

# Diagnostic Considerations in Low Back Pain and an Overview of Nonsurgical Management

L. Shay Richardson MD

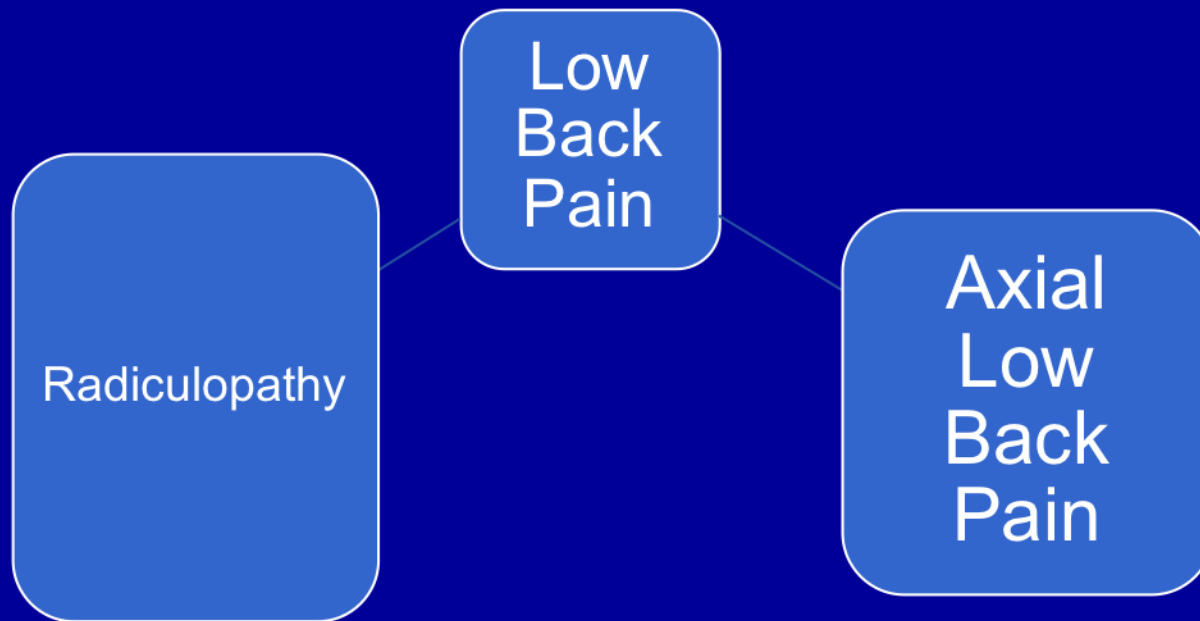
Sports Medicine/Interventional Pain

Center for Sports Medicine and Orthopedics

# Disclosures

- I have no financial disclosures

# Diagnostic Algorithm



# History

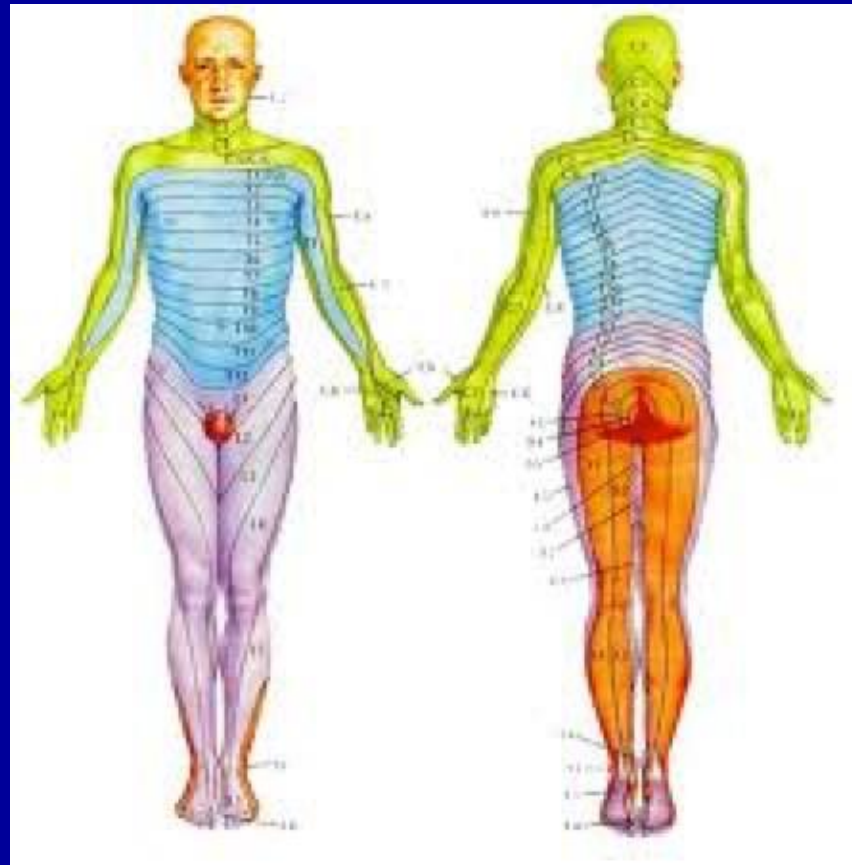
- P (Palliative/Provocative factors)
- Q (Quality of pain)
- R (Radiation)
- S (Severity)
- T (Timing)

