

# Lumbar Disc Degeneration: Disc Replacement, Fusion or Non-Surgical

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July 28, 2023



SYMPOSIUM

# Learning Objectives

- Outline impacts of binocular vs monovision on orthopedic movement patterns.
- Describe impacts of stomatognathic system on cervical, vestibular and visual systems.
- Describe the use of respiration for management of spine position and mechanical stress.
- Demonstrate understanding of neuromotor screening for orthopedic movement of left or right sided dominance.

# Disclosures

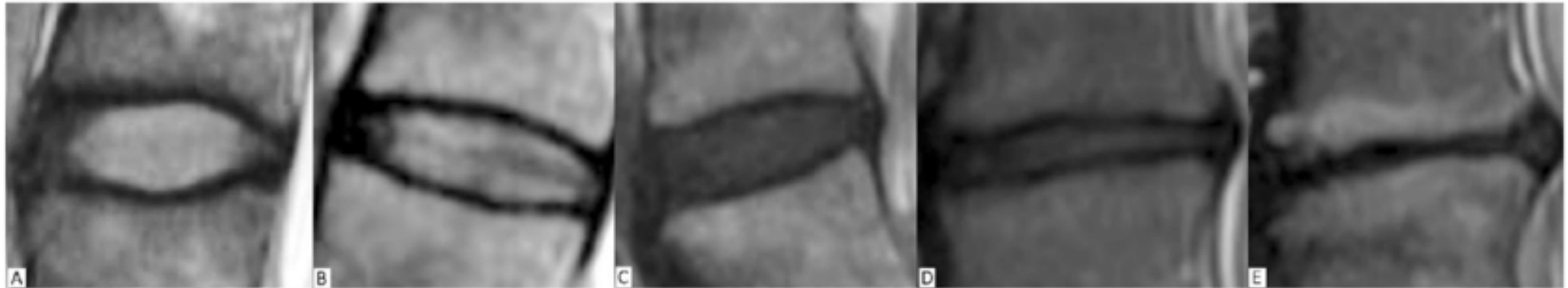
- In 2021, Medical Device Business Services provided lunch to my team; this is no impact on this presentation.

# Clinical Presentation of Lumbar Disc Disease

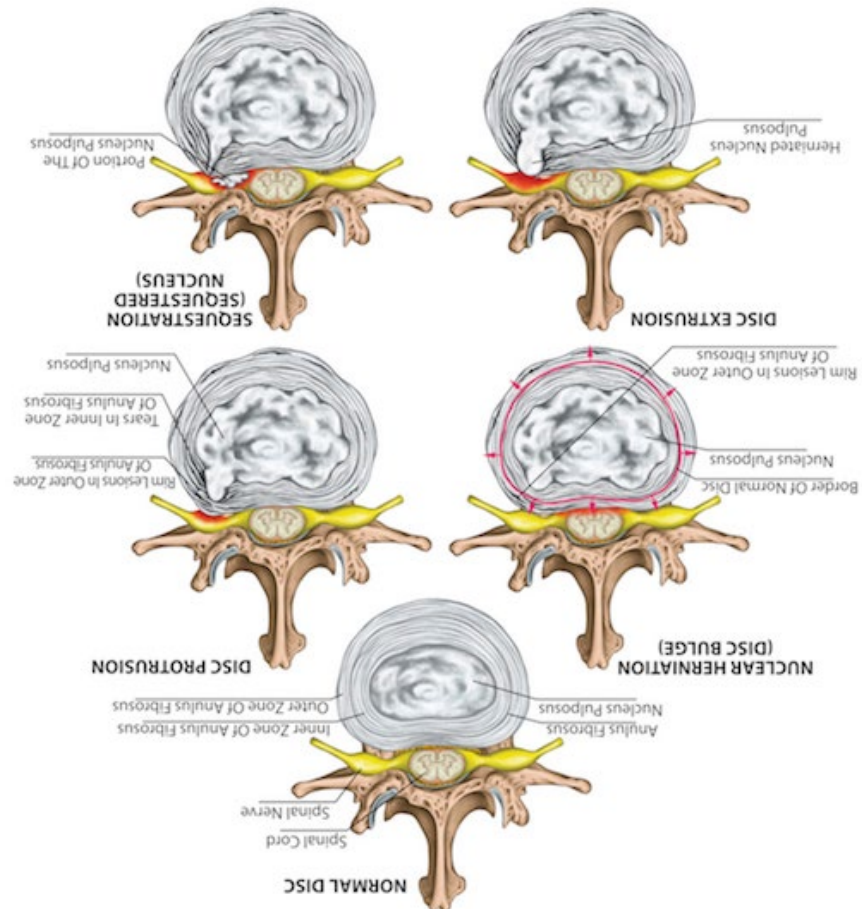
- Lumbosacral back pain, without radiculopathy
  - History – should be thorough
  - Exam – no neurologic signs/deficits
  - XR – no fracture, instability, deformity
  - MR – no herniation, stenosis, arthritis
- Frequently concurrent lateral hip, buttock, neck/trapezial pain
  - May have extraspinal joint/muscle problems
  - Injury, activity, or lifestyle changes?
  - Stressors and non-orthopedic comorbidities?

# Radiographic Assessment

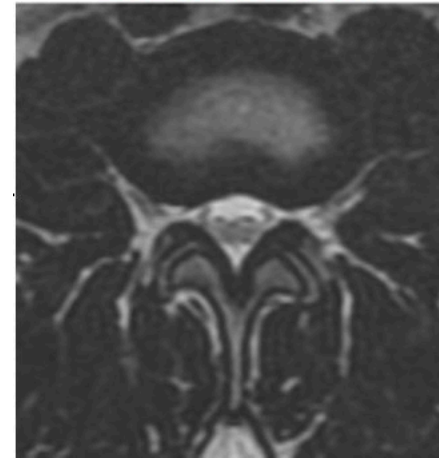
- XR
- MRI: Pfirrmann Grades (I-V)
- Severity of imaging findings generally correlates poorly with history/severity of symptoms
  - Sampling bias in *patients*



