

Advanced Cross-Sectional Imaging of Spinal Injuries

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CENTER FOR
DIAGNOSTIC IMAGING

Spinal Injury Imaging Choices

- Plain Films
- MRI
 - With or without contrast
 - Closed MRI, Open MRI, Open Upright MRI
- CT
 - without contrast

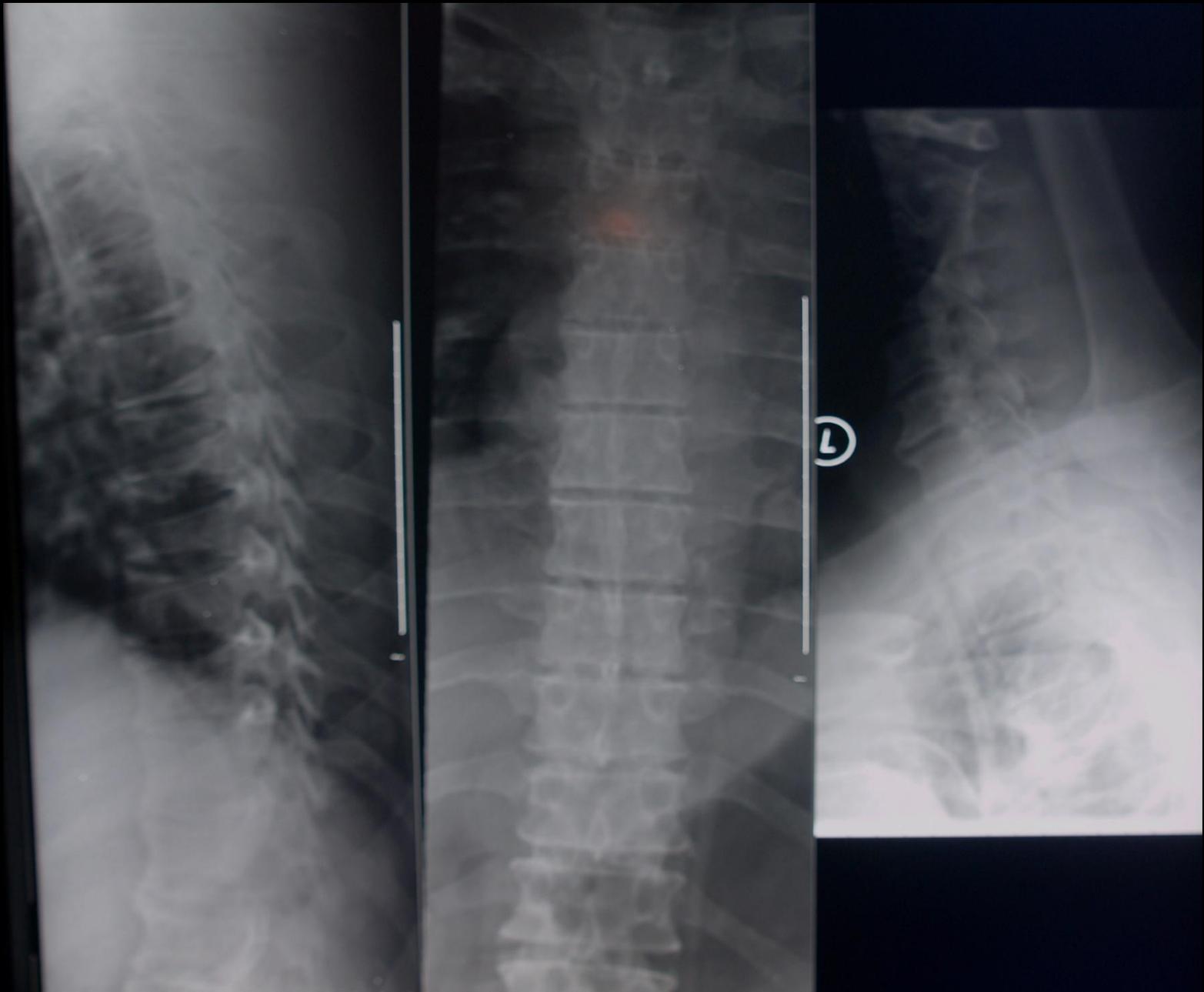
Plain Films

- Lumbar radiographs sufficient for the INITIAL evaluation of the following:
 - Recent significant trauma (at any age)
 - Osteoporosis
 - Age >70