In addition, remember to add red flag questions!

# Inspection/Palpation

- Evaluate gait/station and inspect lordotic curvature and skin
- Palpate (midline, paravertebral facet regions, musculature, PSIS, Sacral Ala, Greater Trochanters, Sciatic outlet/Piriformis, abdomen, etc.)
- Eval range of motion with flexion and extension and any reproduction of pain
- Leg length discrepancy?

# Physical Exam-Dermatome map



# Differentiators of pain

- Axial/Somatic/Nociceptive: Results from noxious stimulation of nerve endings supplying bone, ligament, joint, muscle, fascia
- Poorly localized, achy or dull in quality, may radiate locally but in a referred pattern (non-dermatomal)
- Remember that referred pain is NOT radicular pain

# Differentiators of pain cont'd

- Neuropathic/Radiculopathic: Results from irritation or damage, not to nerve endings, but to axons or cell bodies of peripheral nerves
- ? Follows different spinal cord tracts
- Shooting, lancinating, band-like, well localized, **crossing joint lines**



# Physical Exam-Reflexes

- Patellar- L4
- Heel Cord (Achilles)- S1

# Physical Exam-Myotomes

- Hip flexion- L1,L2
- Knee extension- L3,L4
- Great toe dorsiflexion- L5
- Plantar flexion- S1

# Provocative maneuvers

- Supine straight leg raise
- Seated straight leg raise/Slump test
- Faber's Test
- Gaenslen's Test
- Ober's Test
- Thomas test
- Piriformis provocation
- Extension and rotation (loading of facets)
- Stork Test
- Pelvic Compression and Distraction tests

# Axial Low Back Pain- Common Causes

- Facet arthropathy
- Discogenic pain
- SI joint dysfunction
- Dura
- Soft tissue (ligament, fascia, muscle, etc.)
- Vertebrae (endplates, trabecular fx)
- Definitive diagnosis made ranges from 15-85%

# Acute Treatment- Axial Low Back Pain

Although up to 90% of patients improve acutely, pain may persist in up to 72% of individuals at 1 year (Deyo,Phillips et al. *Low Back Pain: A Primary Care Challenge*. Spine.1996)

- Experienced by most adults (80%) range
- 2nd most common reason for symptomatic visits to MD's (URI's first)
- Radicular pain should be considered separate

# Acute Treatment of Axial (Mechanical) LBP-cont'd

- Overall favorable prognosis
- Most still recommend 4-6 wks. of conservative care (NSAIDS, muscle relaxers, encourage return to normal activities, patient education, light exercise activity, w/ avoidance of strenuous activity until sx's resolve)
- Heat>cold; Massage, Acupuncture, and Chiropractic may be beneficial
- If still no improv'm't or worsening, clinically reassess

# Treatment- subacute and chronic LBP

- Heat has proven to be beneficial in subacute LBP
- Spinal manipulation- short-term benefit
- Massage- short-term benefit
- Acupuncture ?
- CBT
- Exercise...