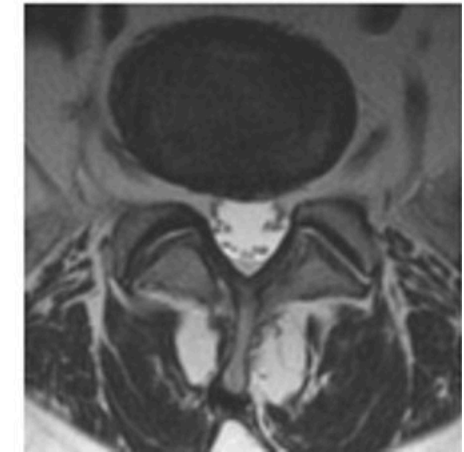
# Disc Pathology - Nomenclature



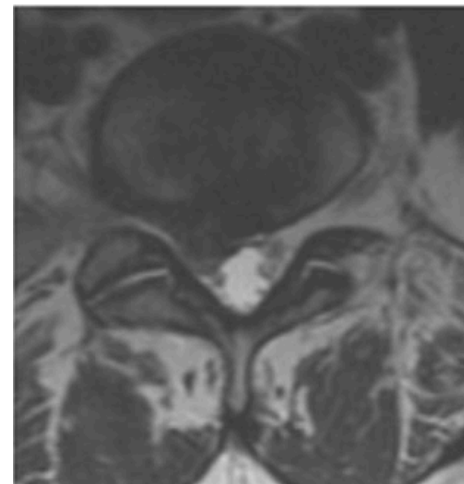
Normal Disc



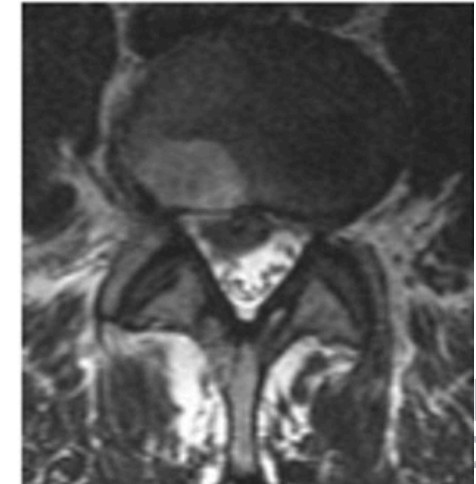
Bulge



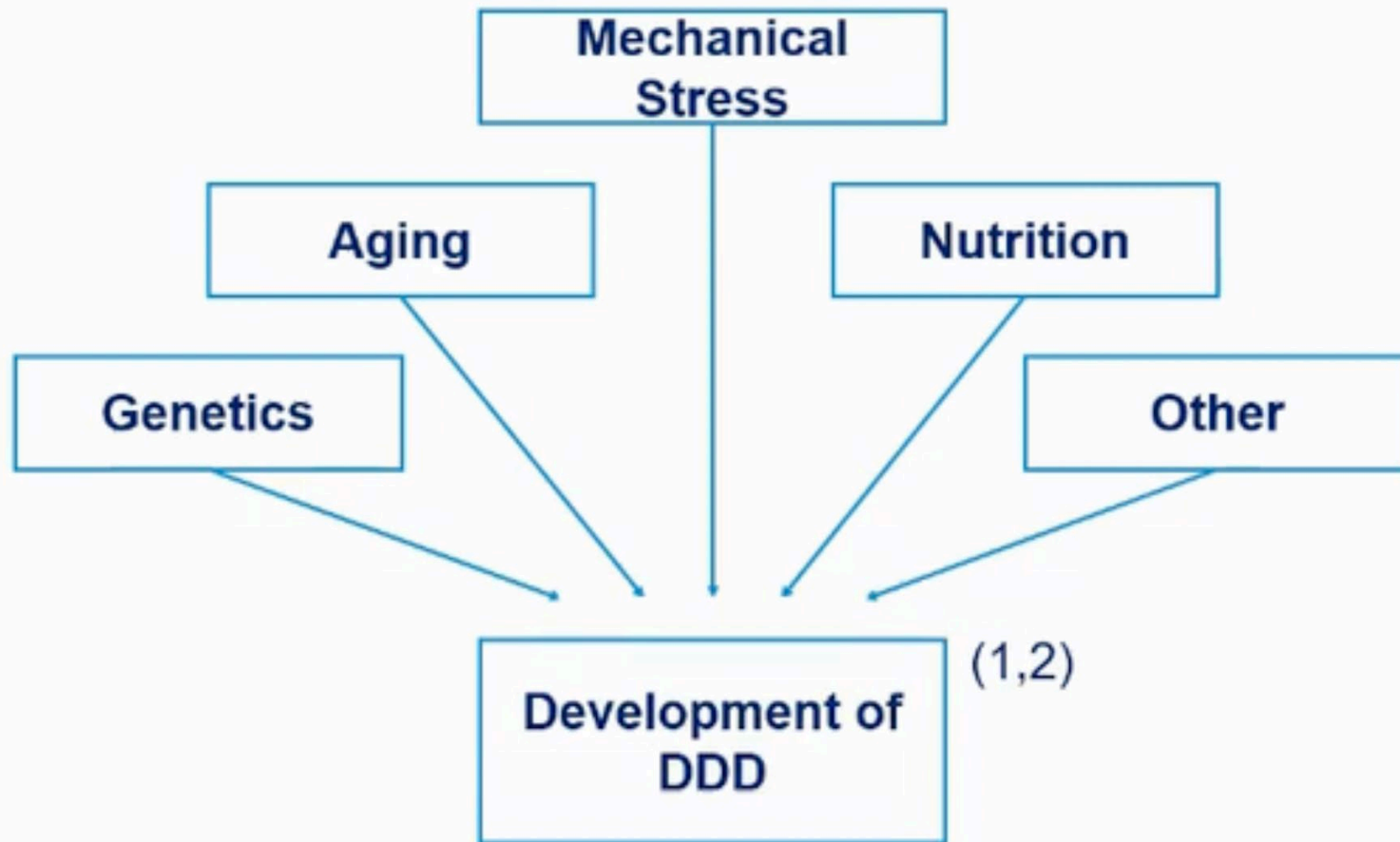
Protrusion



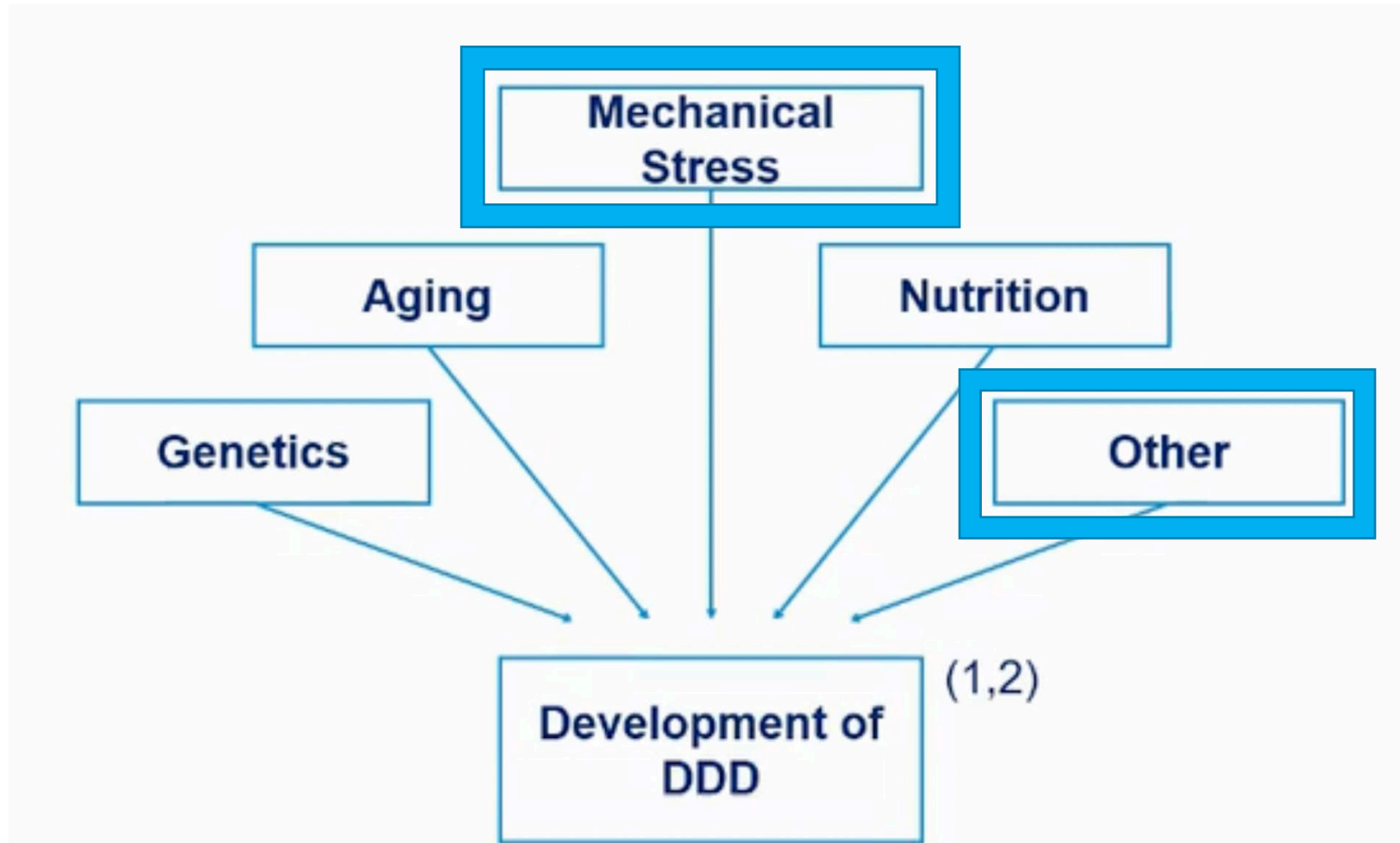
Extrusion