Normal 2 view L-Spine



Normal 3 view T-Spine



Fall with Fracture/Subluxation



Plain Films

Advantages

- Fast Study (2-3 seconds)
- Quick Survey(Order 2-View)
- Inexpensive
- No contraindications
- Limited Radiation Dose

Disadvantages

- Only evaluates bones
- May not detect subtle fractures
- Small amount of radiation

MRI

- Invented in 1971, but took many years before it became clinically viable
- Images obtained within a strong magnetic field using the properties of hydrogen within tissue

MRI – Closed Bore



MRI – Open Bore



Open Upright MRI OF MISSOURI



Seated



Standing



Recumbent

Open
Upright MRI
OF MISSOURI



MRI – Indications in complicated Back Pain

- Order without contrast:
 - High suspicion for compression fracture
 - Radiculopathy, nerve, or spinal cord compression
 - Cauda Equina Syndrome
- Order WITH and without contrast:
 - History of Cancer, infection, or immunosuppression
 - Prior Lumbar Surgery
- Gadolinium FDA warning (GFR<30)

MRI – Contraindications

- Pacemaker/Defibrillator
- Certain aneurysm clips, neural stimulator devices
- Metallic Foreign Bodies in orbits
- Infusion/Insulin Pumps
- 1st Trimester Pregnancy
- Severe claustrophobia
- Morbid obesity

- Call to speak with our Chief MR Tech or one of the Neuroradiologists with questions about patient safety