# Exercise for subacute and chronic LBP

- Has shown benefits in pain and function
- Reduces central desensitization in animal studies
- Exercise decreases pro-inflammatory cytokines
- Positive effects on muscle, joint, and intervertebral disc metabolism
- Psychological benefits



# Exercise cont'd

- Does not appear to increase risk of LBP exacerbations
- Beyond benefits of PT, formal exercise instruction and education can be beneficial
- No single exercise technique has superiority over others for patients with subacute and chronic LBP

# Exercise-role in prevention of LBP

- 2017 meta-analysis showed reduced risk of frequent or chronic LBP in active individuals
- 2018 meta-analysis: Exercise ↓ both severity of pain and back related disability
- Also been shown to reduce rate of recurrent LBP

# Physical Therapy

- Systematic reviews have not clearly demonstrated benefit for ACUTE low back pain
- PT has been proven beneficial for subacute and chronic LBP

# Sacroiliac Joint Dysfunction

- Prevalence estimated at 25%
- Presence of 3 provocative SI joint tests increases sensitivity and specificity of diagnosis (**thigh thrust, compression, Faber's, sacral thrust, Gaenslen's, distraction**)
- PT, anti-inflammatories
- ? Heel lift
- SI joint diagnostic/therapeutic blockade
- Radiofrequency ablation (neurotomy)
- SI joint fusion

# Facet Arthropathy

- Prevalence estimated to be 25-45%
- Anti-inflammatories/meds
- PT?
- Facet diagnostic/therapeutic blockade
- RFA

# Discogenic Low Back Pain

- Most common prevalence ages 30-50 w/ male>female predominance
- Prevalence estimated at approx. 30%
- ESI's can occasionally be helpful
- PT
- Meds
- Thermal Biaccuplasty?
- Regenerative Medicine?
- Fusion?

# Radiculopathy

- Tend to require more aggressive initial meds/treatment, consider neuropathic agents
- If true cauda equina symptoms, or progressive neuro deficits, MRI and immediate surgical referral
- Oral/IM steroid may be beneficial
- Quicker threshold for referral if not significantly improved in 1-2 wks.
- Recommend x-ray for eval
- Good evidence for ESI's, but when?
- Surgery

# Spinal Stenosis (central)

- Narrowing of the spinal canal, resulting in symptoms and signs caused by entrapment and compression of the intraspinal, vascular, and nervous structures
- Disc bulge, ligamentum flavum hypertrophy, facet joint djd
- Approx. 30% prevalence