# Etiology of Lumbar Disc Degeneration



# Etiology of Lumbar Disc Degeneration





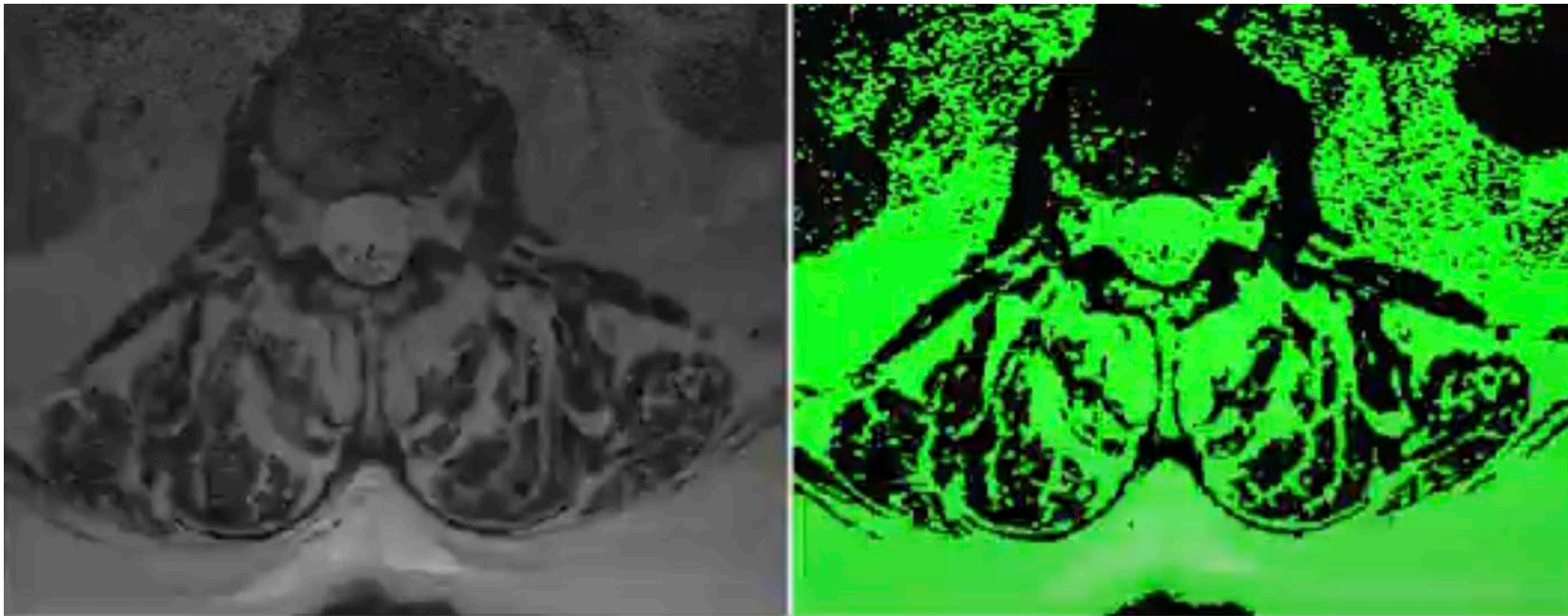
# Etiology - Mechanical Stressors

- Sports/exercise, occupation, and compensation-specific stresses
- Activities of daily living may also contribute
- Assess by XR, MRI, History/exam, PT