Fall with Fracture/Subluxation



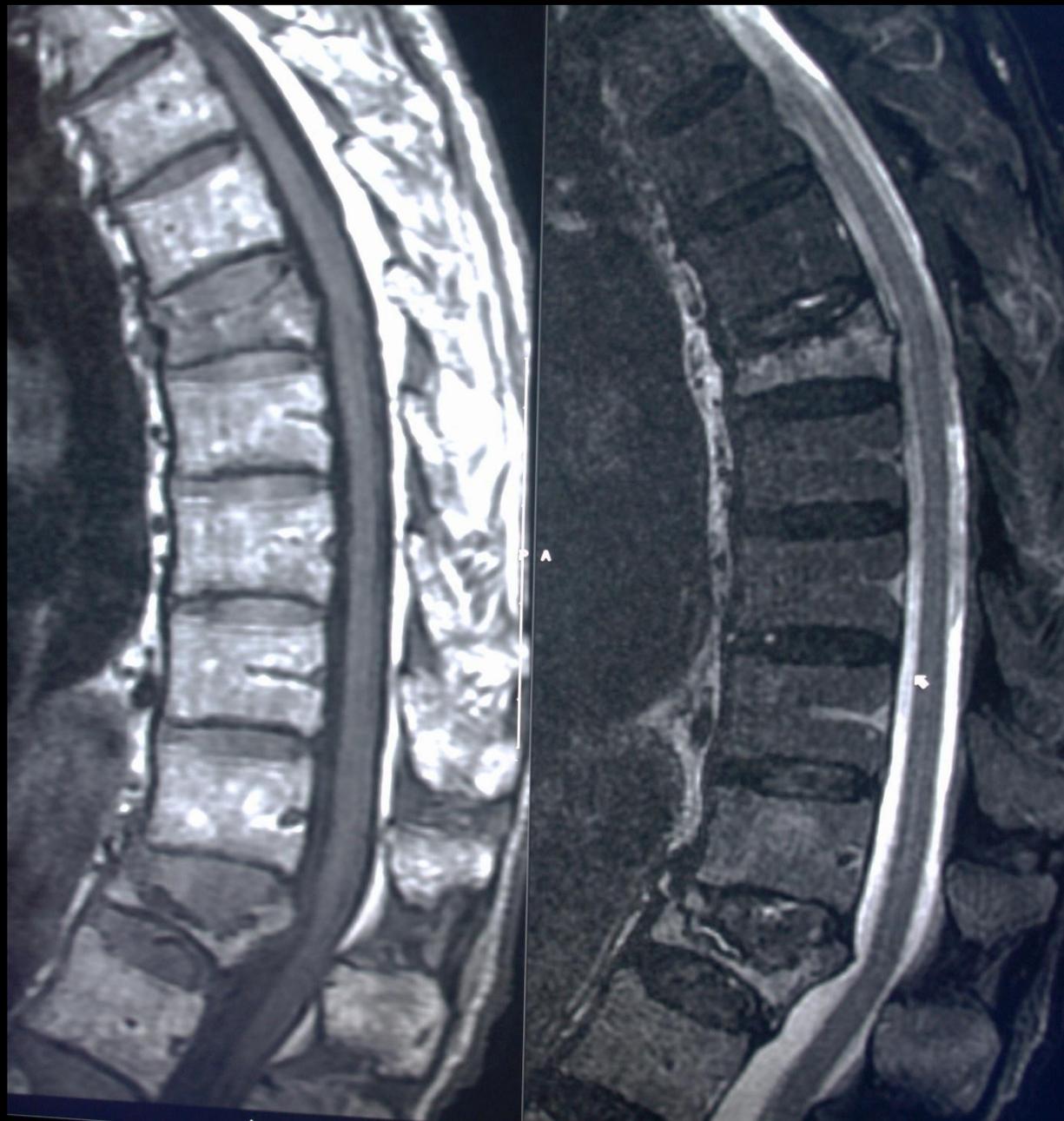
Fall with Fracture/Subluxation



