PainWeek®

Surgical Consult: When Pain Management is Contraindicated

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Title & Affiliation

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Disclosures

- Consultant for Nevro, Camber Spine, Vertos

Education

- Robert Wood Johnson Medical School 2009
- University of Pennsylvania Anesthesia and Critical Care 2013
- University of Pennsylvania Interventional Pain Fellowship 2014
- Board Certified Anesthesia and Pain Management 2014-2024

Learning Objectives

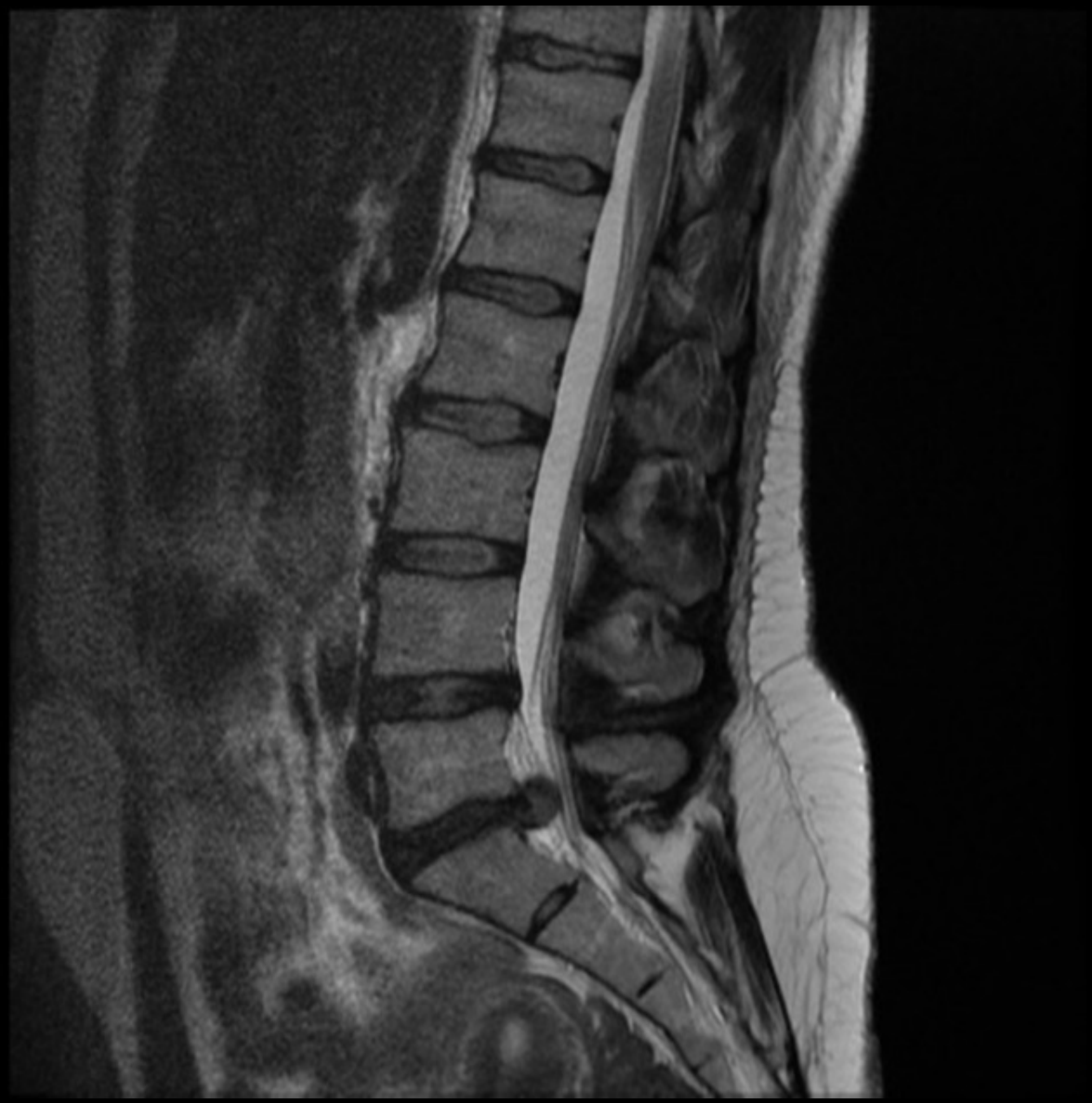
- Describe when pain injections are not the next step in care
- Identify symptoms that should always be asked to a patient
- List indications for spine surgery
- Explain imaging studies of surgical pathology
- Review patient case studies

Mrs Smith

- Pleasant 63 yo who presents with 3 week course of “sciatica”
- Symptoms started after a slip and fall on wet surface
- No significant PMHx or SurgHx
- Numbness and tingling in RLE along with subjective weakness in leg reported
- Difficulty with plantar flexion on exam, Patellar reflex is 1+
- Denies bowel or bladder dysfunction

Mrs Smith

- Plain film lumbar xrays show facet arthopathy with no fracture
- PCP referred over for LESI vs TFESI
- MRI not ordered or completed
  - I think you need an MRI first
  - Standard of care prior to any spine related procedure



Mrs Smith

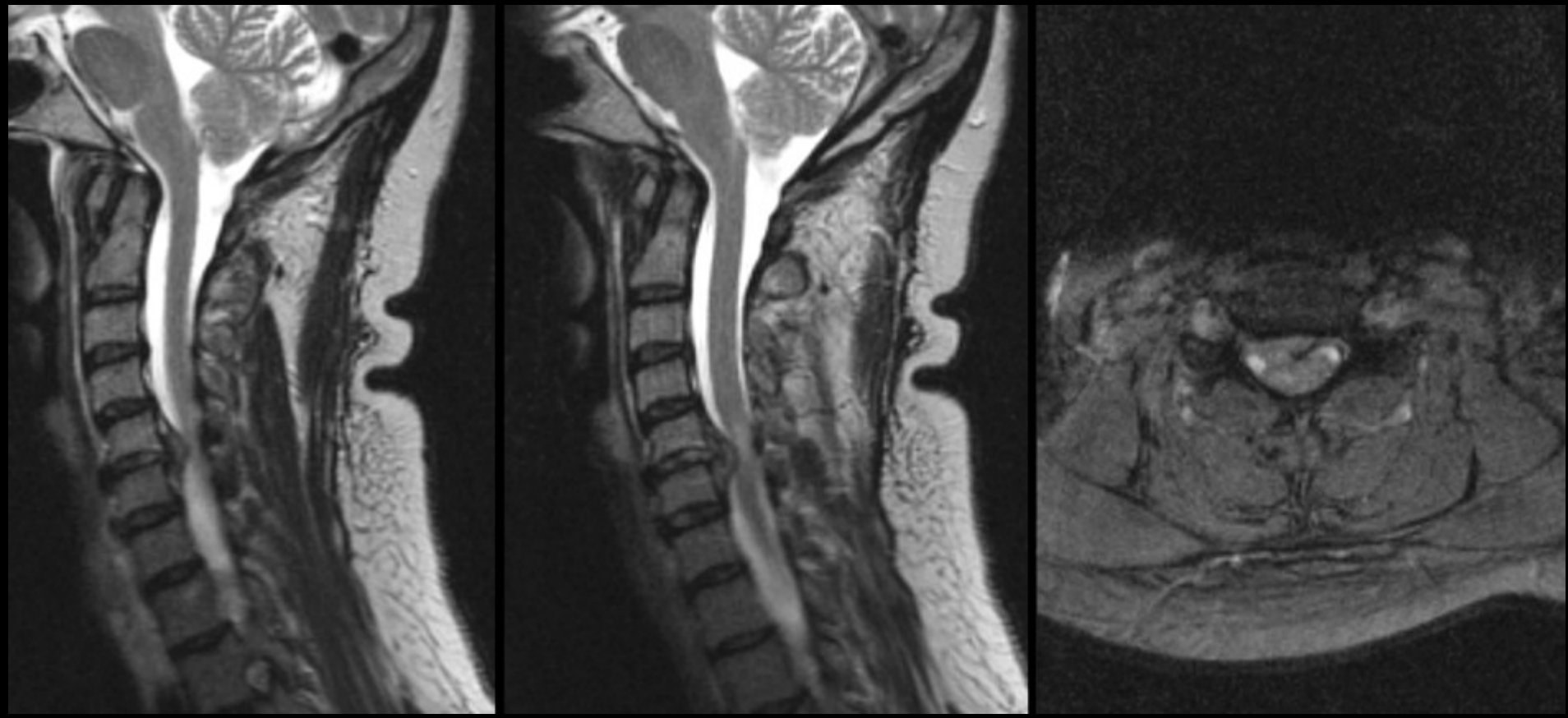
- MRI showed a large L5-S1 disc extrusion with severe canal stenosis
- Referred out for surgical decompression and symptoms resolved
  - Right L5-S1 hemilaminectomy with diskectomy
- The importance of appropriate imaging can not be overlooked
  - Subjective weakness needs to be worked up!
    - Motor nerve impingement…time is tissue
- Physical Exam Findings
- Appropriate Imaging
  - Can not be overlooked. CT vs MRI
  - Xrays help get imaging approved but are not gold standard for diagnosis

Referrals for Injection

- Imaging needs to be obtained
- Standard of Care
- Ideally MRI, CT scan can suffice for those with contraindications for MRI studies