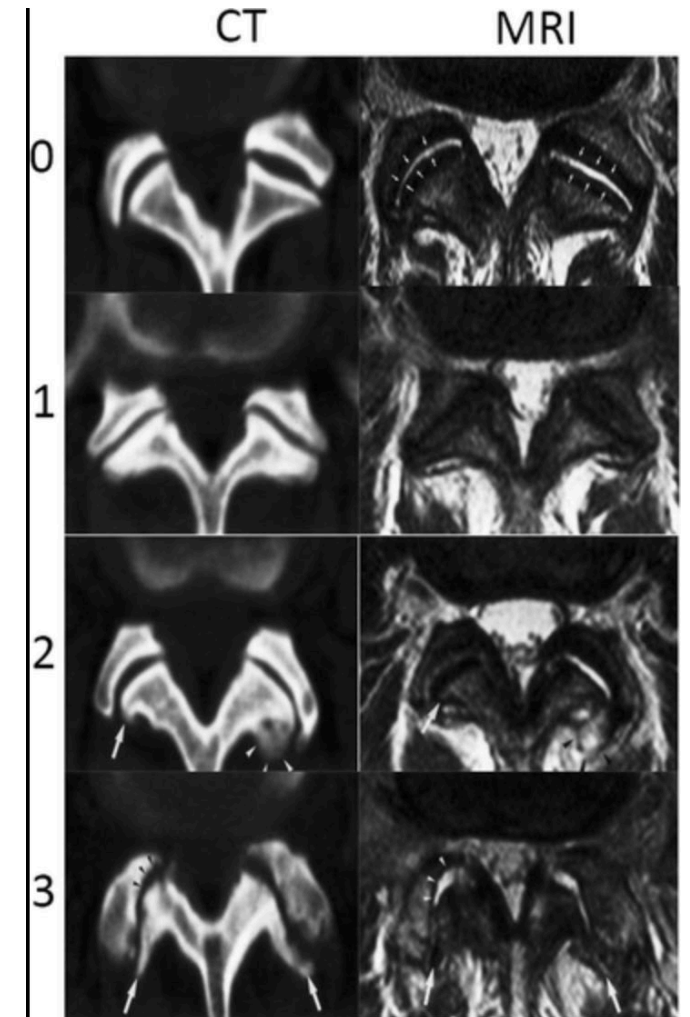
# Etiology – Paraspinal Muscles

- Paraspinal muscle atrophy is positively correlated with development/progression of disc disease (Schonnagel et al)



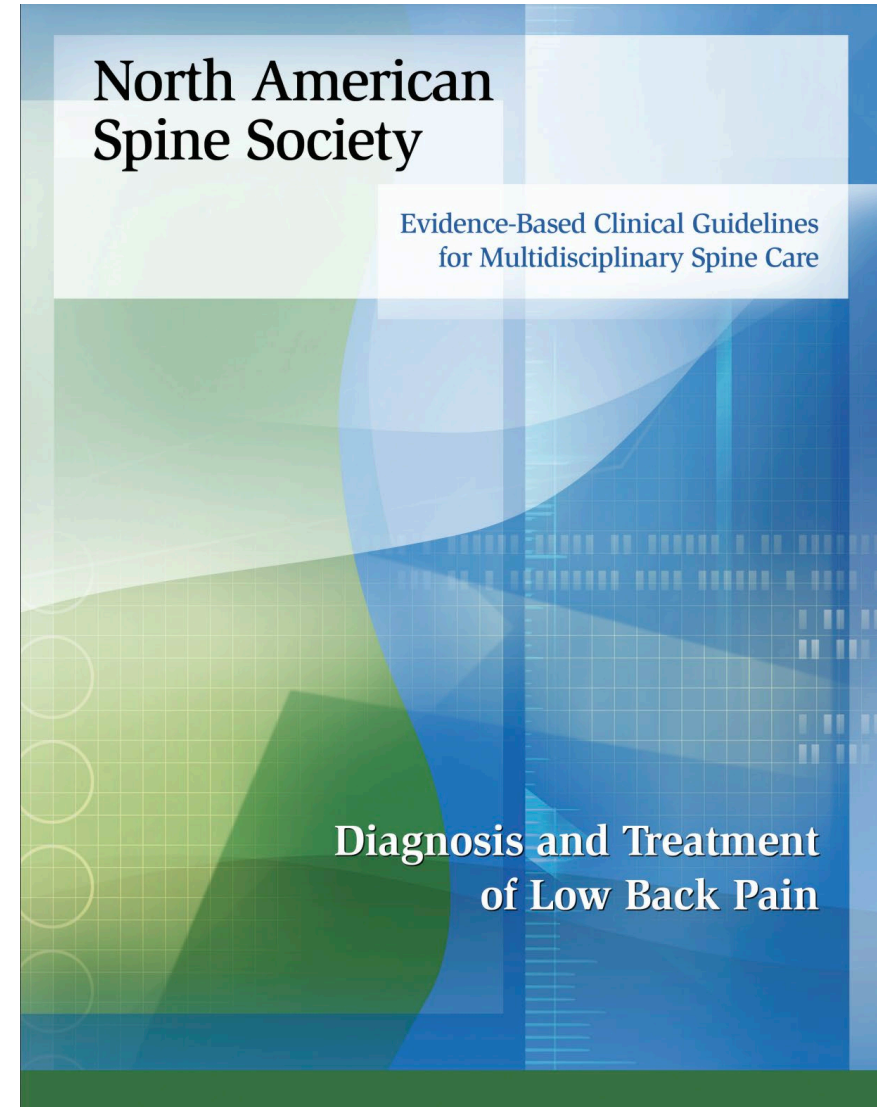
# Etiology – Facet Joints

- Facet arthropathy also positively correlated with worsening disc degeneration and paraspinal muscle atrophy
  - Disc + facet joints = motion segment
  - Motion segments + paraspinal muscles + “core” muscles



# Treatments

- Medications
- Physical Therapy
  - Activity Modification (don't do it)
  - Lifestyle Modification (do less)
  - Biomechanical rehabilitation (do it, differently)
    - ADLs + exercise
- Cognitive Therapy
- Injections?
- “Billboard Medicine”
  - Stem cells, laser, supplements, etc.
- Surgery



# Treatments – Varying Levels of Evidence

- Medications
- Physical Therapy
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There is insufficient evidence to make a recommendation for or against the use of caudal epidural steroid injections in patients with low back pain.