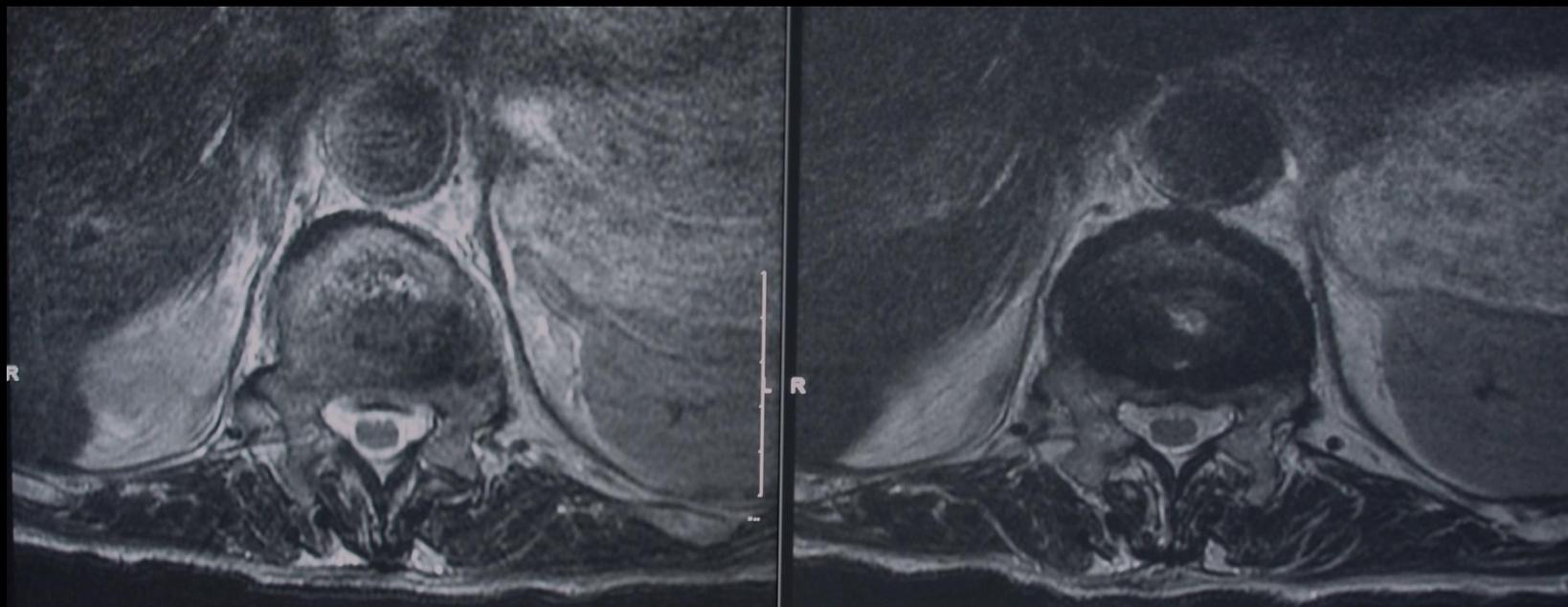
Weightlifting injury with Pedicle Fracture Not Visible on Plain Film