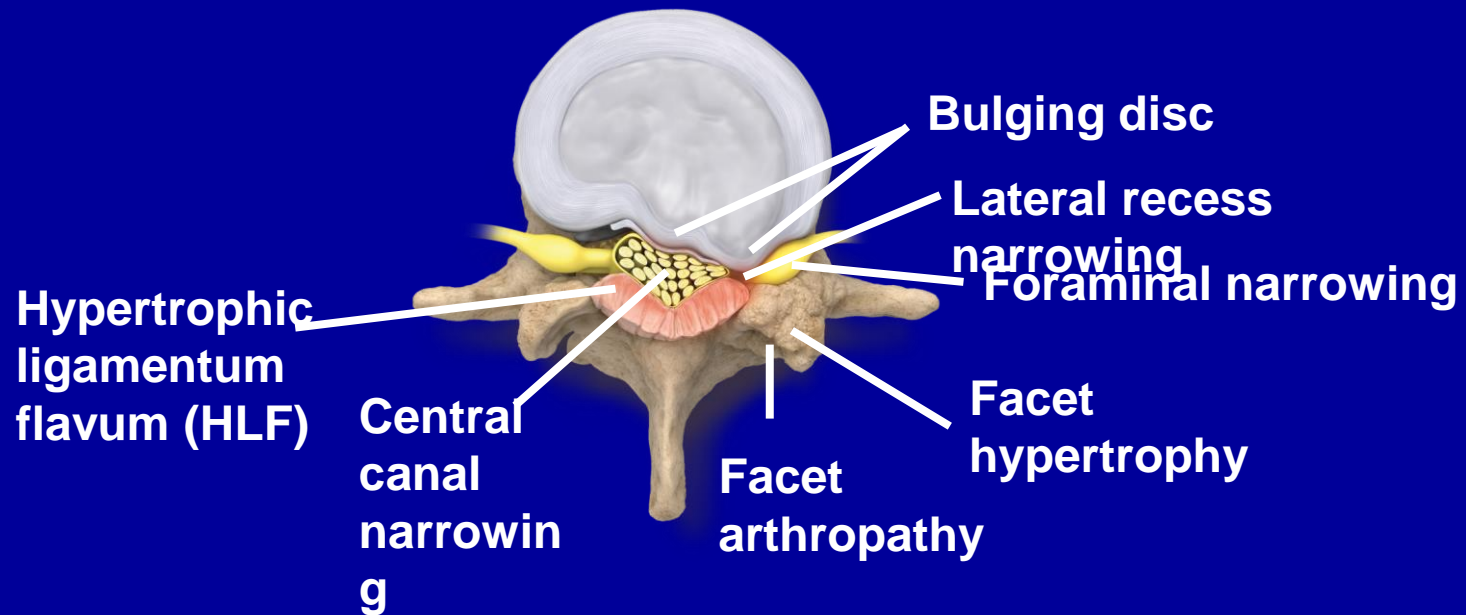


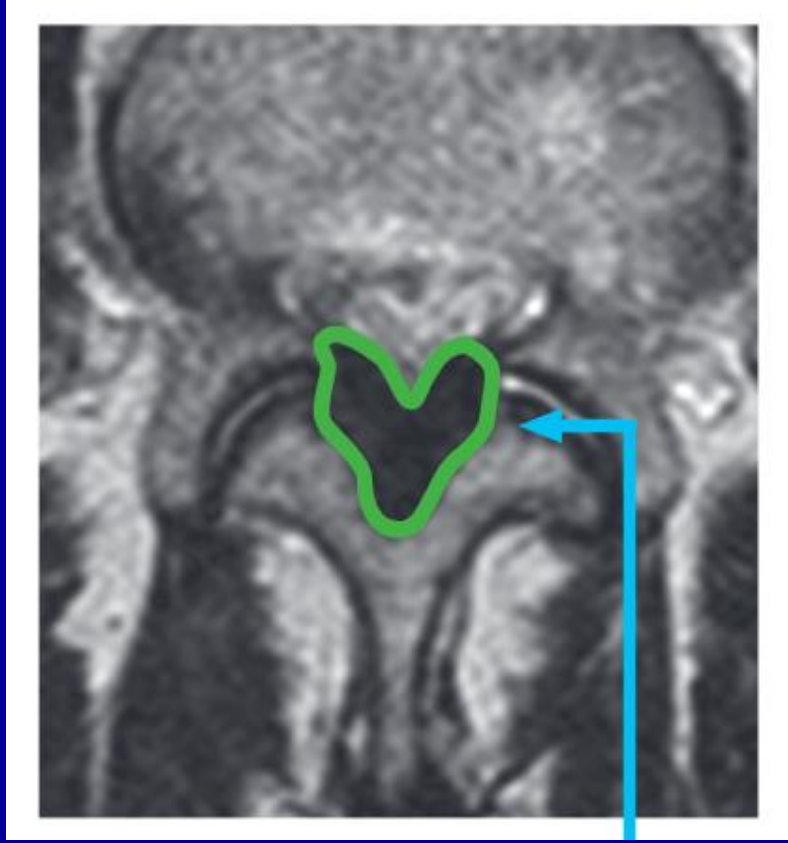
# Central spinal stenosis- cont'd

- Worsening pain/ LE weakness w/ standing/walking
- Predominantly elderly population
- Improvement w/ sitting/flexion; grocery cart sign
- Neuropathic agents, PT, LESI
- Minimally invasive lumbar decompression
- Surgical decompression