**Grade of Recommendation: I**

For patients with acute low back pain, spinal manipulative therapy (SMT) results in similar outcomes to no treatment, medication or modalities. Periodically, short-term improvement is statistically better, but clinical significance is uncertain.

**Grade of Recommendation: A**

Cognitive behavioral therapy is recommended in combination with physical therapy, as compared with physical therapy alone, to improve pain levels in patients with low back pain over 12 months.

**Grade of Recommendation: A**

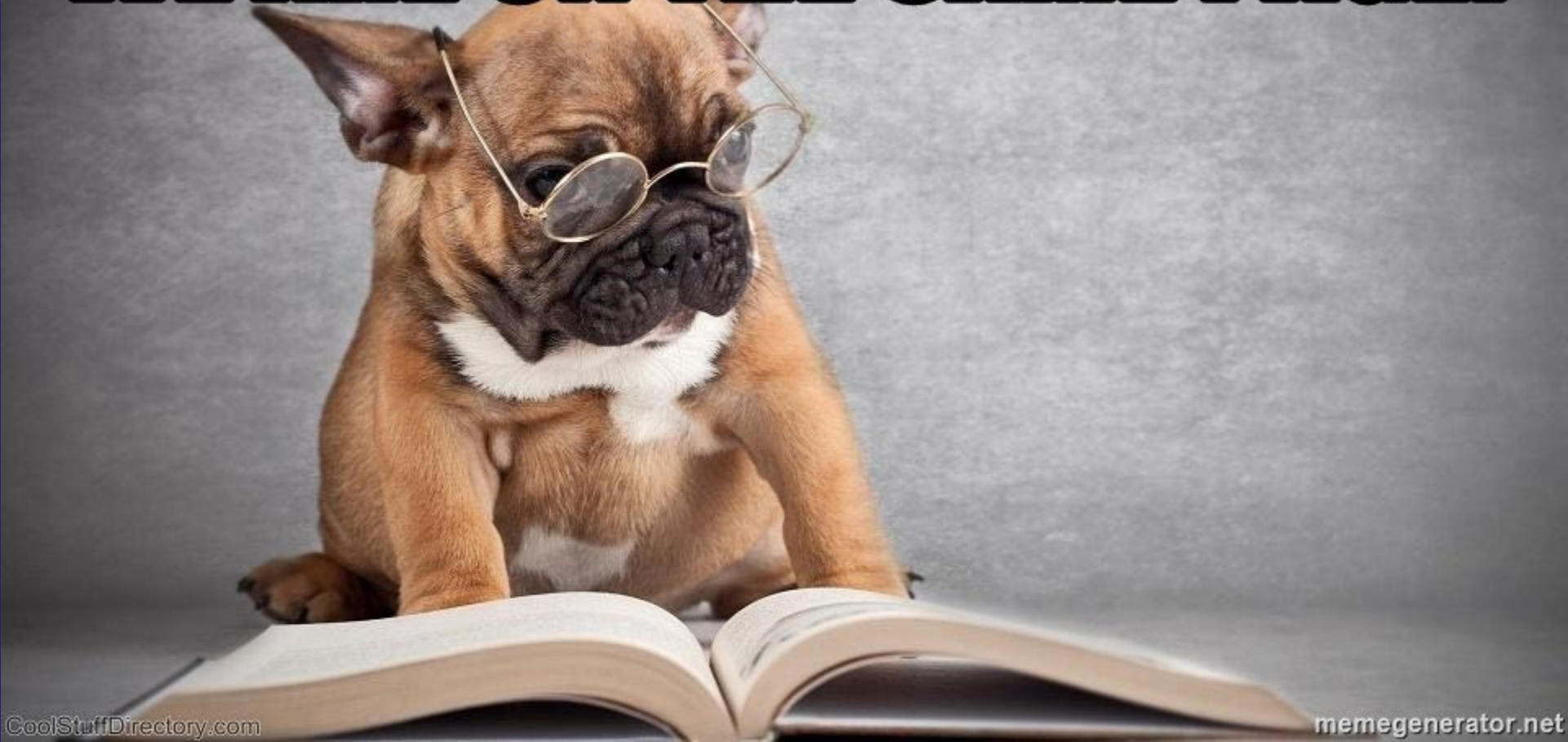
# Treatments - "Normal" versus Correct

- ~~Medications~~
- ~~Physical Therapy~~
  - ~~Activity Modification (don't do it)~~
  - ~~Lifestyle Modification (do less)~~
  - ~~Biomechanical rehabilitation (do it, differently)~~
    - ~~ADLs + exercise~~
- Cognitive Therapy
- ~~Injections?~~
- ~~"Billboard Medicine"~~
  - ~~Stem cells, laser, supplements, etc~~
- ~~Surgery~~

Cognitive behavioral therapy is recommended in combination with physical therapy, as compared with physical therapy alone, to improve pain levels in patients with low back pain over 12 months.

