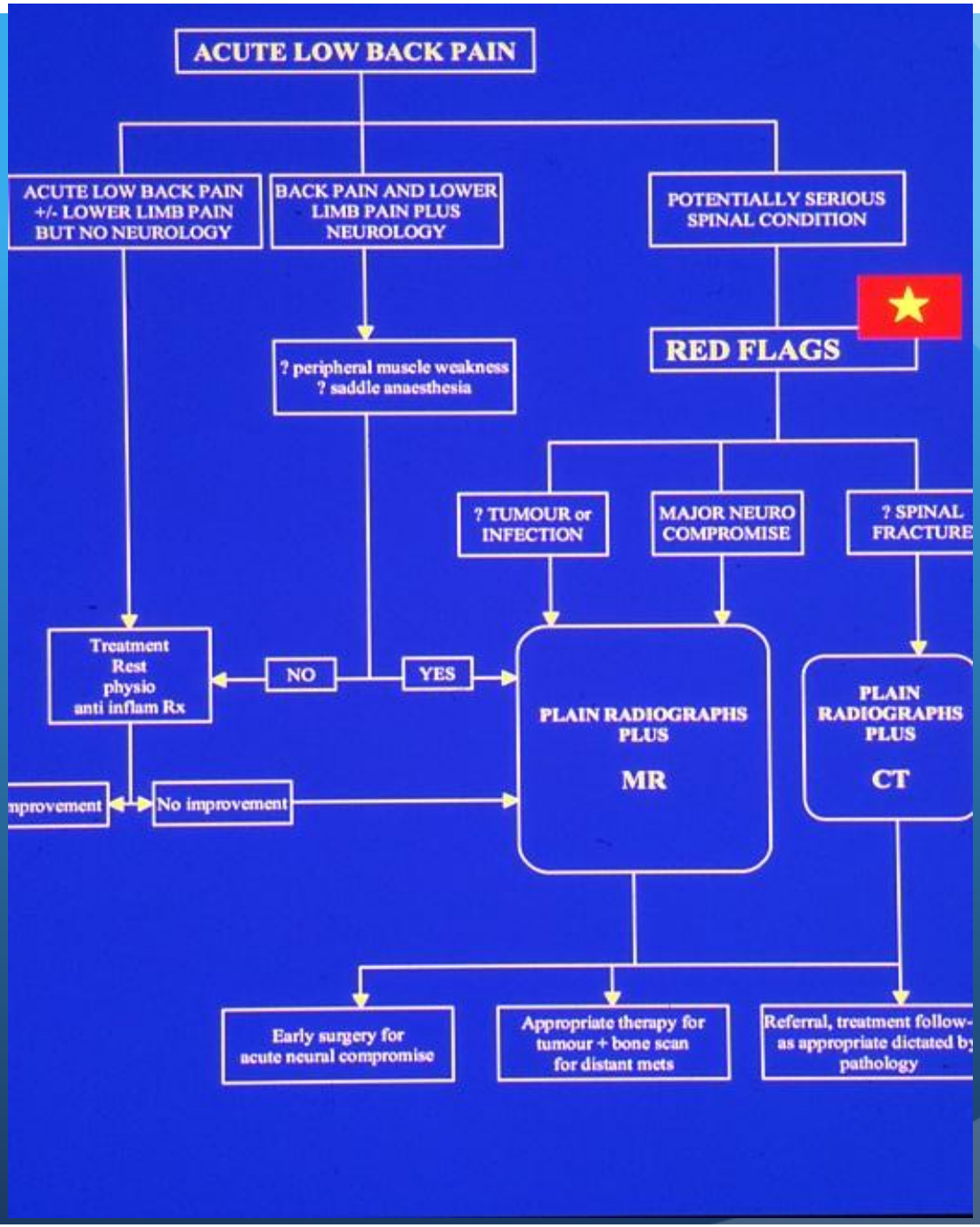
Imaging the SPINE

Peter Gendall


ACUTE LOW BACK PAIN
ACUTE LOW BACK PAIN +/- LOWER LIMB PAIN BUT NO NEUROLOGY
BACK PAIN AND LOWER LIMB PAIN PLUS NEUROLOGY
POTENTIALLY SERIOUS SPINAL CONDITION
? peripheral muscle weakness ? saddle anaesthesia
RED FLAGS
? TUMOUR or INFECTION
MAJOR NEURO COMPROMISE
? SPINAL FRACTURE
Treatment Rest physio anti inflam Rx
NO
YES
PLAIN RADIOGRAPHS PLUS MR
PLAIN RADIOGRAPHS PLUS CT
nprovement
No improvement
Early surgery for acute neural compromise
Appropriate therapy for tumour + bone scan for distant mets
Referral, treatment follow- as appropriate dictated by pathology