Mr Smith

- 38 year old construction worker presents with 1 month of cervical pain following 5foot fall off of rebar
- No significant PMHx or SurgHx
- Xrays negative for fracture
- Referred for injections
- Physical Exam
  - Radiation of pain into right upper extremity with radicular complaints
  - 1+ biceps reflex with C5 C6 sensory deficit in RUE
- MRI ordered



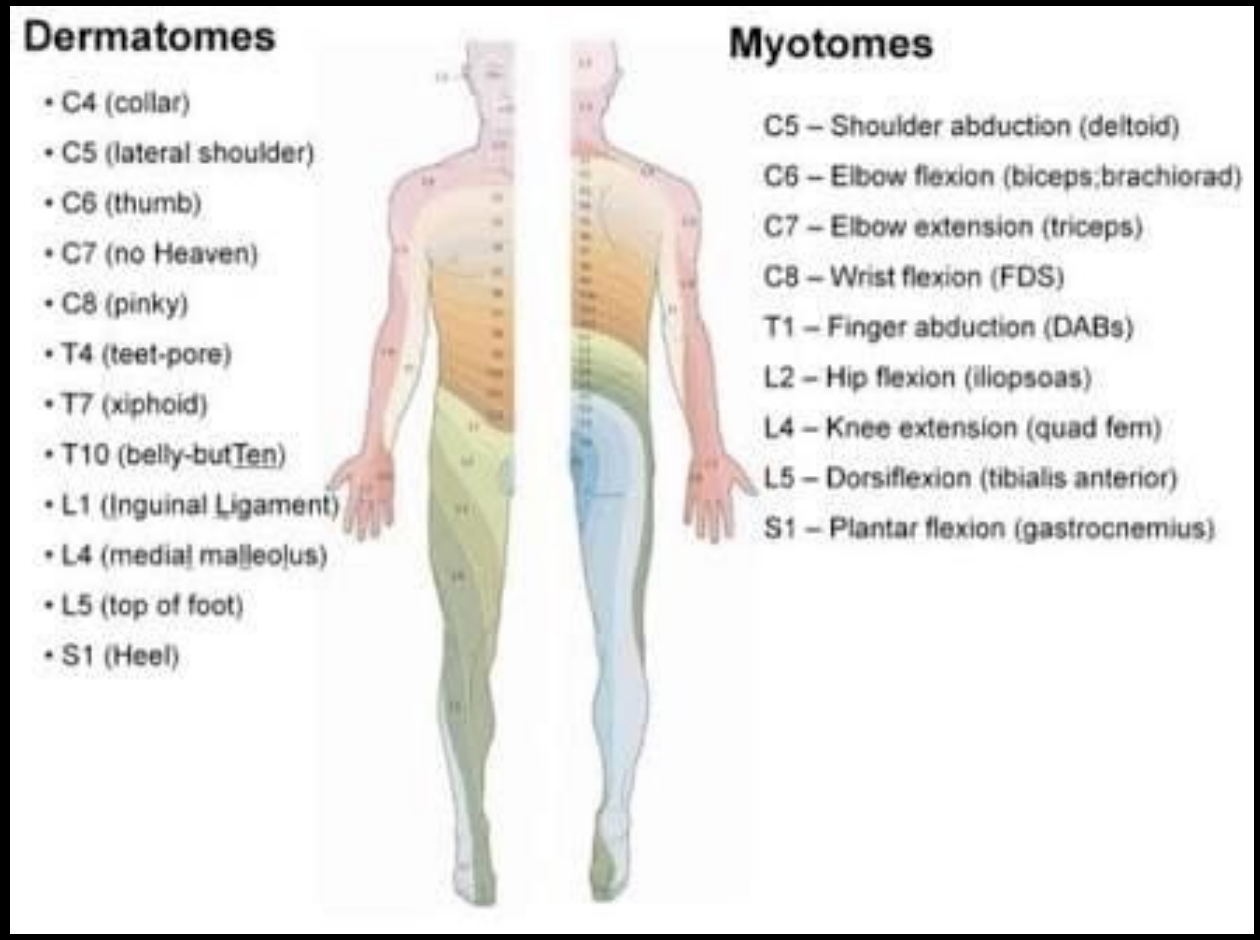
Mr Smith

- C5 C6 disc extrusion with cord impingement
  - Medrol pack ordered and referred out for surgery
  - Symptoms resolved after C5 C6 ACDF
- WEAKNESS ON EXAM CAN NOT BE OVERLOOKED

Weakness

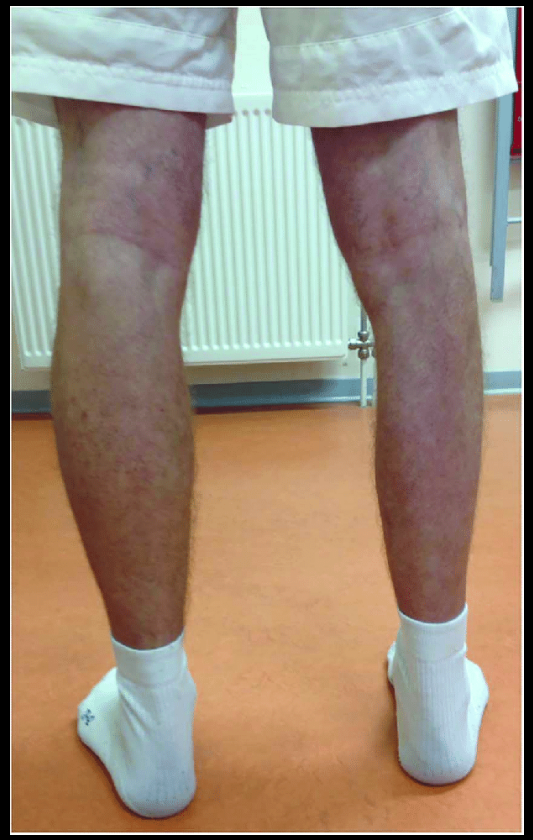
- If reported subjectively, physical exam is very important
- Helps diagnose pathology
- Allows for approval of appropriate imaging studies
- MRI denials
  - Most insurance companies are looking for weakness or reflex changes on exam prior to MRI approval along with plain film xrays
  - Course of conservative care being documented
  - PT, home exercise, chiro
- Myotomes/Dermatomes