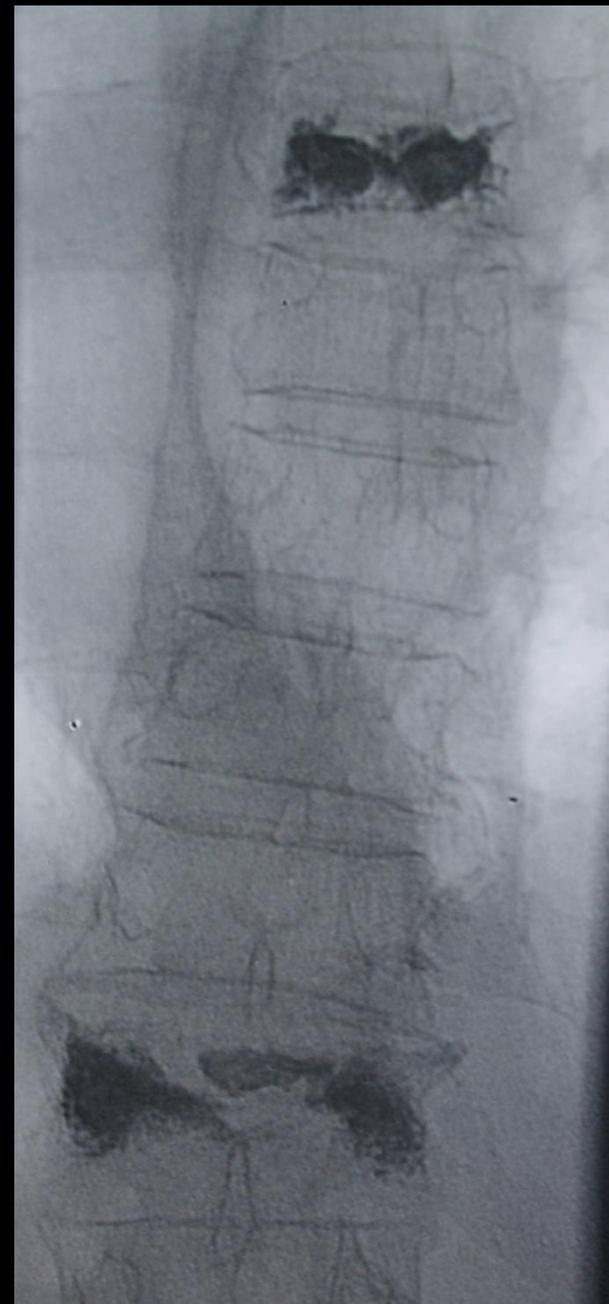
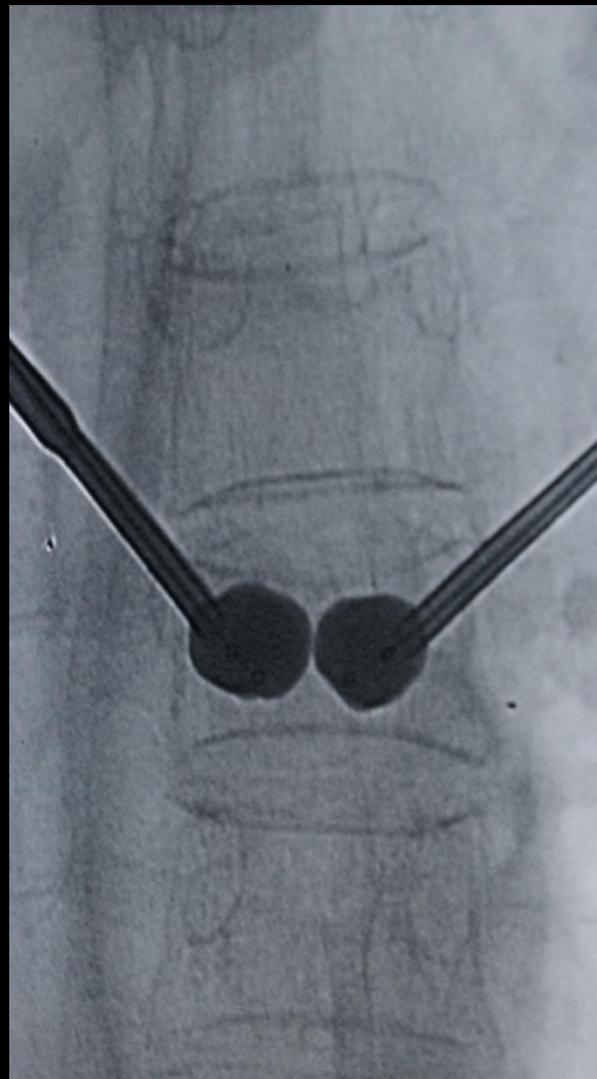
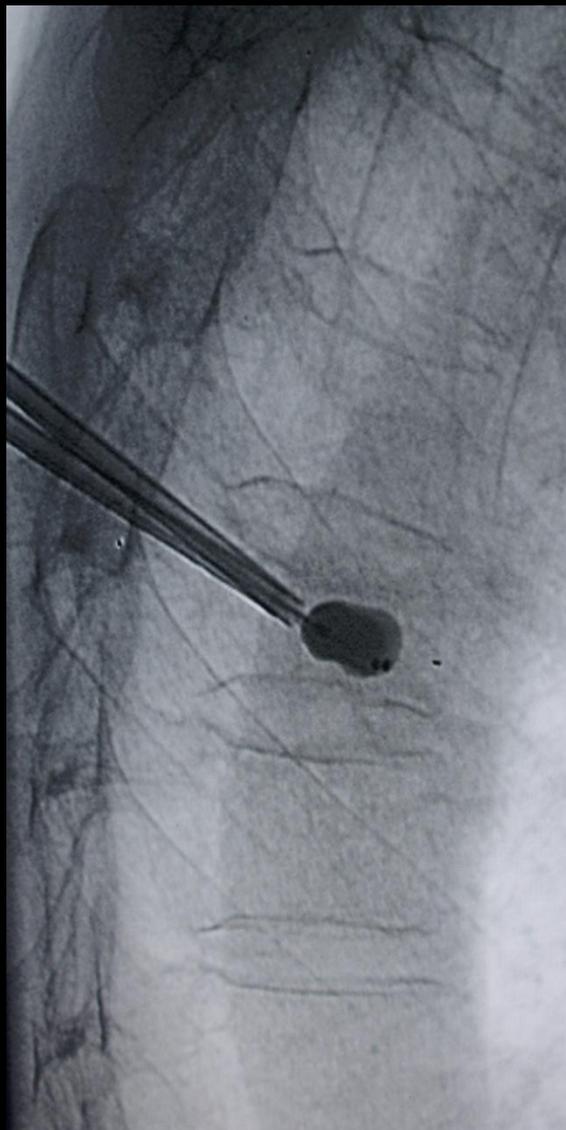
Recent Fall, Back pain