RED FLAGS

Mandating Early Investigation of Back Pain

- Possible Fracture
- Possible Tumour or Infection
- Possible Cauda Equina Syndrome
- Other

Possible Tumour or Infection

- Over 50 yrs or under 20 yrs
- History of malignancy
- Constitutional symptoms (fever, chills, weight loss)
- Elevated ESR
- At risk for spinal infection

Recent bacterial infection, IV drug abuse, immune suppression(steroids, transplant, HIV), pain that worsens when supine

Possible fracture

- Injury of sufficient violence to cause fracture
- Minor trauma or even strenuous lifting in older or potentially osteoporotic patient

Variables Correlating Positively with Cervical Spine Injury

Variable	p Value
• head trauma	.37
• neck pain	.14
• headache	.31
• loss of consciousness	.382
• fall of more than 10 feet	.083

• Jacobs & Schwartz. Ann Emerg Med 15: 44-49. 1986

Variables Correlating Positively with Cervical Spine Injury

Variable	p Value
• RTC	.052
• neck tenderness	.002
• numbness	.001
• weakness	.001
• neck spasm	.001
• fall of less than 10 ft	.007

• Jacobs & Schwartz. Ann Emerg Med 15: 44-49. 1986

Clinical Evaluation

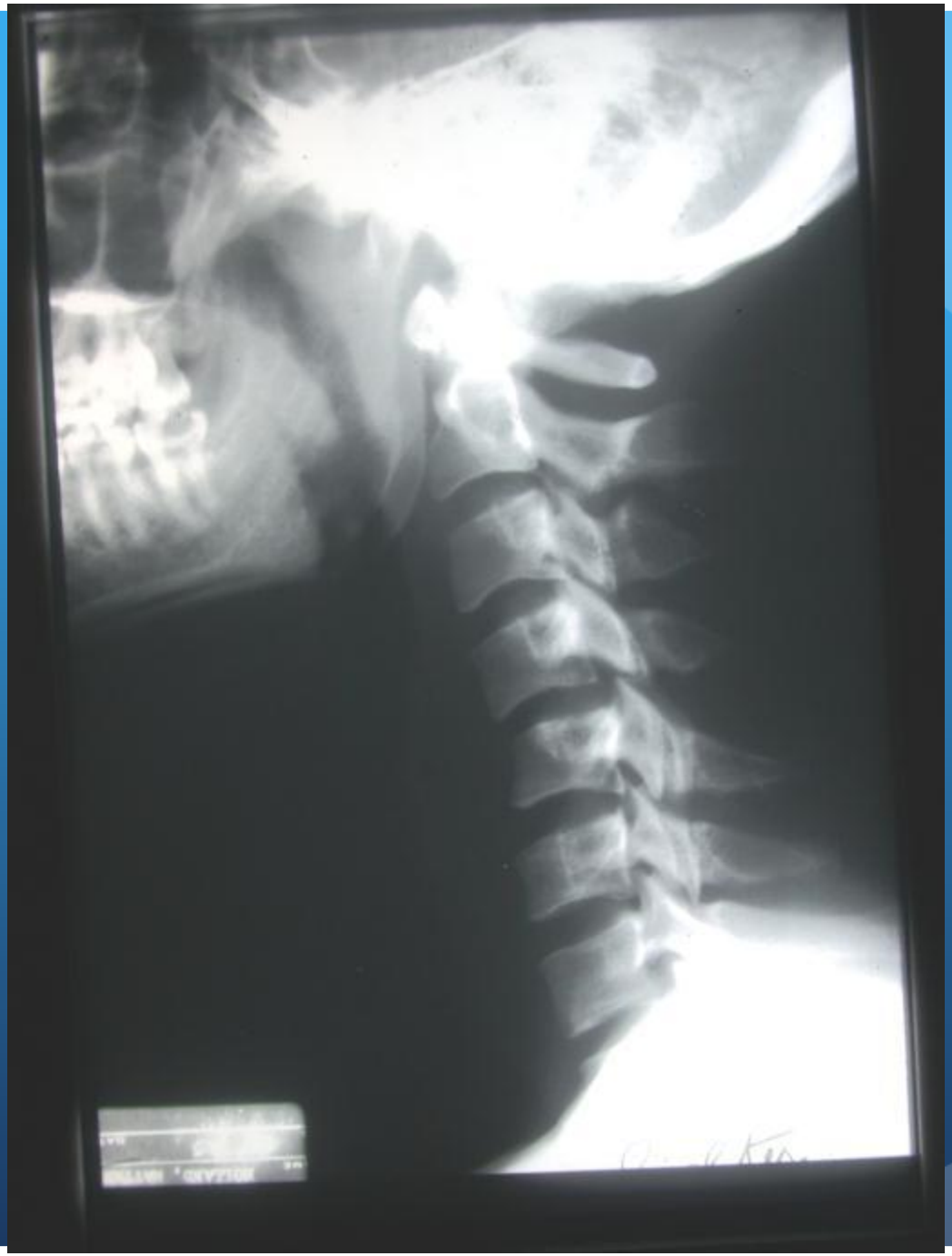
- physicians only 11% effective in detecting clinically who had a fracture