**Grade of Recommendation: A**

**WE ARE ON THE SAME PAGE!**



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# Surgery versus Procedures

- Partial laminectomy L4, L5
- L4-5 posterior spinal fusion
- L4-5 posterior instrumentation with plate
- Allograft for spinal fusion
- Iliac crest aspirate x5 from pt's right crest
- Concentrated bone marrow using centrifuge technique for cellular grafting and spinal fusion
- Nerve monitoring



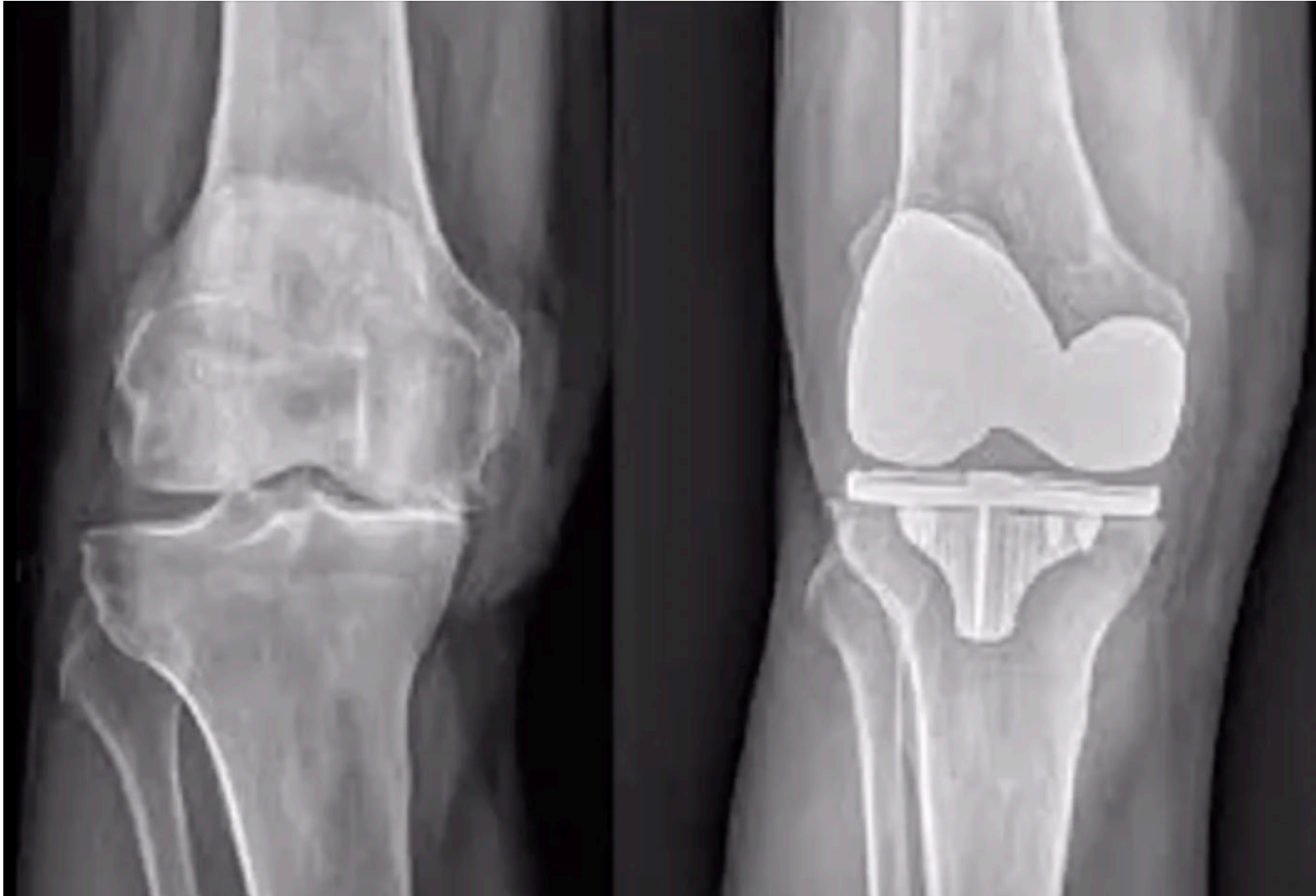
# Lumbar Disc Surgery

- Disc Arthroplasty vs Fusion vs Decompression/Discectomy
- Decompression/discectomy
  - Works well for leg pain
- Fusion
  - Heals well, concerns for adjacent segments
  - Versatile indications
- Arthroplasty
  - Motion sparing, less concern or adjacent segments
  - Indications and contraindications

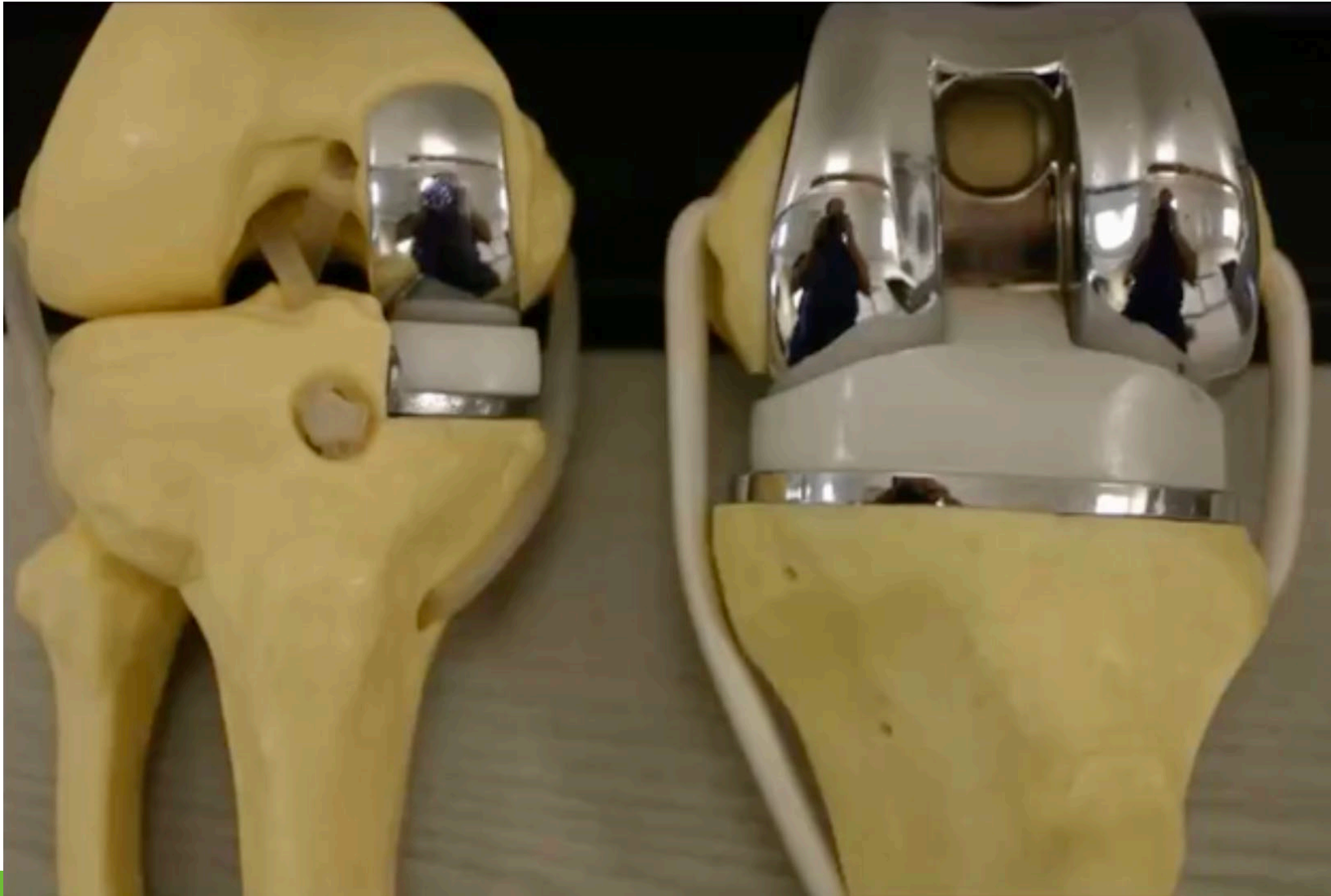
# Lumbar Disc Arthroplasty - Indications