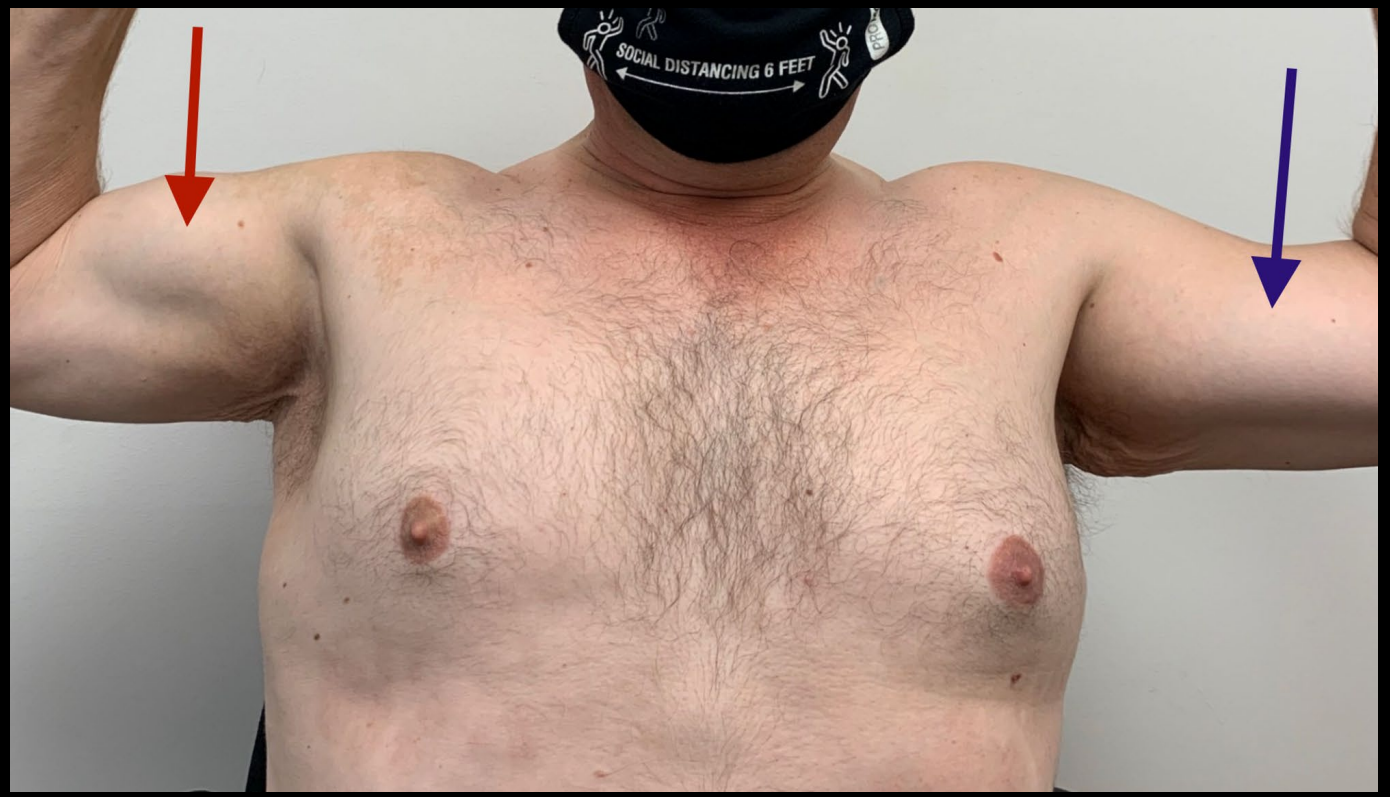
Dermatomes/Myotomes



Atrophy

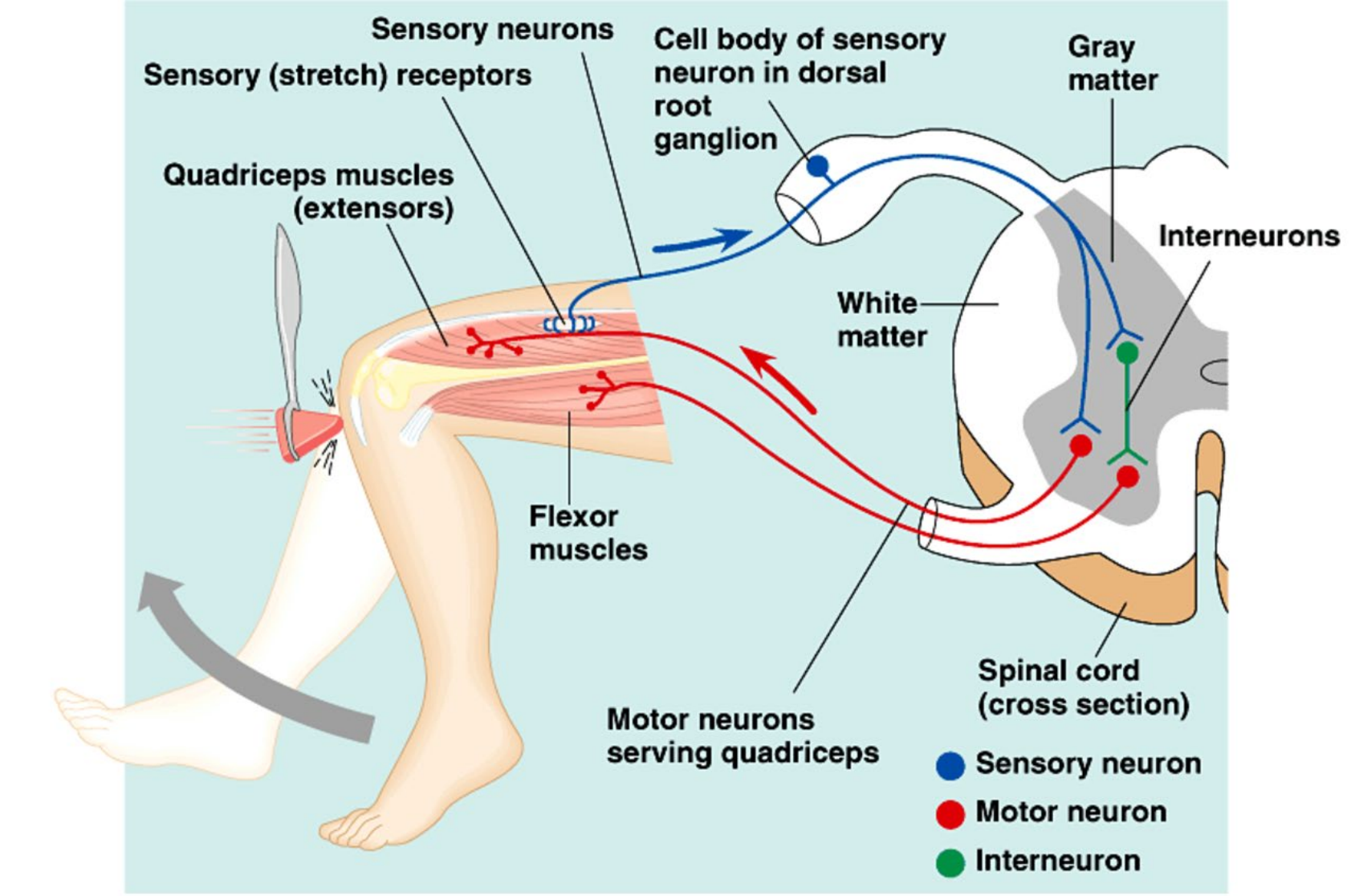
- Longstanding nerve root compression
- Typically not going to be alleviated with intervention or surgery





Reflexes

- If reflexes are diminished consider peripheral nerve injury
- Hyper reflexic concern for central process
- Once again helps formulate diagnosis
- Allows for appropriate imaging to be approved



- https://humanphysiology.academy

Reflexes

Nerve root	Motor reflexes	Sensory reflexes	Deep tendon reflexes
C5	Deltoid	Lateral arm	Biceps jerk (C5,C6)
C6	Biceps, brachioradialis, wrist extensors	Lateral forearm	Brachioradialis
C7	Triceps, wrist flexors, MCP extensors	Middle of hand, middle finger	Triceps jerk
C8	MCP flexors	Medial forearm	—
T1	Abductors and adductors of fingers	Medial arm	—
L4	Quadriceps	Anterior thigh	Knee jerk
L5	Dorsiflex foot and great toe	Dorsum of foot	Hamstring reflex (L5, S1)
S1	Plantarflex foot	Lateral foot, posterior calf	Ankle jerk

- Taylor et al.Taylor's Musculoskeletal Problems and Injuries A Handbook

Reflexes

NINDS Scale for Tendon Reflex Assessment

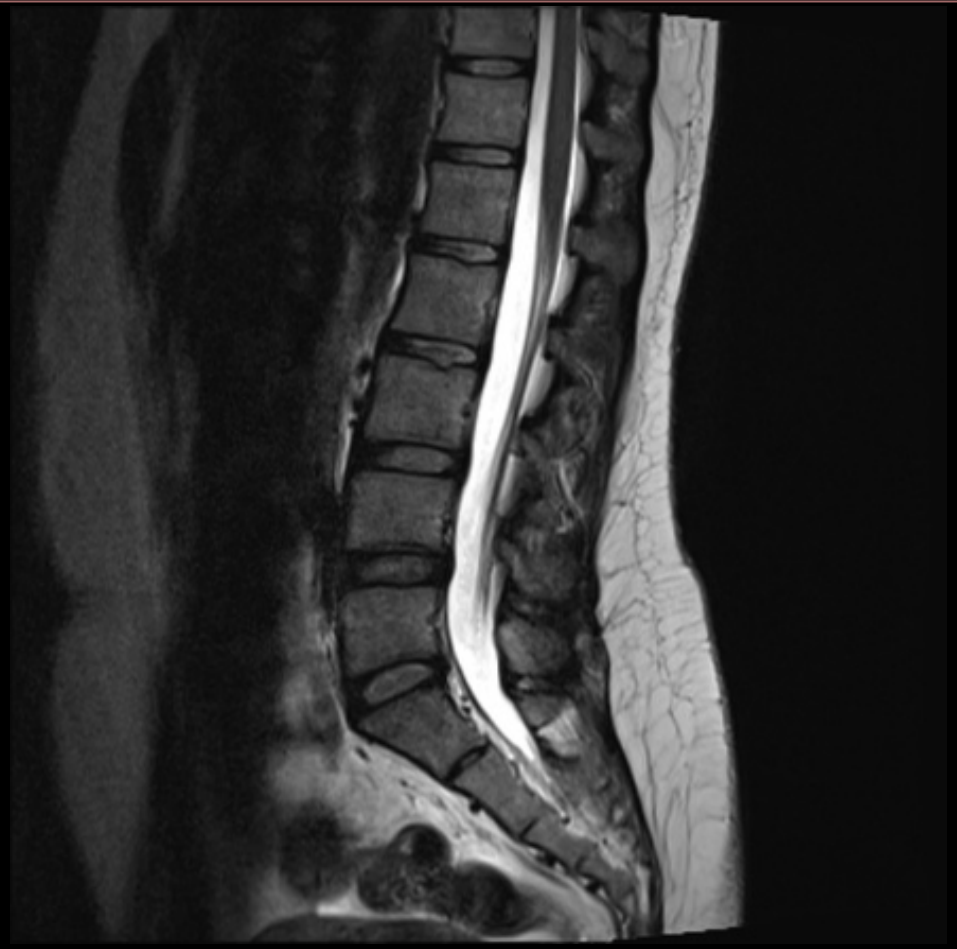
Description	*Score*
Reflex absent	0
Reflex small, less than normal; includes a trace response, or a response brought out only by reinforcement	1
Reflex in lower half of normal range	2
Reflex in upper half of normal range	3
Reflex enhanced, more than normal; includes clonus if present, which can be noted in an added description of the reflex	4