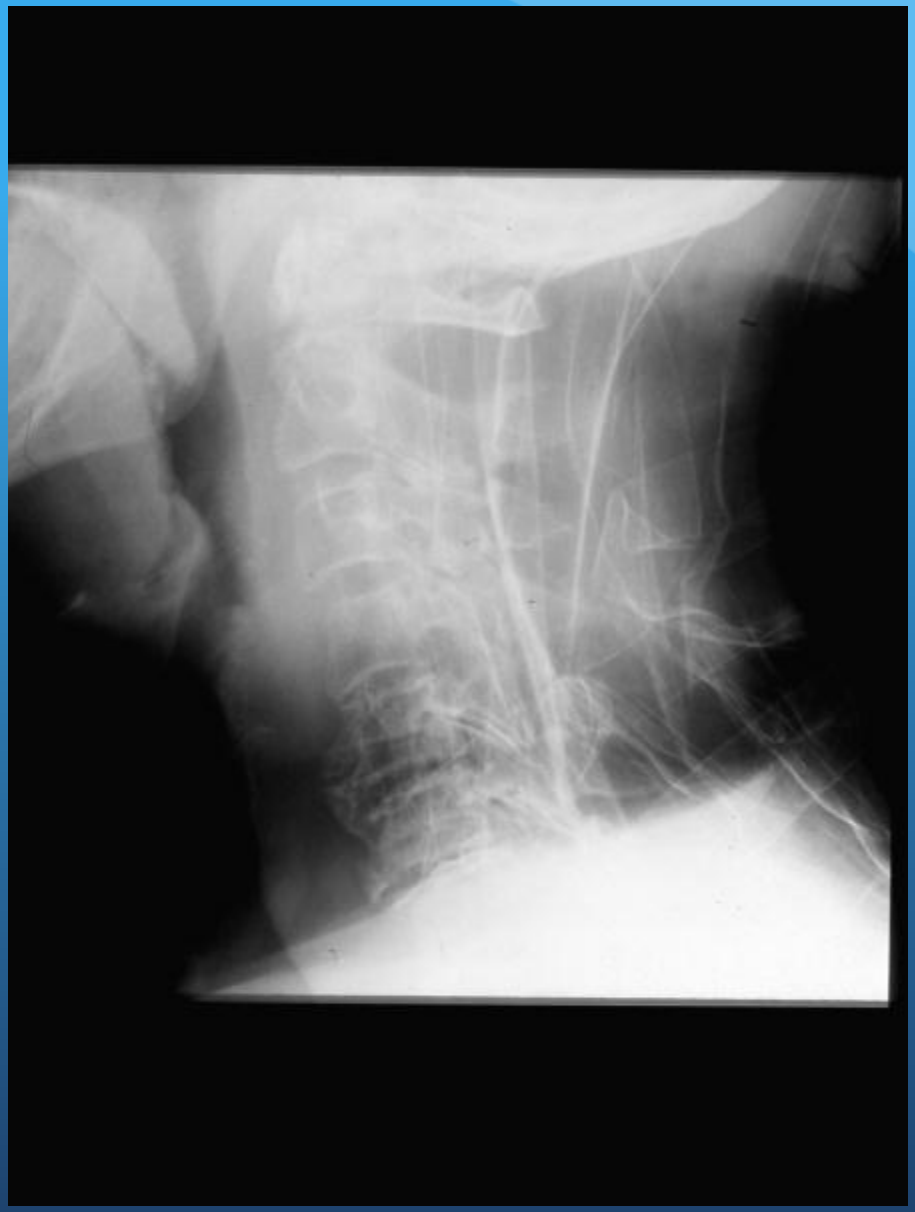
- physicians 92% effective in deciding who did **not** have a fracture

