595573513825
10. https://www.bonati.com/conditions/herniated-disc/
11. https://www.google.com/url?sa=i&source=images&cd=&cad=rja&uact=8&ved=2ahUKEwj6ocPN_P_gAhVIqJ4KHa2JD3UQjRx6BAgBEAU&url=https%3A%2F%2Fwww.mayfieldclinic.com%2FPE-CaudaEquina.htm&psig=AOvVaw1Vl30oA1xiv-GbjuozvIVP&ust=1552595904184403