# LSS Patients Have Multiple Comorbidities

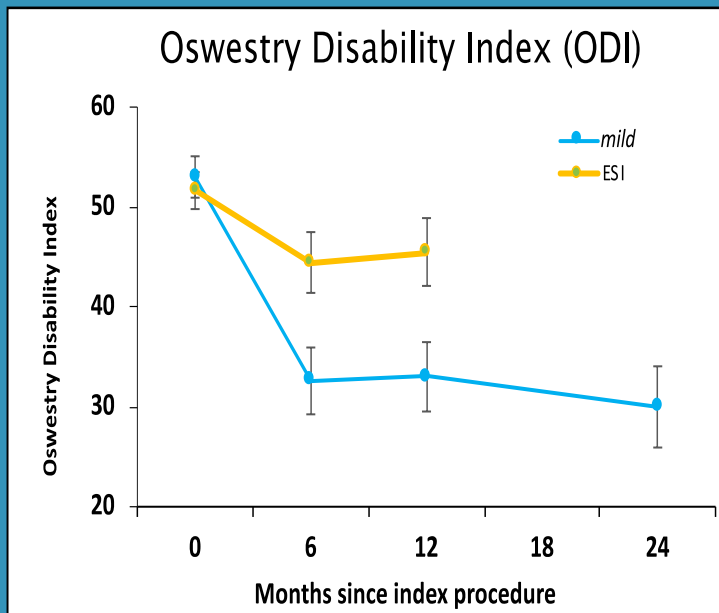
## Aging Spinal Canal with LSS



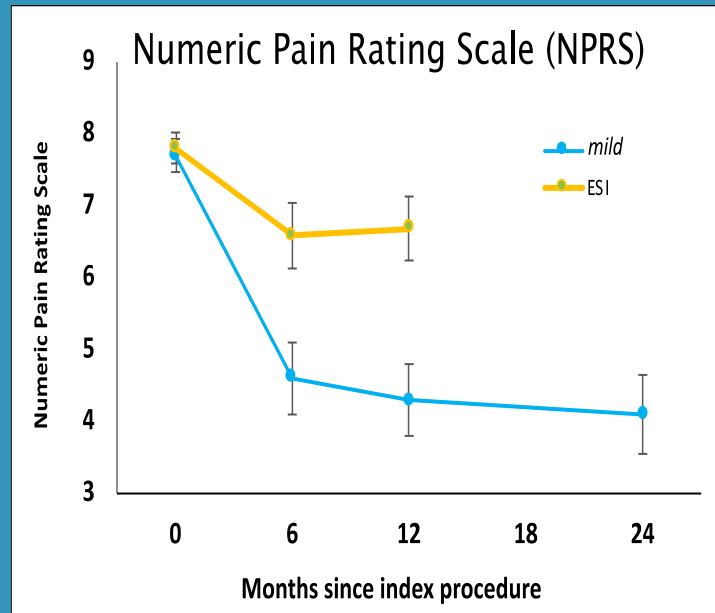


# ENCORE Study 2-year Outcomes

## Functional and Pain Improvement Compared to ESIs<sup>3</sup>



- Significant and sustained functional improvement through 2-year follow-up
- Mean ODI improvement of 22.7 points at 2 years  
(10-point improvement is clinically significant.)



- Significant and durable reduction of pain through 2-year follow-up
- Mean NPRS improvement of 3.6 points at 2 years  
(2-point improvement is clinically significant.)

# ENCORE Study 2-year Outcomes

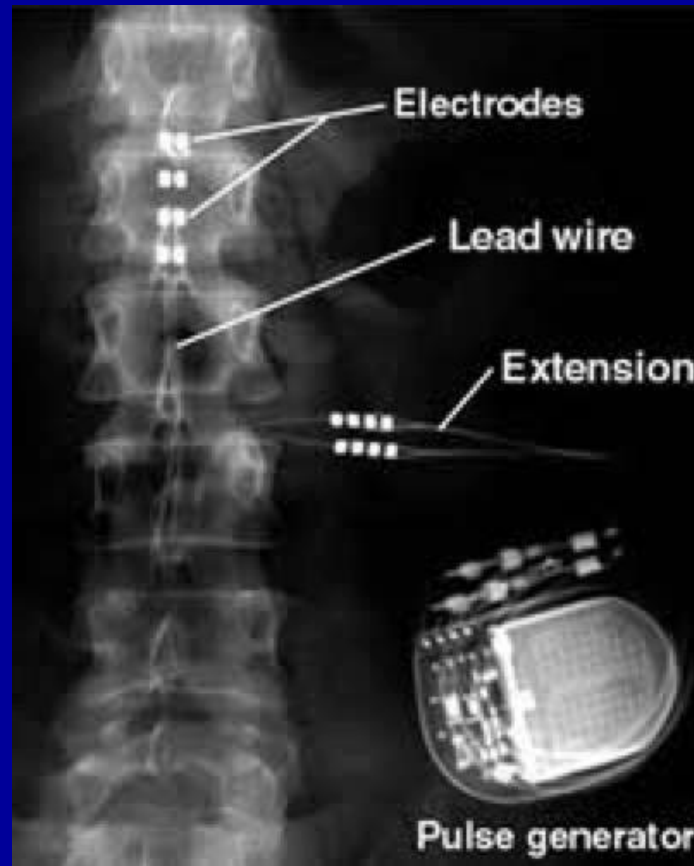
## 95% of Patients Had 5 or More Comorbidities<sup>3</sup>