Recent Fall, Back pain



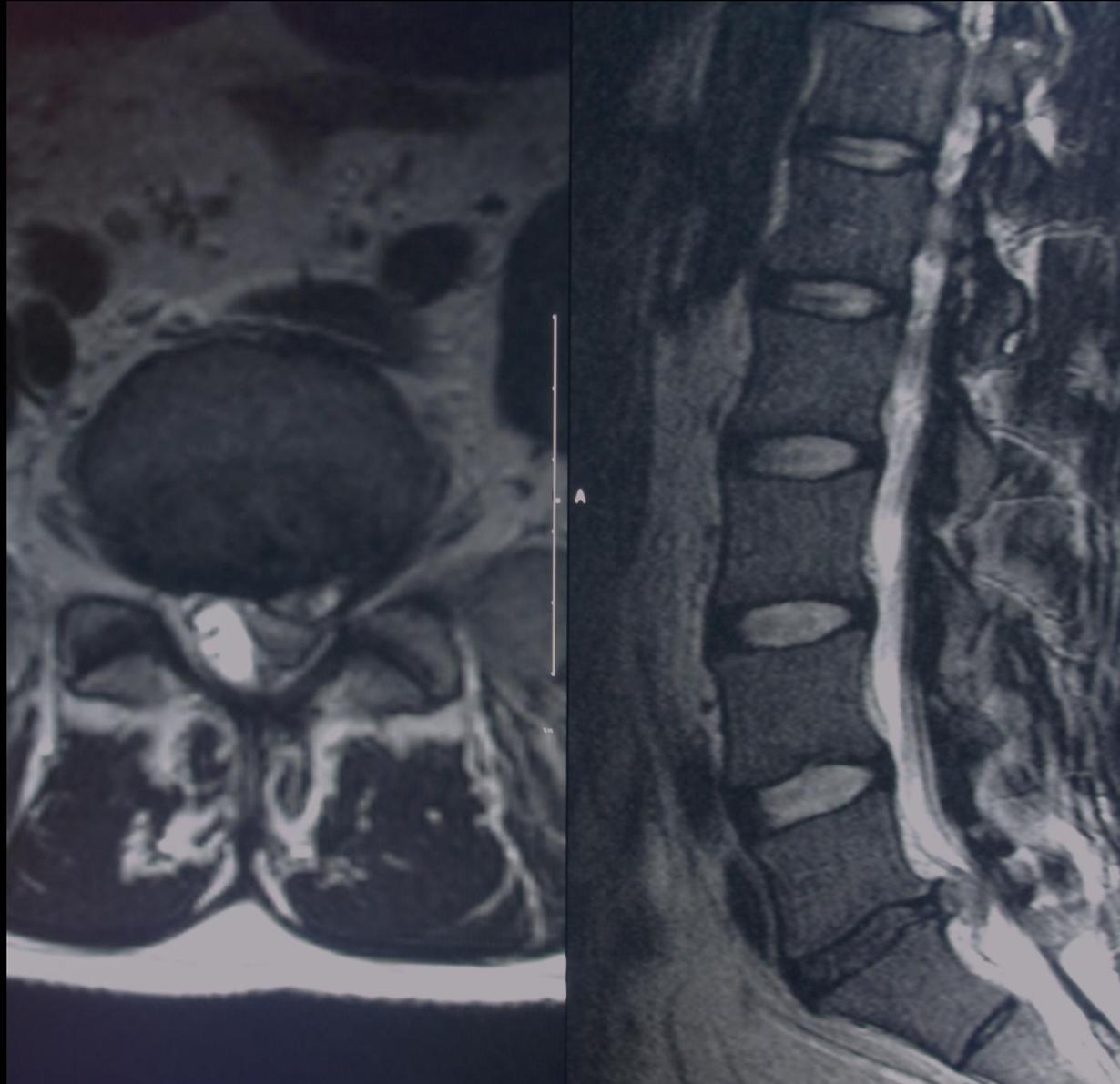
Recent Fall, Back pain



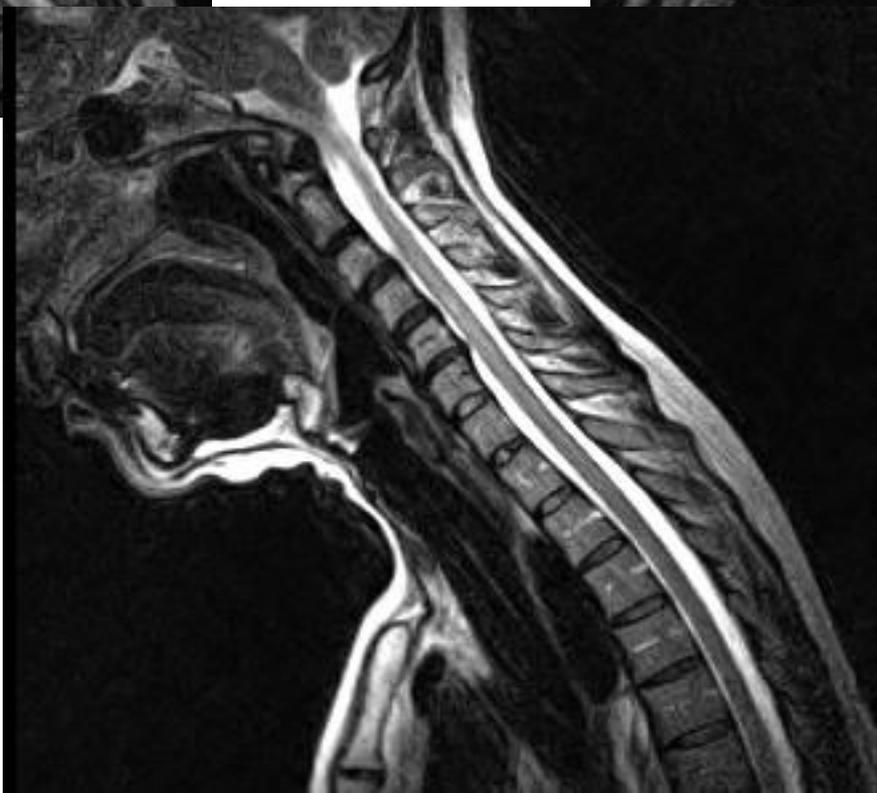