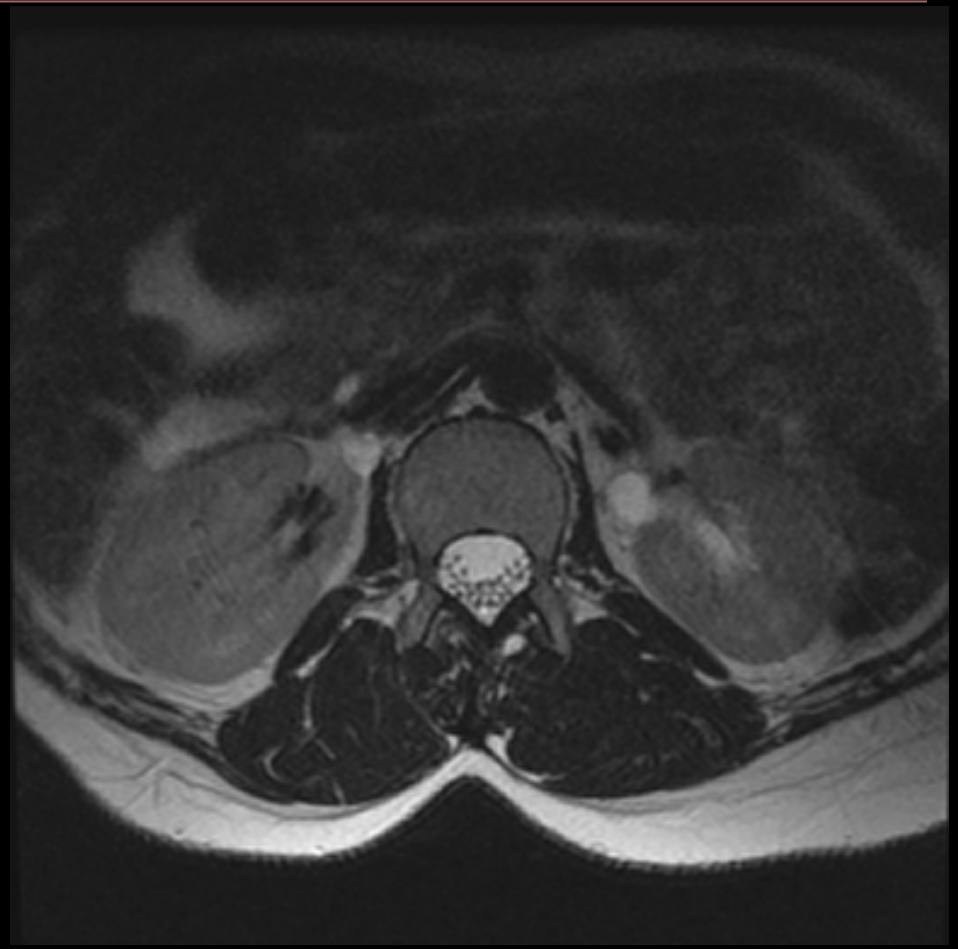
Note. From "NINDS Myotatic Reflex Scale," by M. Hallett, *Neurology*, *43*, p. 2723. Copyright 1993 by the National Institutes of Health. Reprinted with permission.

Mr Bell

- 72 yo with PMHx of afibb, HTN, HL
- Meds: Plavix 75mg qday, metoprolol 25mg, atorvastatin 20mg
- Chief complaint of worsening left leg pain over past 3 months with neck and low back pain
- Antalgic gait
- Radicular complaint in L5 S1 dermatomal distribution
- MRI of L spine ordered by PCP relatively normal
- Referred over for LESI

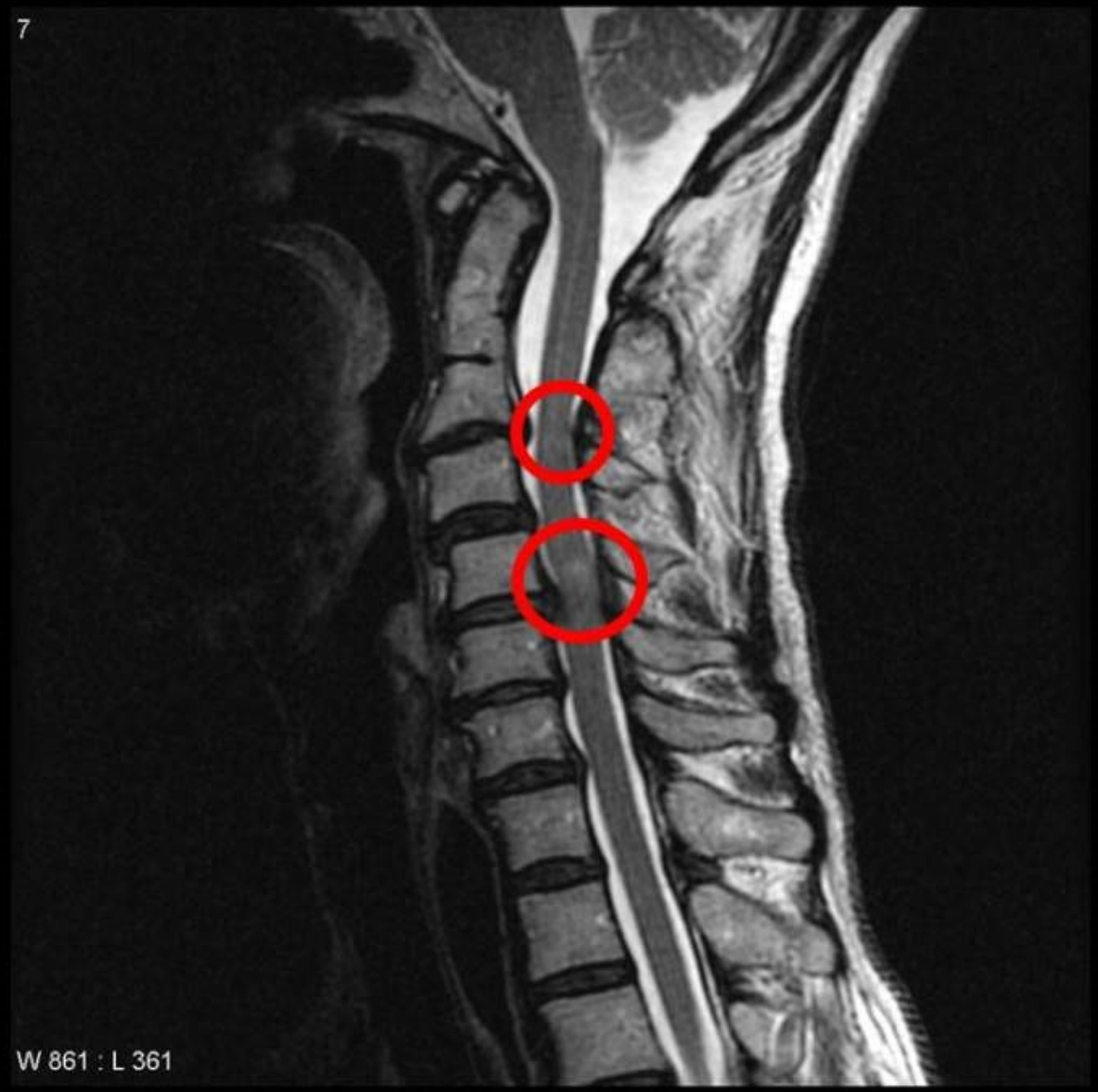
L SPINE MRI





Mr Bell

- Neck pain with antalgic gait
- MRI L spine relatively normal
- MRI of C spine ordered due to gait disturbance with neck pain complaint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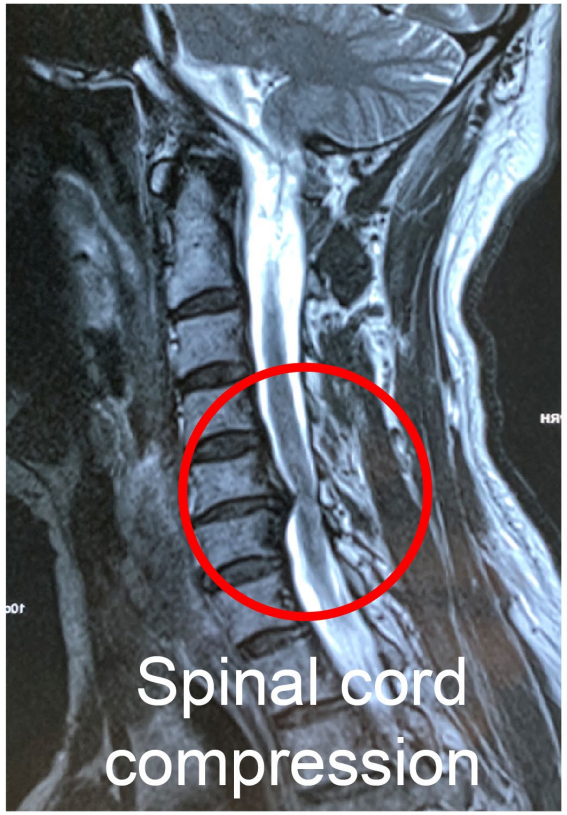
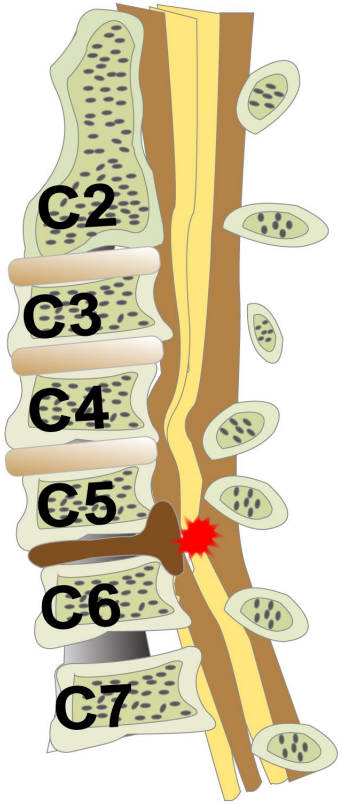
Myelomalacia/Cord Injury

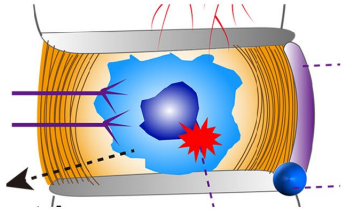
- Seen on MRI imaging
- “Softening of the spinal cord”
- Can occur anywhere in spinal cord
- Traumatic or degenerative in etiology