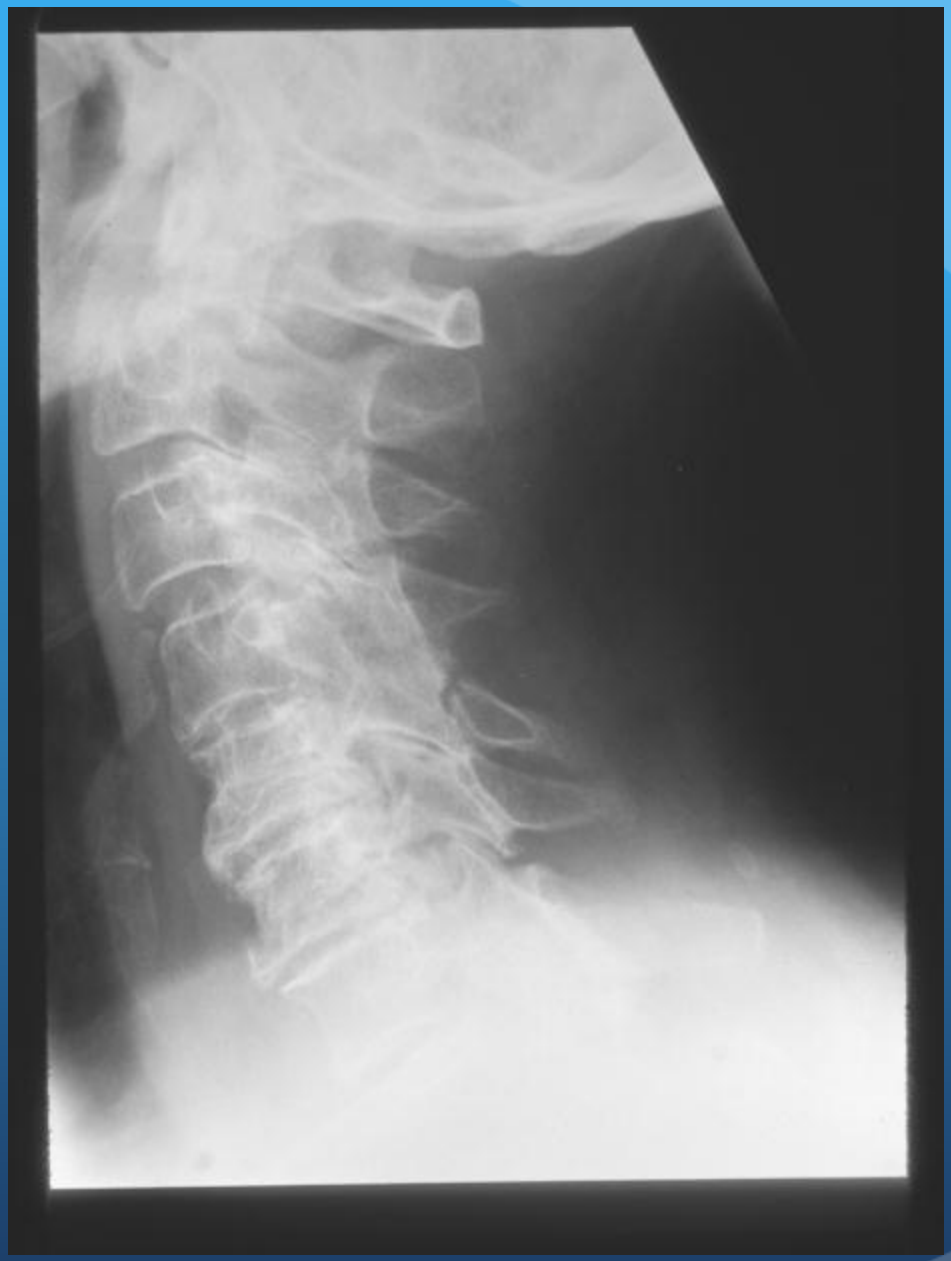
- Jacobs & Schwartz. Ann Emerg Med 15: 44-49. 1986