- Single level disease, negative facet joints, correlating imaging, “failed nonsurgical”, no stenosis, no radiculopathy, no deformity
- Fras et. al - high prevalence on contraindications in surgical patients
  - 100% of decompression patients had at least one contraindication
  - 86% of fusion patients had at least one contraindication
- Wong et. – numerous contraindications in lumbar fusion patients
  - 100% had contraindications, average 3.6 (range 1-7)
  - Facet arthropathy noted in 97% of patients (imaging or intraop)

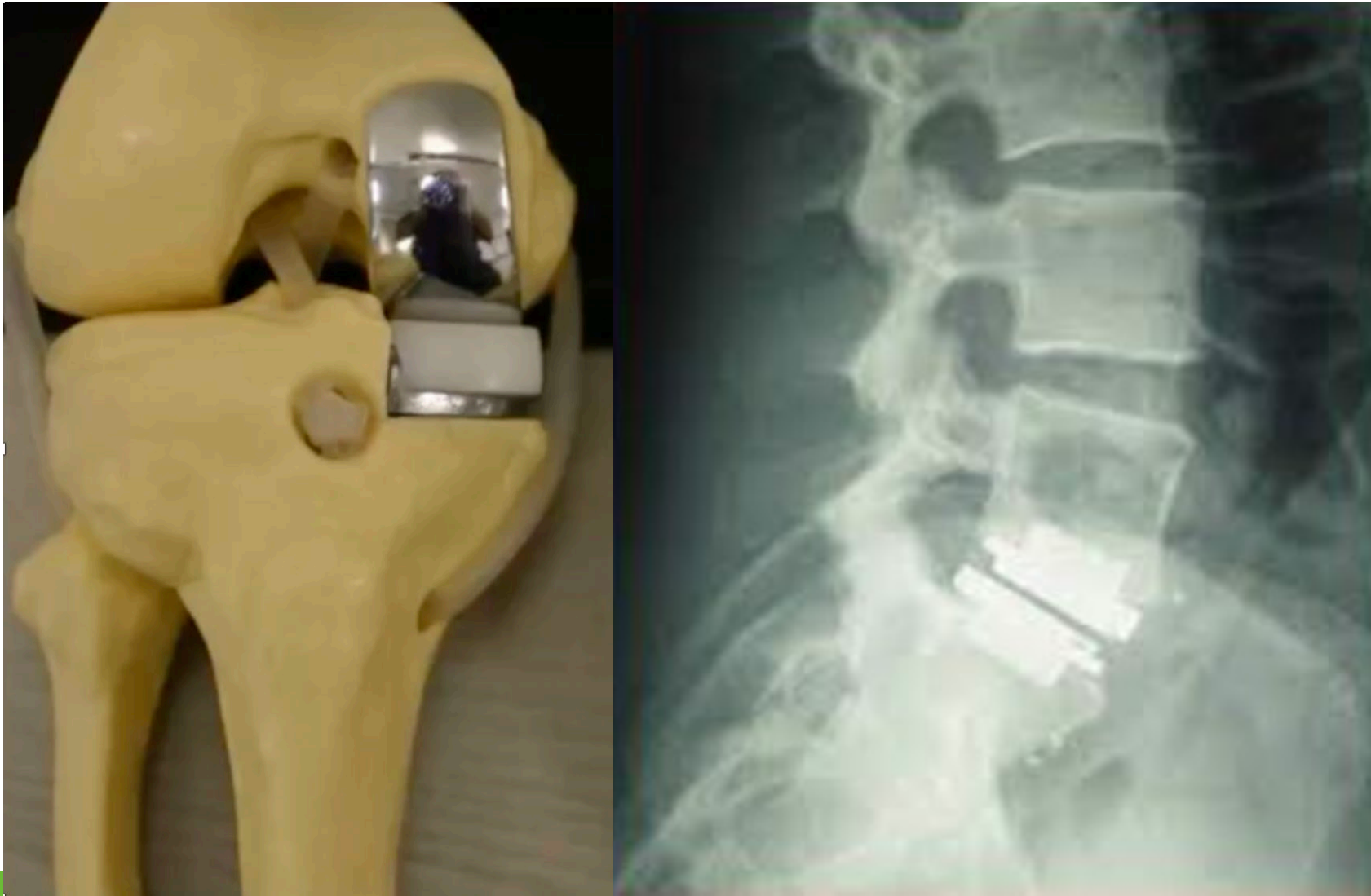
# Hips and Knees are No Longer Fused!



# Total Disc Arthroplasty



# “Total Disc Arthroplasty” = Misnomer



# Disc Arthroplasty - Outcomes

- Statistically significant improvement in appropriate patients
- Similar degree and length of improvement seen with multiple disc arthroplasty implants
- Important data for increasing adoption of arthroplasty
  - No longer comparing to arthroplasty to fusion
  - Decreased bias related to specific implant

Figure 2: ODI through 7 years post-treatment for activL vs. ProDisc-L.