Degenerative Cervical Myelopathy

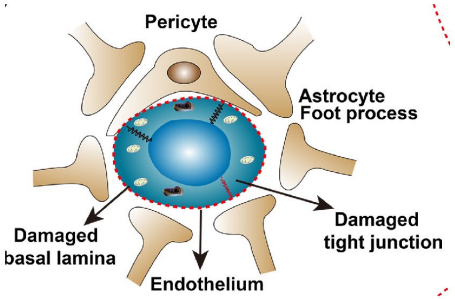




Disc degeneration



Damaged blood-spinal cord barrier



Neck pain

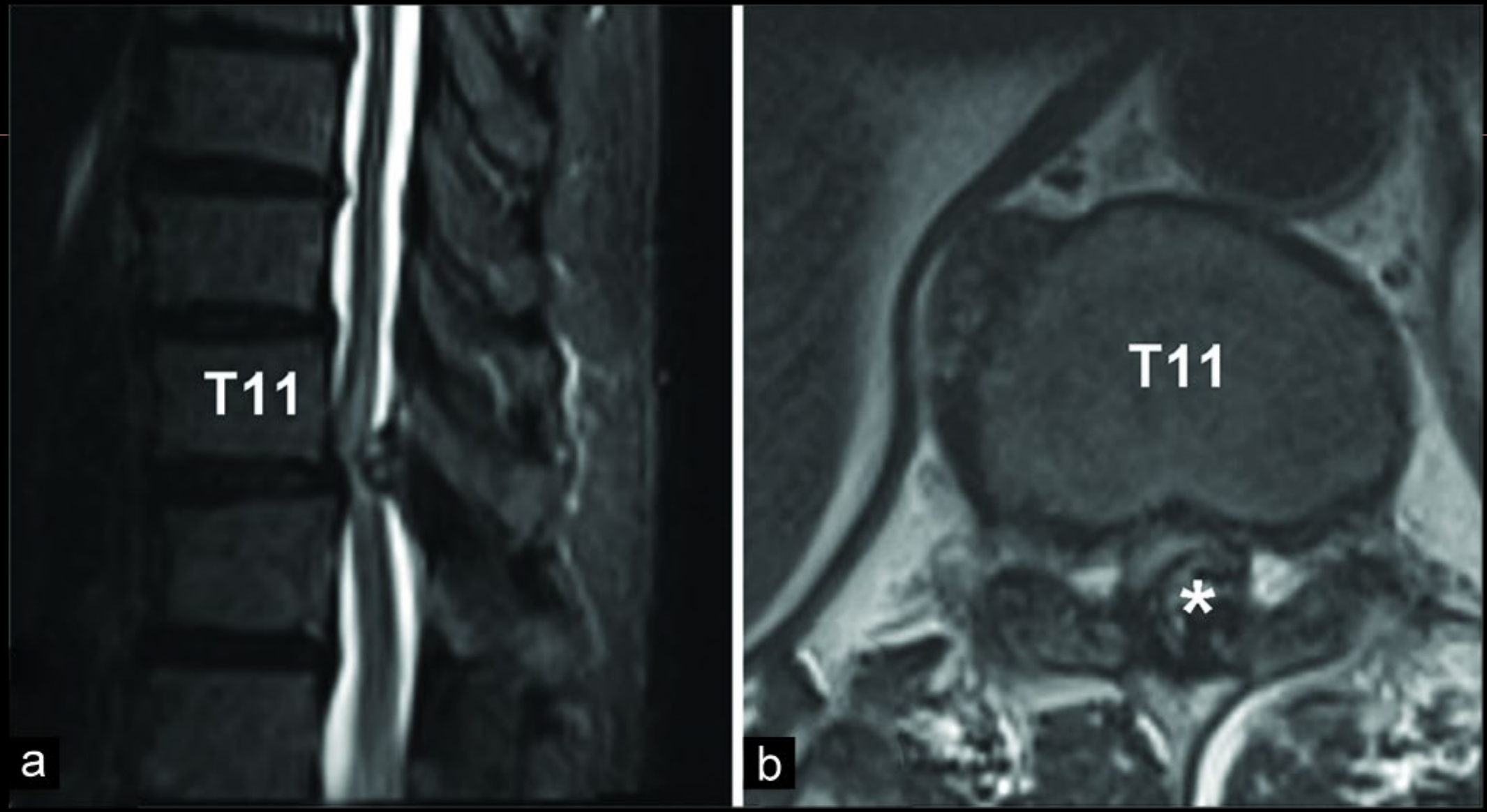
Neck stiffness

Gait instability

Loss of dexterity

Nerve damage

Paralysis


T11
a
T11
*
b

Myelomalacia/Cord Injury

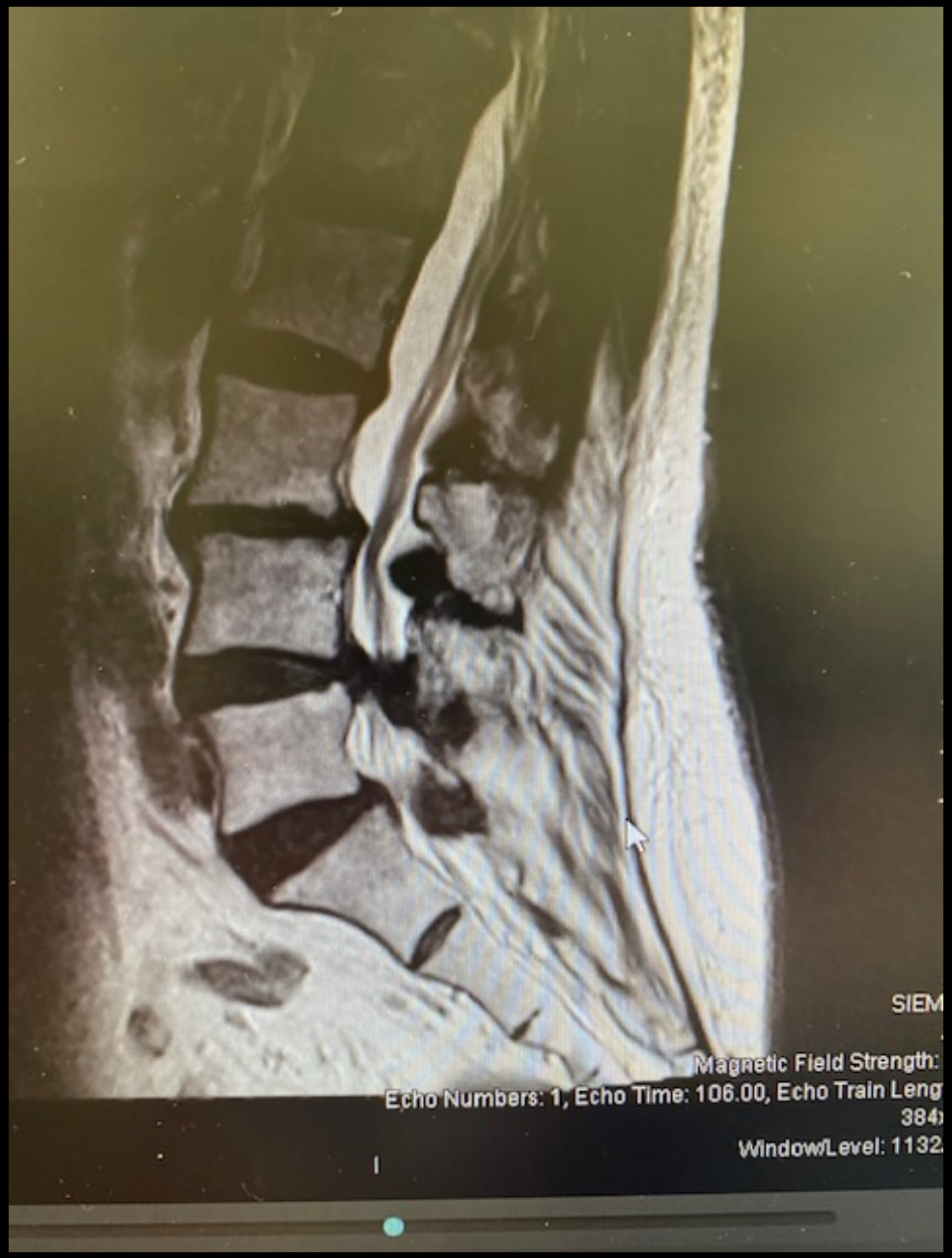
- Symptoms
  - Loss of motor function
  - Hypo reflexic/areflexia
  - Loss of pain perception
  - Paralysis
- Injection therapy not indicated
- Surgical referral needed….time is tissue

Mr Bell

- Referred for surgical consultation
- Underwent ACDF at C5 C6
- Complete resolution of symptoms 3 months post fusion