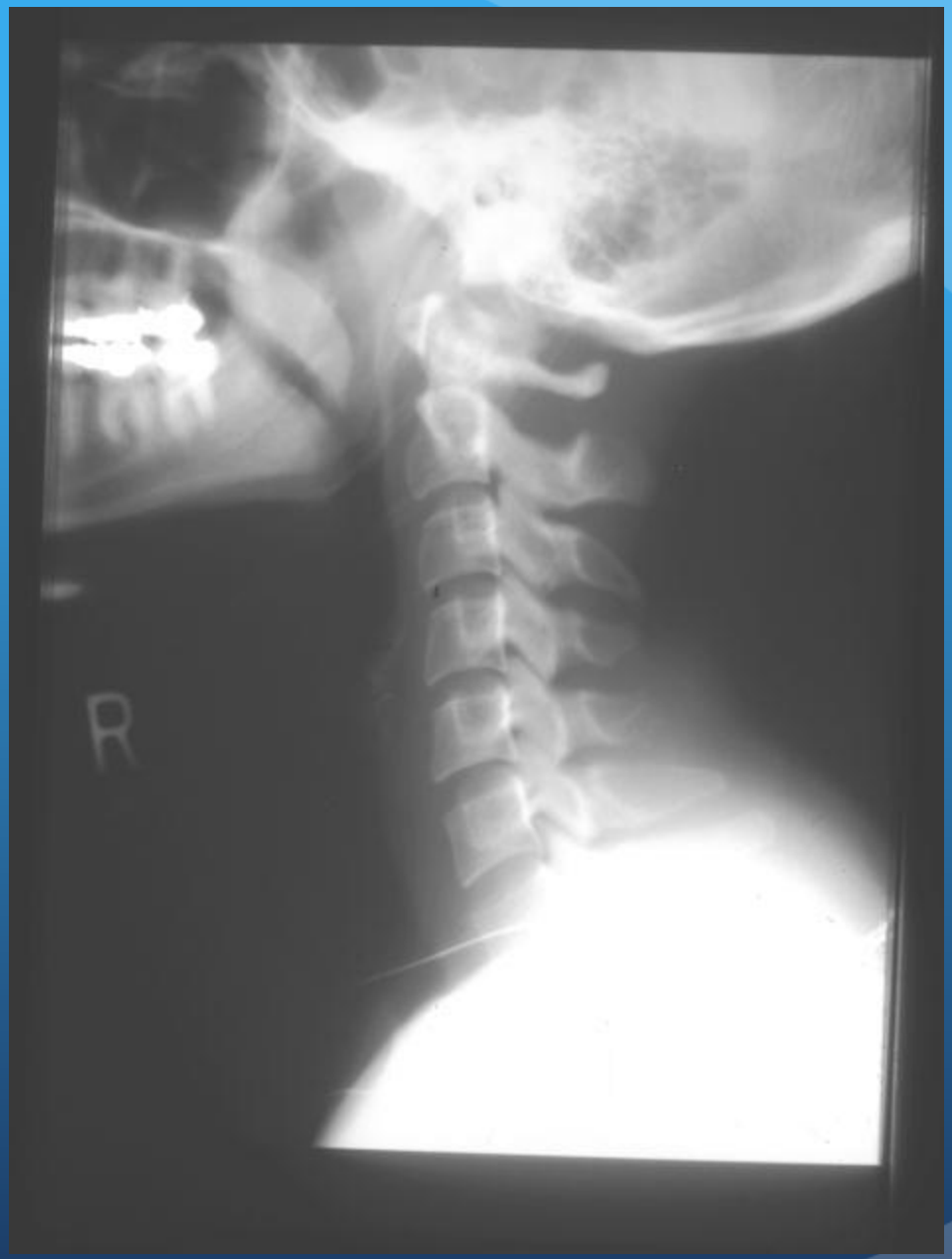
20% of C. spine injuries are missed on clinical evaluation