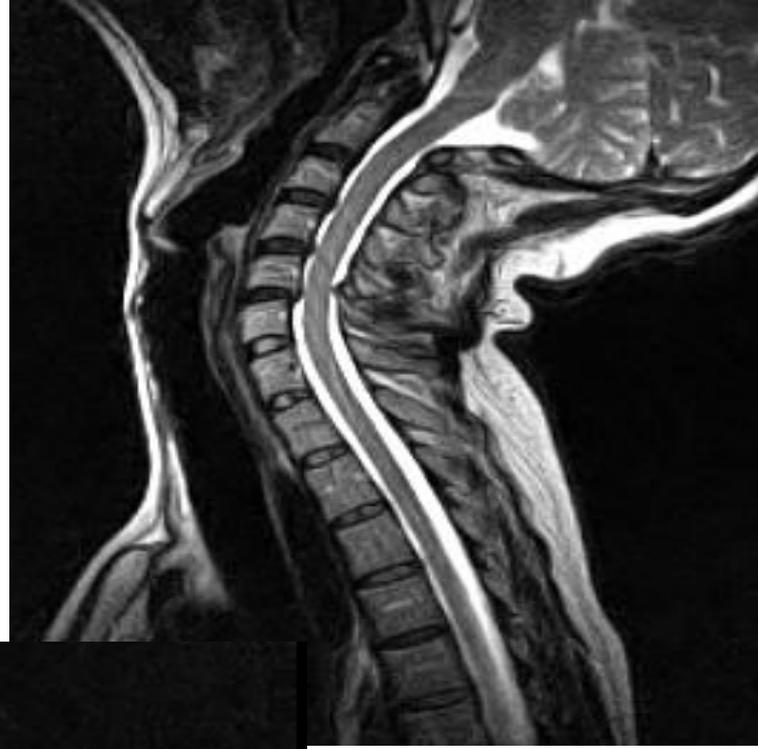
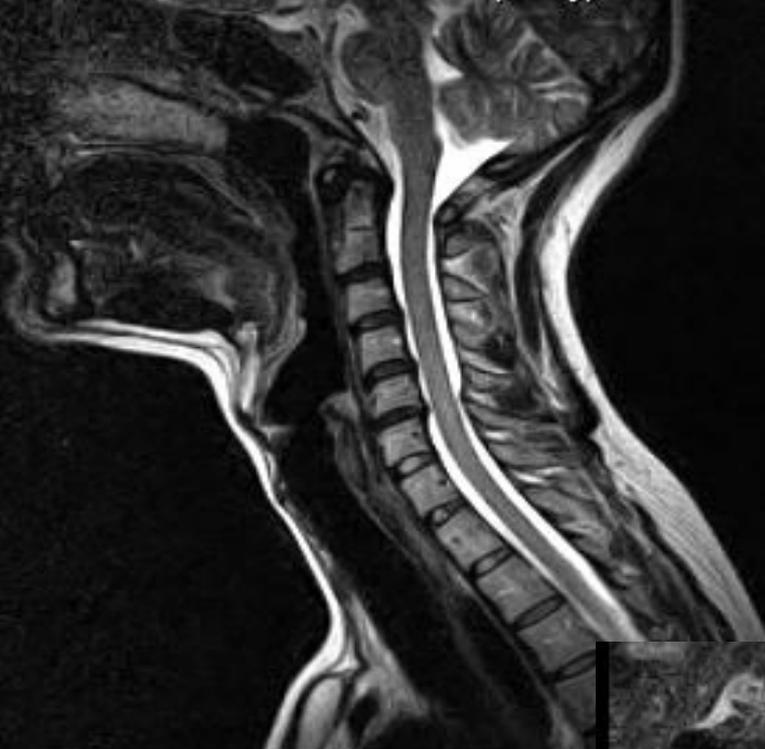
Pt. with lifting injury at work with lumbar radiculopathy