Mrs Albright

- 78 yo female with PMHx of GERD, HTN
- Presents with worsening neurogenic claudication symptoms over past 4 months
- Pain worse with standing and walking
- Pain improves with lumbar flexion
- Physical exam benign
- Completed PT with no relief, MRI completed, referred for LESI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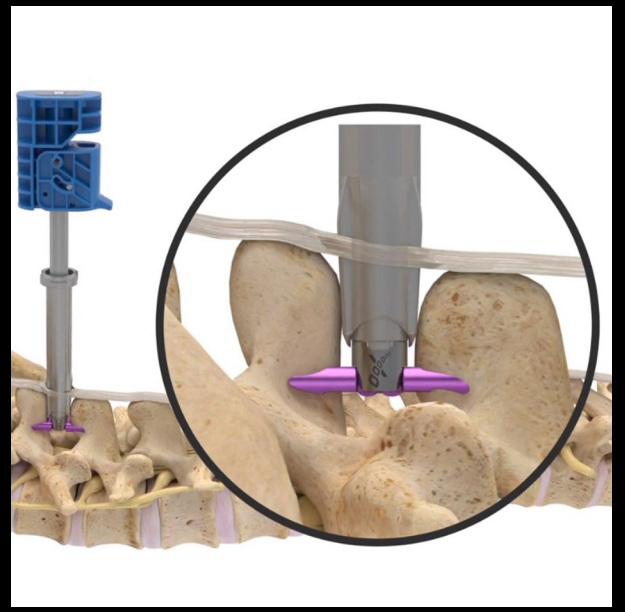
Magnetic Field Strength:
Echo Numbers: 1, Echo Time: 106.00, Echo Train Leng
384
Window/Level: 1132

PAINWEEK®

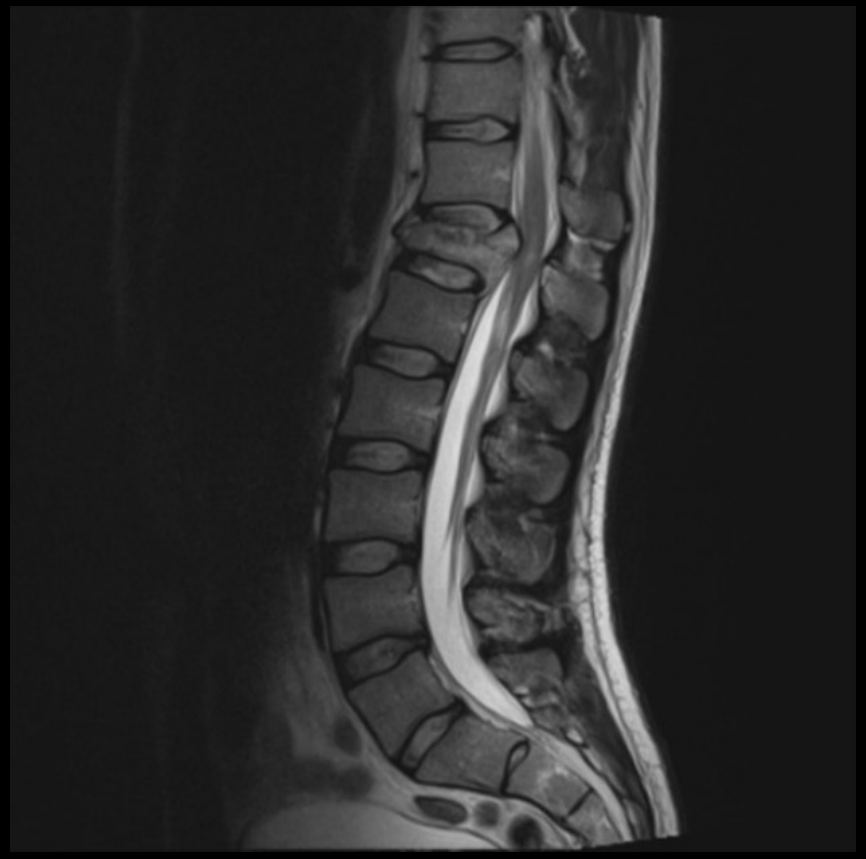
Lumbar Spinal Stenosis

- Mild to moderate cases of LSS are candidate for intervention
- LESI vs MILD vs Interspinous spacer
- Severe cases of LSS should be considered for surgical decompression