- Jacobs & Schwartz. Ann Emerg Med 15: 44-49. 1986





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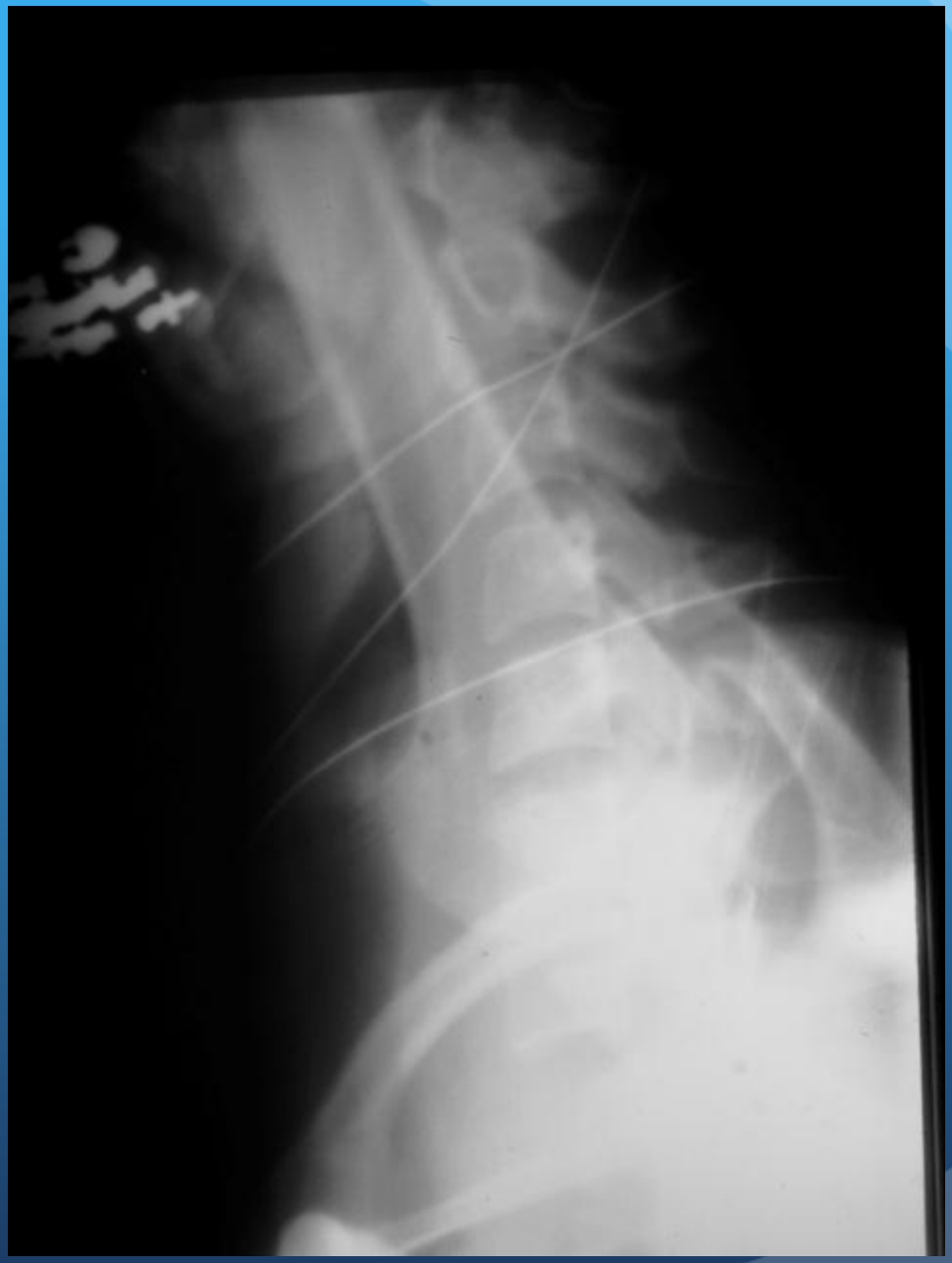