The Mere Presence of Comorbidities Should Not Be Used as an Exclusion

Characteristic	Presenting Spinal Comorbidities % (n)	ODI Response Rate* at 2Y
Ligamentum flavum hypertrophy	100.0% (149)	72.4%
Bulging disc	89.9% (134)	77.3 %
Foraminal narrowing	87.2% (130)	73.8 %
Facet hypertrophy	86.6% (129)	76.8 %
Facet arthropathy	76.5% (114)	72.7 %
Degenerative disc disease	67.8% (101)	74.3 %
Disk space/height loss	59.1% (88)	79.3 %
Lateral recess narrowing	57.0% (85)	76.3 %

\*Percent of patients achieving ODI improvement of  $\geq 10$  points.

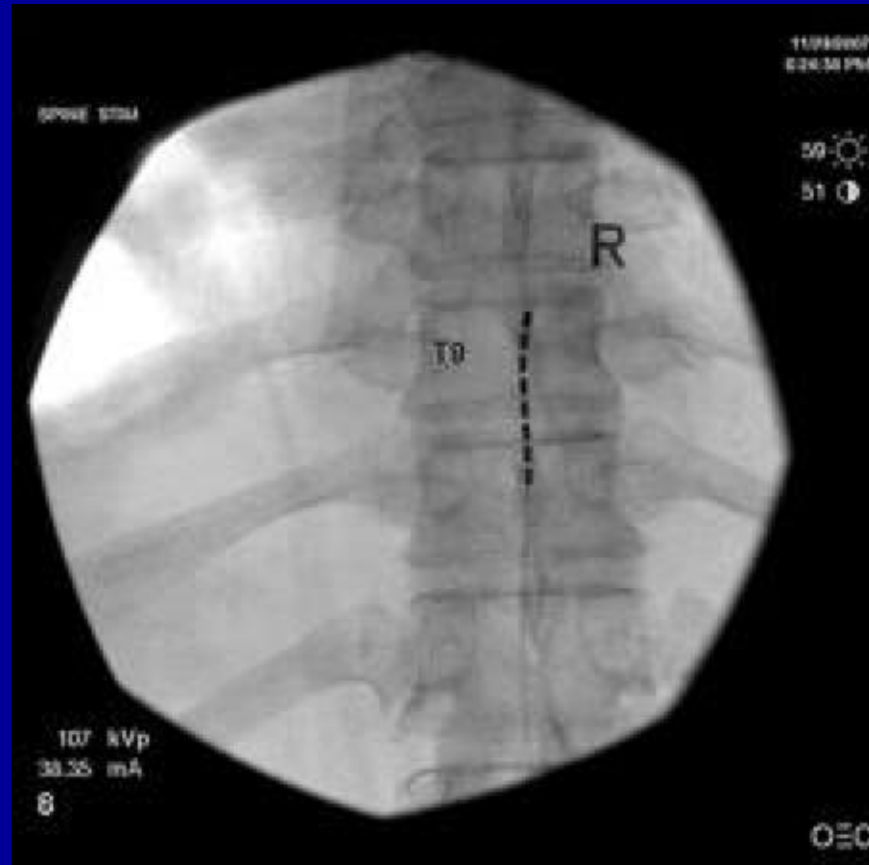
# Refractory Radiculopathy- Spinal Cord Stimulator