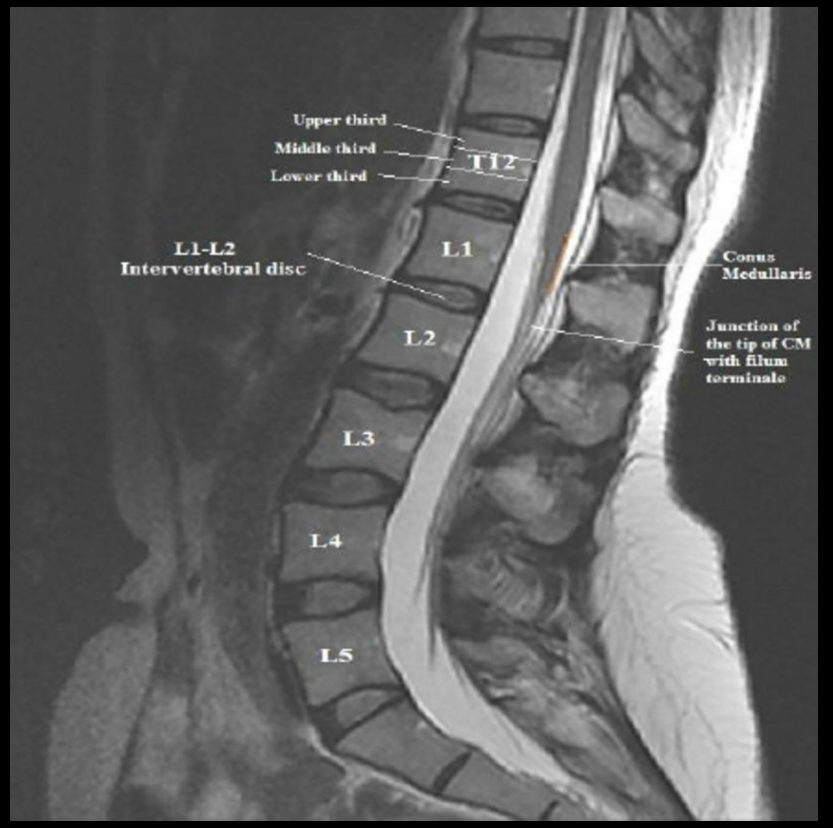
Burst Fractures

- If retropulsion of material occurs with weakness consider surgical referral

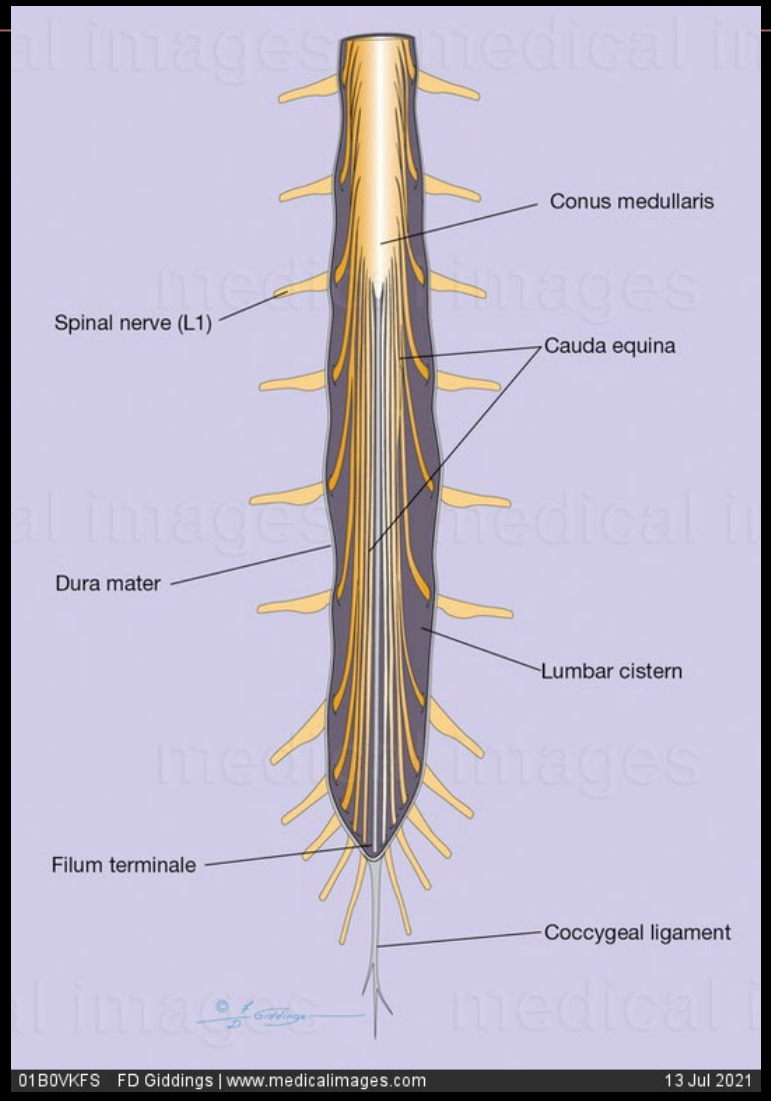


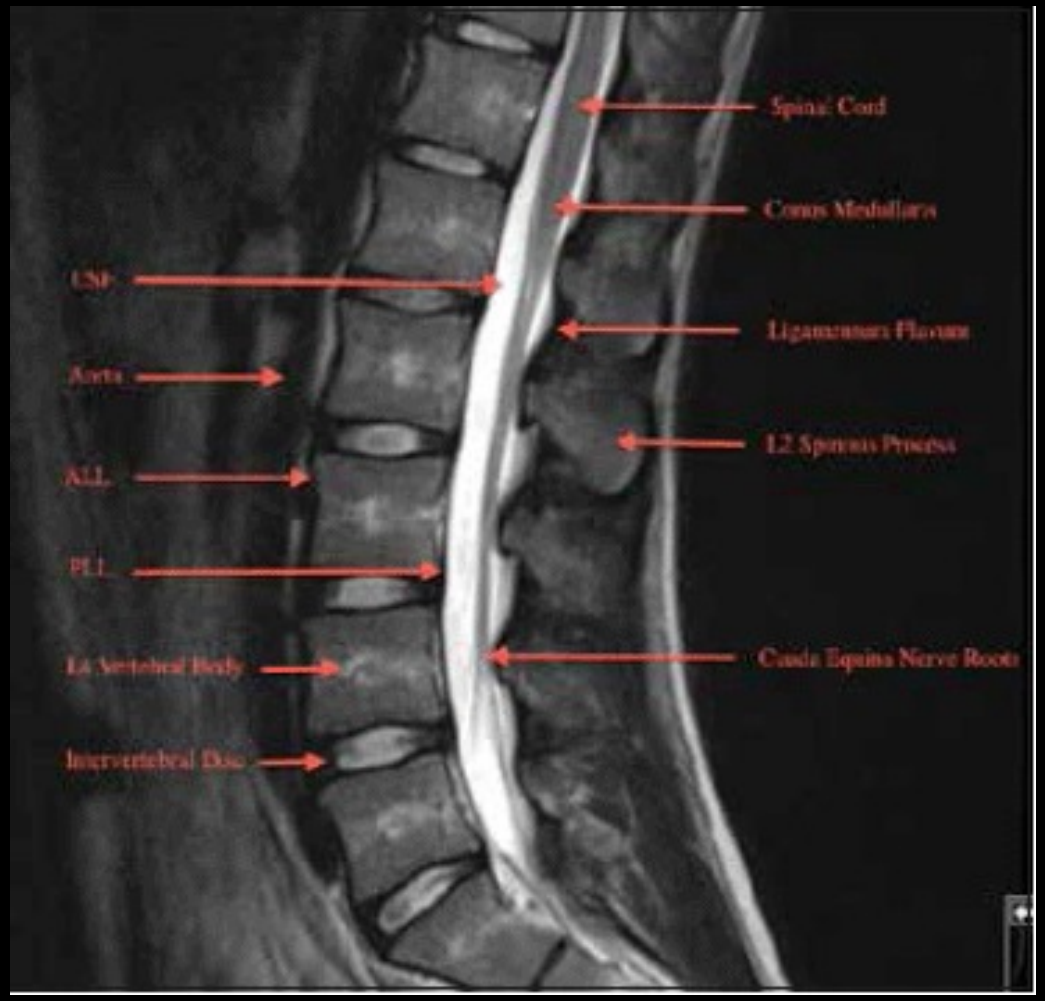
Cauda Equina

- Horse's Tail



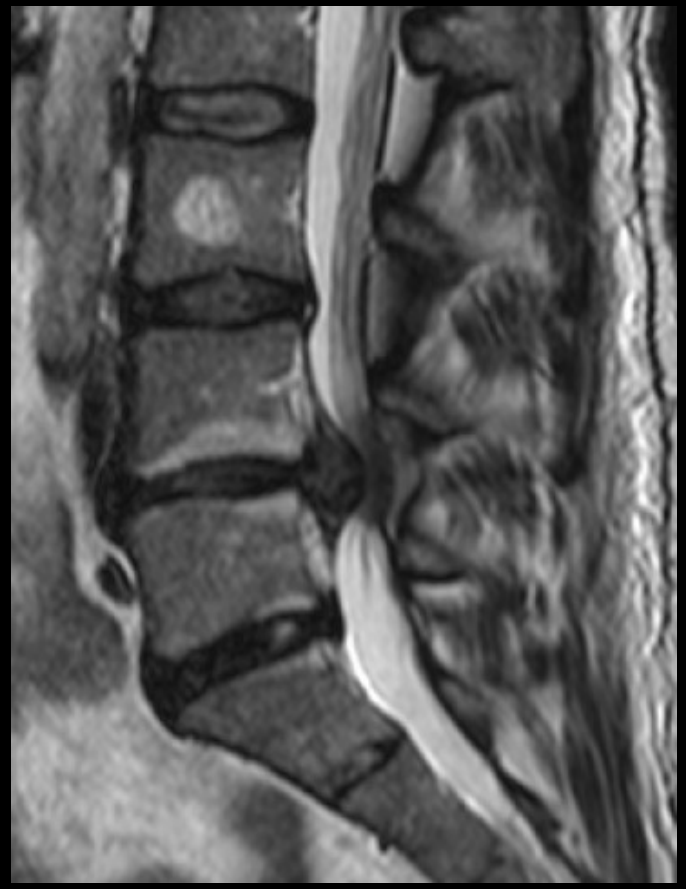
Cauda Equina

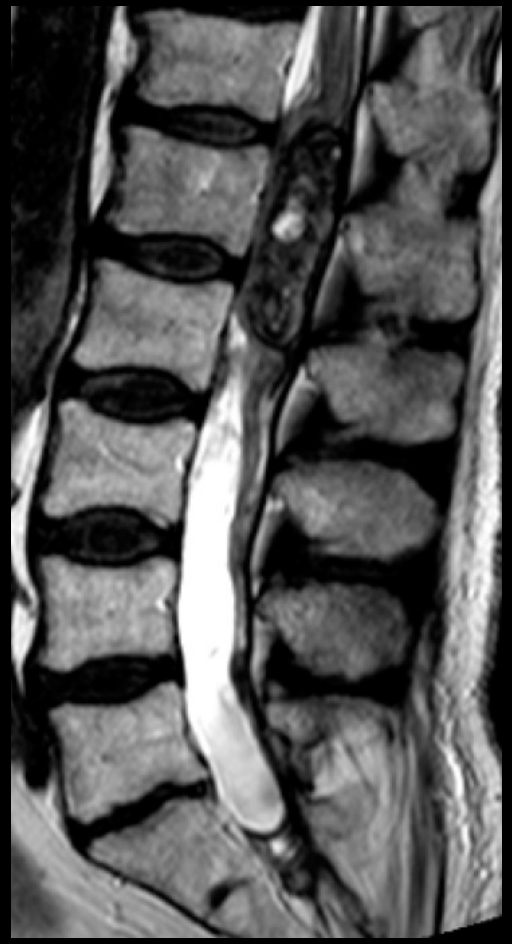



Spinal Cord
Conus Medullaris
CSF
Ligamentum Flavum
Aorta
L2 Spinous Process
ALL
PLL
L4 Vertebral Body
Cauda Equina Nerve Roots
Intervertebral Disc

Cauda Equina Syndrome

- Saddle Anesthesia
- Weakness or loss of sensation in lower extremities
- Urinary/bowel incontinence or retention
- Causes
  - Large disc herniation or extrusion
  - Tumor
  - Infection
  - Hemorrhage
  - Fracture
  - Severe stenosis





Greenhalgh et al. Assessment and management of cauda equina syndrome. Musculoskeletal Science and Practice. October 2018. Volume 37. 69-74

Bowel and Bladder Dysfunction

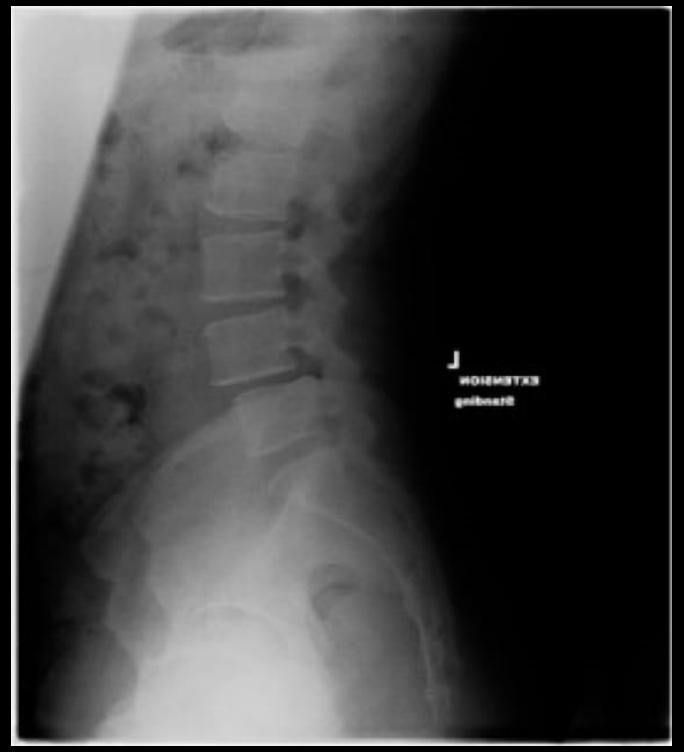
- Incontinence of bowel or bladder should be questioned every visit when seeing a patient with complaint of lumbar pain
  - Red Flag Symptom
- Sometimes hard to distinguish with older patients who have chronic issues with bowel and bladder
  - Timing of complaints can be key
  - Weakness in legs or sensory deficits will not come with stress incontinence or urge incontinence