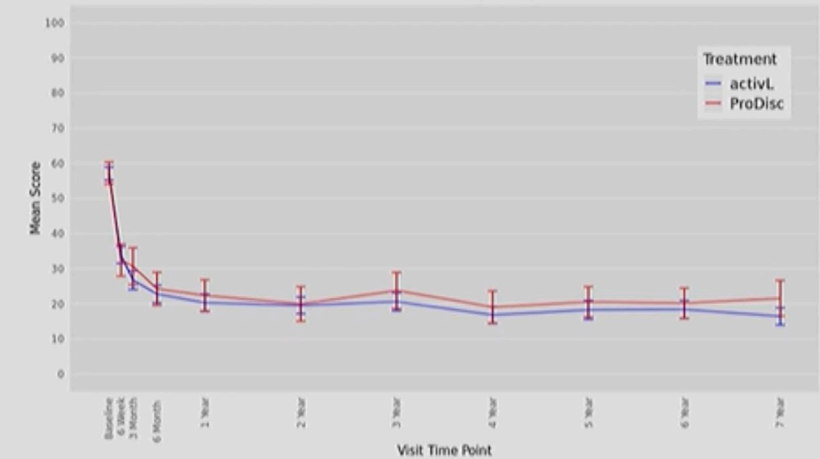
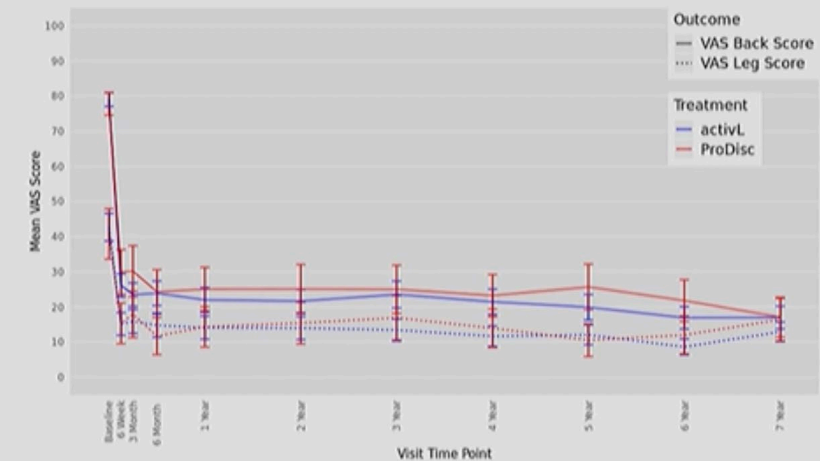
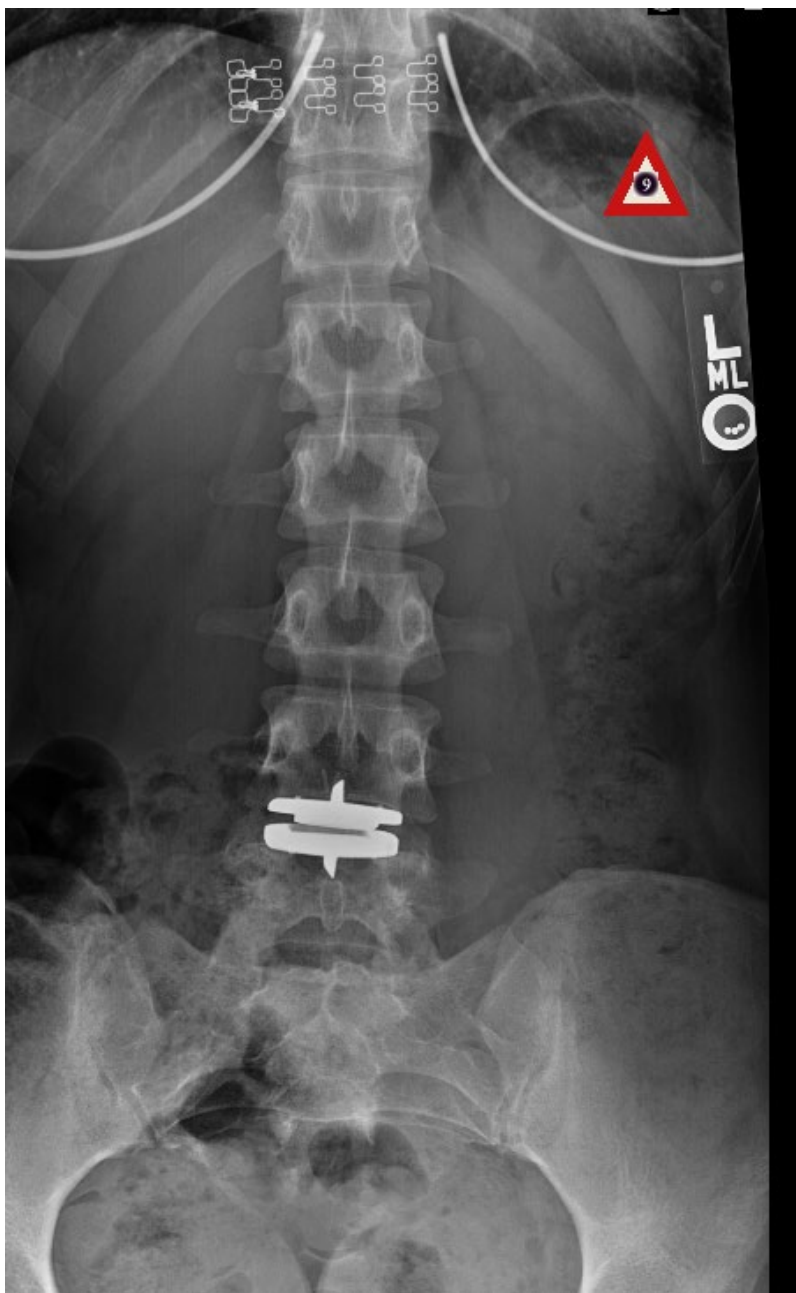


Figure 3: VAS back & leg score through 7 years post-treatment for activL vs. ProDisc-L.



MCS, mental PCS, physical VAS, visual ar





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# Conclusion

- Axial back pain and MRI disc degeneration are very common
- Multifactorial etiology for severity and trajectory of DDD
- Numerous contraindications to disc arthroplasty
- Decompression and fusion procedures remain most common
- In large groups of patients, few will be candidates, but appropriately selected patients can do well with disc arthroplasty
- Physical therapy and non-surgical care will continue
- Primary indications for surgery remain - neurologic signs/symptoms with instability, deformity, foraminal stenosis