# SCS recent systematic review and pooled analysis:

- VAS pain scores averaged 76.7 prior, with decrease to 36.7
- Patient reported outcomes consistently improved with Burst SCS

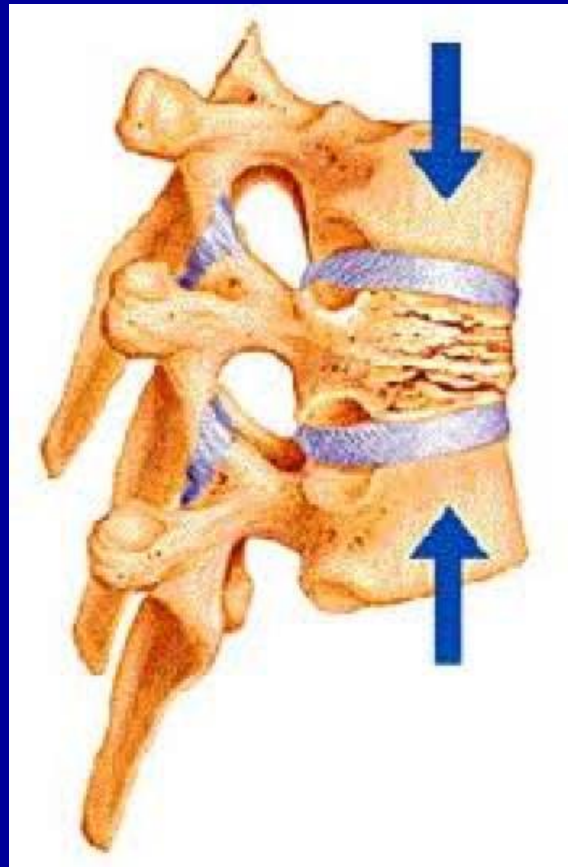
# SCS- cont'd







# Vertebral Compression Fracture- Diagram



# Vertebral Compression Fracture- MRI



# Kyphoplasty- Cavity formation



# Not all is as it seems...

- Abdominal pathology
- Vascular claudication
- Piriformis Syndrome
- Inflammatory arthritides (including PMR)
- Piriformis Syndrome
- Hip pathology, both intra and extra-articular
- Ischiofemoral impingement
- Neuropathic extremity pain/CRPS
- dystonia

# References

- *An Update of Comprehensive Evidence-Based Guidelines for Interventional Techniques in Chronic Spinal Pain. Part II: Guidance and Recommendations.* Pain Physician. 2013; 16:S49-S283.
- The Orthopaedic Physical Exam. Reider, B. 2<sup>nd</sup> edition.
- Orthopedic Physical Assessment. Magee, D. 5<sup>th</sup> edition.
- *Acute Lumbosacral Radiculopathy: Treatment and Prognosis.* Levin et al. Up to Date. June, 2019.

# References cont'd

- Clinical Anatomy of the Lumbar Spine and Sacrum. Bogduk, N. 4<sup>th</sup> edition.
- *“Burst Spinal Cord Stimulation: A Systematic Review and Pooled Analysis of Real-World Evidence and Outcomes Data”.* Chakravarthy, K et al. Pain Medicine. June, 2019. 20. S47-S57.
- <sup>3</sup>Staats PS, Chafin TB, Golovac S, et al. *Long-term safety and efficacy of minimally invasive lumbar decompression procedure for the treatment of lumbar spinal stenosis with neurogenic claudication: 2-year results of MiDAS ENCORE.* Reg Anesth Pain Med. 2018;43:789-794.

# References cont'd

- *Evaluation of Low Back Pain in Adults.* Wheeler et al. Up to Date. June, 2019.
- *Treatment of Acute Low Back Pain.* Knight et al. Up to Date. Dec., 2017.
- *Exercise-based Therapy for Low Back Pain.* Rainville et al. Up to Date. June, 2019.
- *Subacute and Chronic Low Back Pain: Nonsurgical Interventional Treatment.* Chou et al. Up To Date. Jan., 2019.



Thank You! And Go CATS!