Previous Lumbar Surgery in recent MVA, now with recurrent pain



- **Hx of MVA 3 years earlier**
- **Persistent neck pain, and upper extremity numbness/tingling**
- **Comparison plain films from that date demonstrated instability at C5-6**
- **Open Upright MRI requested with flexion/extension views**



54 y.o. female w/
neck & back pain & HA post-MVA





Pt. With fall, back pain and numbness, unable to lay flat due to kyphosis



MRI

Advantages

- No Radiation
- Excellent Soft Tissue, Spinal Canal and Cord Detail
- Sensitive for Edema
- Detects other lesions –cysts, tumors, etc.
- Can use non-iodinated contrast – diskitis
- Vertebroplasty Planning

Disadvantages

- Length of scan - 30-45 minutes
- Claustrophobia
- Weight limit
- Painful position- must lay flat and still for a prolonged time.
- Last 3 disadvantages reduced with open MRI and Open Upright MRI

CT

- Computed Tomography:
 - Large series of two-dimensional x-ray images taken around a single axis of rotation
- No IV contrast needed for spine studies
- Best Indications:
 - Patients unable to have MRI
 - Quick Evaluation of Acute Trauma(ER)
 - Evaluate Fusion Bone post surgery
- Contraindications
 - Pregnancy

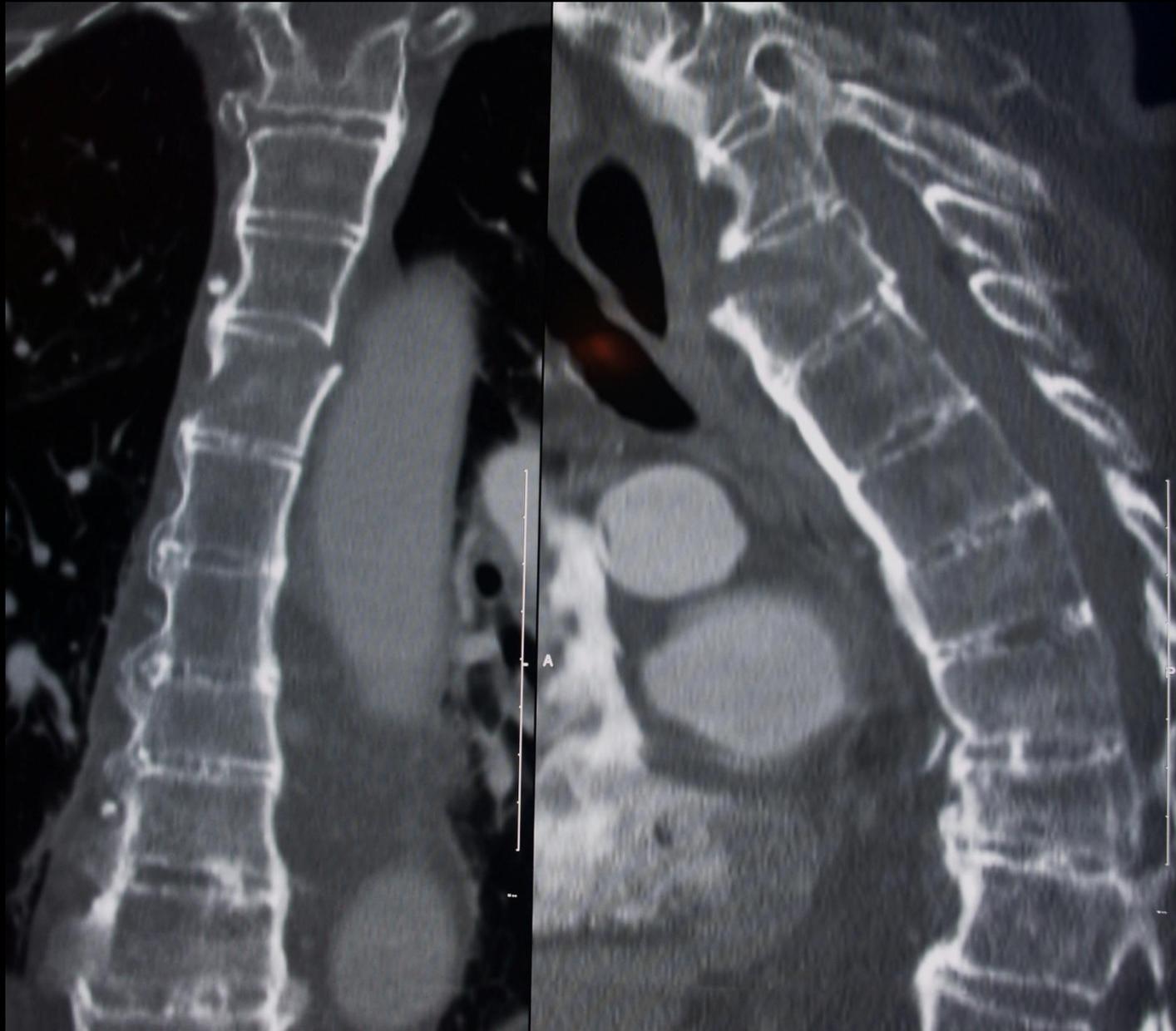
CT



Pt. with acute back pain post trauma, with pacemaker



Ankylosing Spondylitis with acute injury and pain



CT

Advantages

- Fast (30 sec.)
- Reconstructions- Sag./Cor.
- Excellent Bone Detail
- Surgical Planning
- Larger bore size than MRI
- No Contraindications for Metal Device(Pacers,etc)

Disadvantages

- Radiation Dose (10 mSv)
- Weight limits
- Disk and Soft Tissue Detail less than MRI
- Cannot evaluate Cord

Questions/Comments?

- Made CT and MR schedules accomodating to allow many add-ons during the day
- For questions:
- http://www.mycdi.com/missouri/locations_services/
- 314-567-9729
- Kishan Yalavarthi M.D.

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Open
Upright MRI
OF MISSOURI