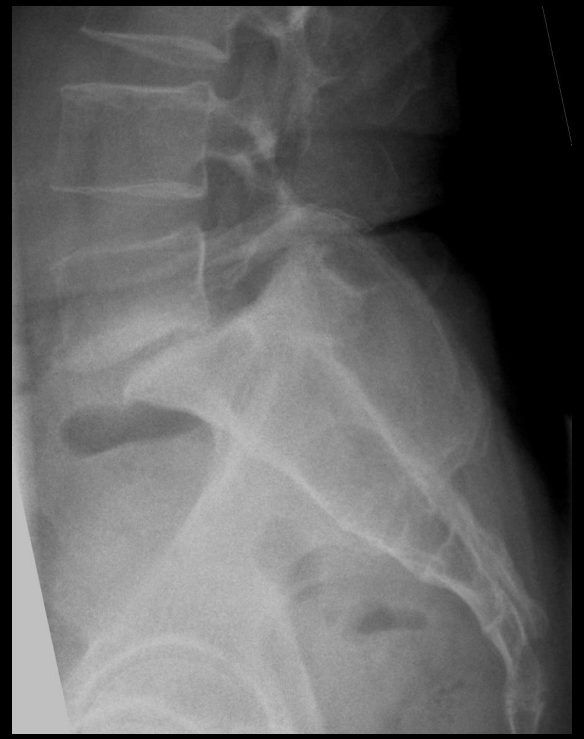
Spine Instability

- Typically seen in setting of trauma but can be degenerative in etiology

Spondylolisthesis

- Vertebral Body Movement
- Anterolisthesis vs Retrolisthesis
- Grading System
- 1-5
- Flexion/Extension Films

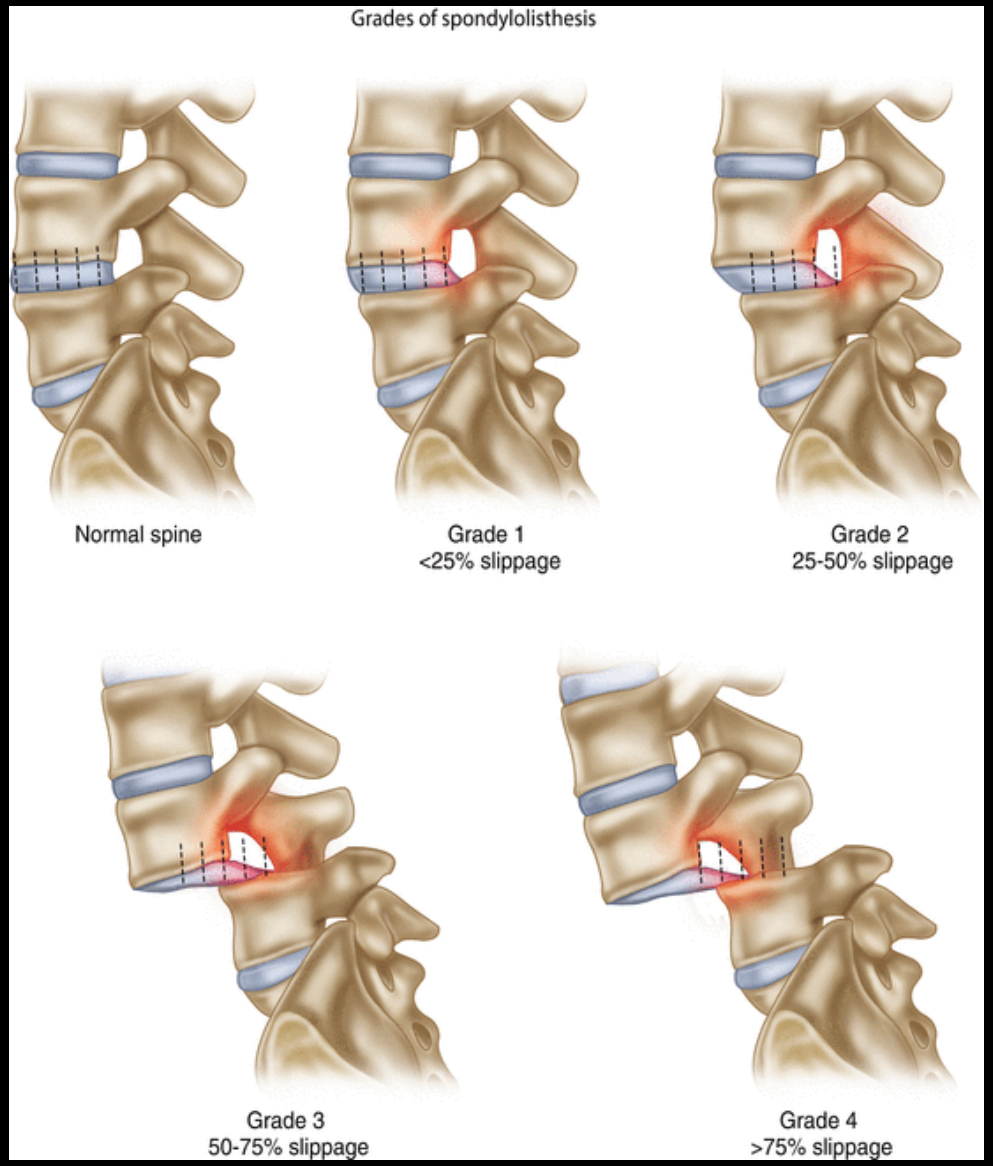




Bydon et al. Degenerative Lumbar Spondylolisthesis: Definition, Natural History, Conservative Management, and Surgical Treatment. Neurosurgery Clinics of North America. Volume 30, Issue 3, July 2019, 299-304

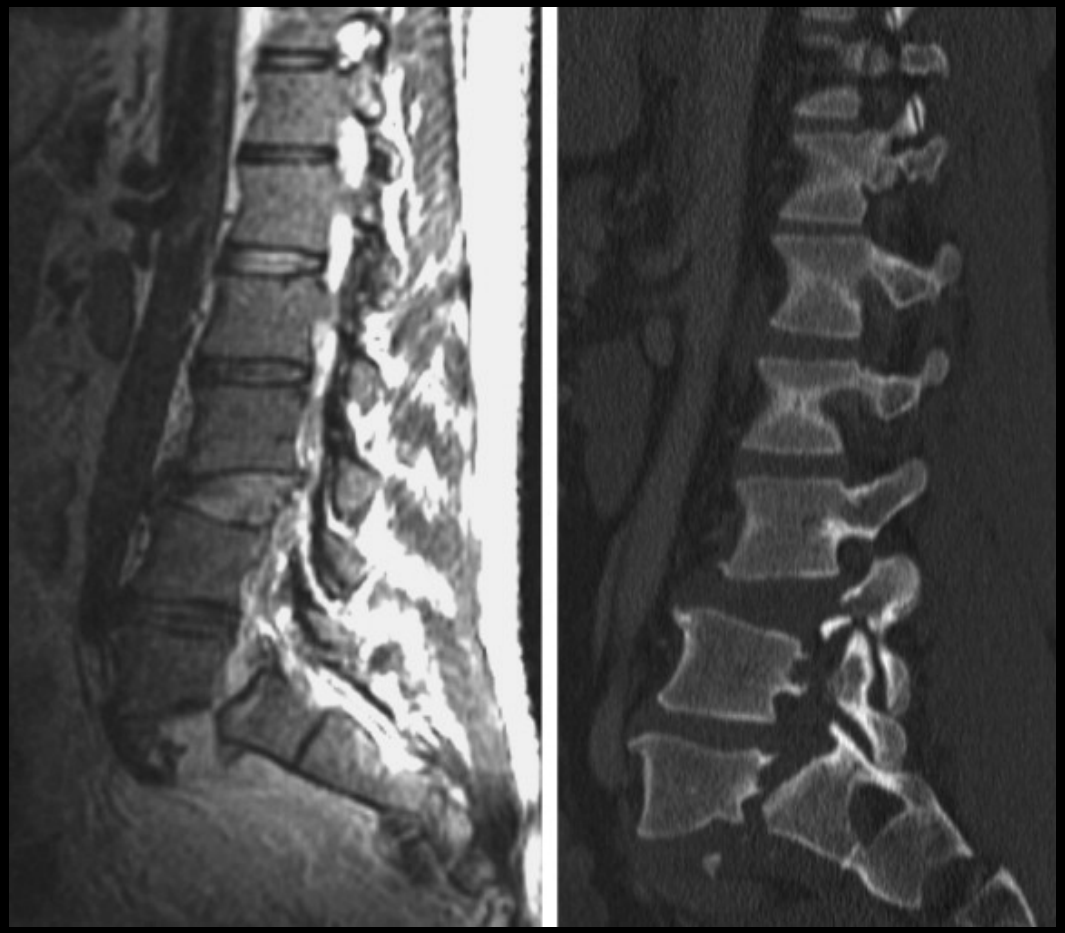
Grading System 1-5

- Grade 1 25% of vertebral body has moved forward
- Grade 2 50%
- Grade 3 75%
- Grade 4 100%
- Grade 5 Vertebral Body completely off (spondyloptosis)



Bydon et al. Degenerative Lumbar Spondylolisthesis: Definition, Natural History, Conservative Management, and Surgical Treatment. Neurosurgery Clinics of North America. Volume 30, Issue 3, July 2019, 299-304

Grade 5 Spondyloptosis



Tian et al. Treatment of L5-S1 Spondyloptosis with Multiple Pedicle Defects Through a Combined Anterior and Posterior Approach. World Neurosurgery. May 2020. Volume 137. 206-210

Referrals for Injection

- Imaging needs to be obtained
- Standard of Care
- Ideally MRI, CT scan can suffice for those with contraindications for MRI studies

References

- https://humanphysiology.academy
- Taylor et al. Musculoskeletal Problems and Injuries A Handbook
- McNamee et al. Imaging in Cauda Equina Syndrome- A Pictorial Review. Ulster Med J. 2013 Mayl 82(2): 100-108
- Daniels et el. Traumatic spondyloptosis resulting from high energy trauma with a tonic clonic seizure. The Spine Journal. Volume 9, Issue 1, E1-E4 January 1, 2009

Questions