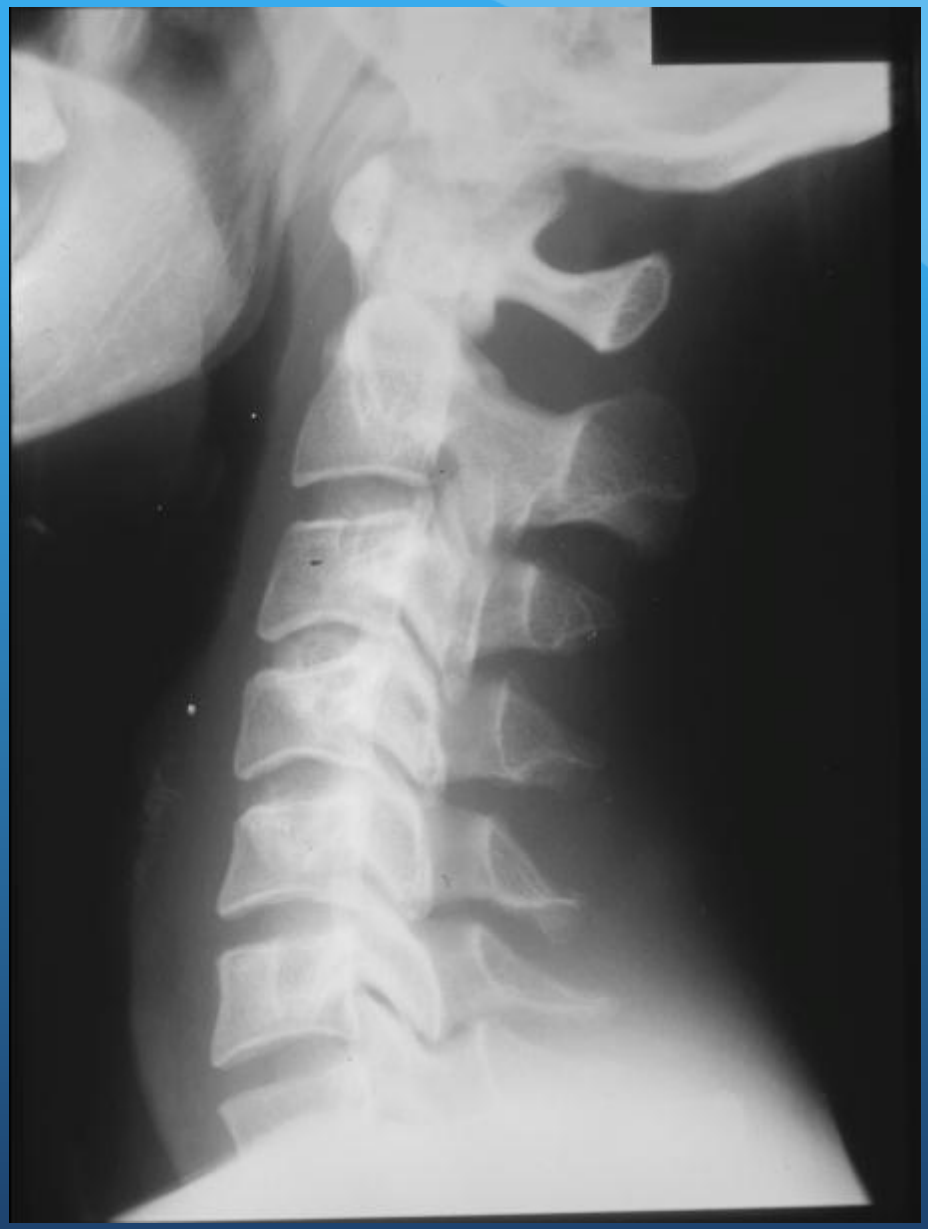

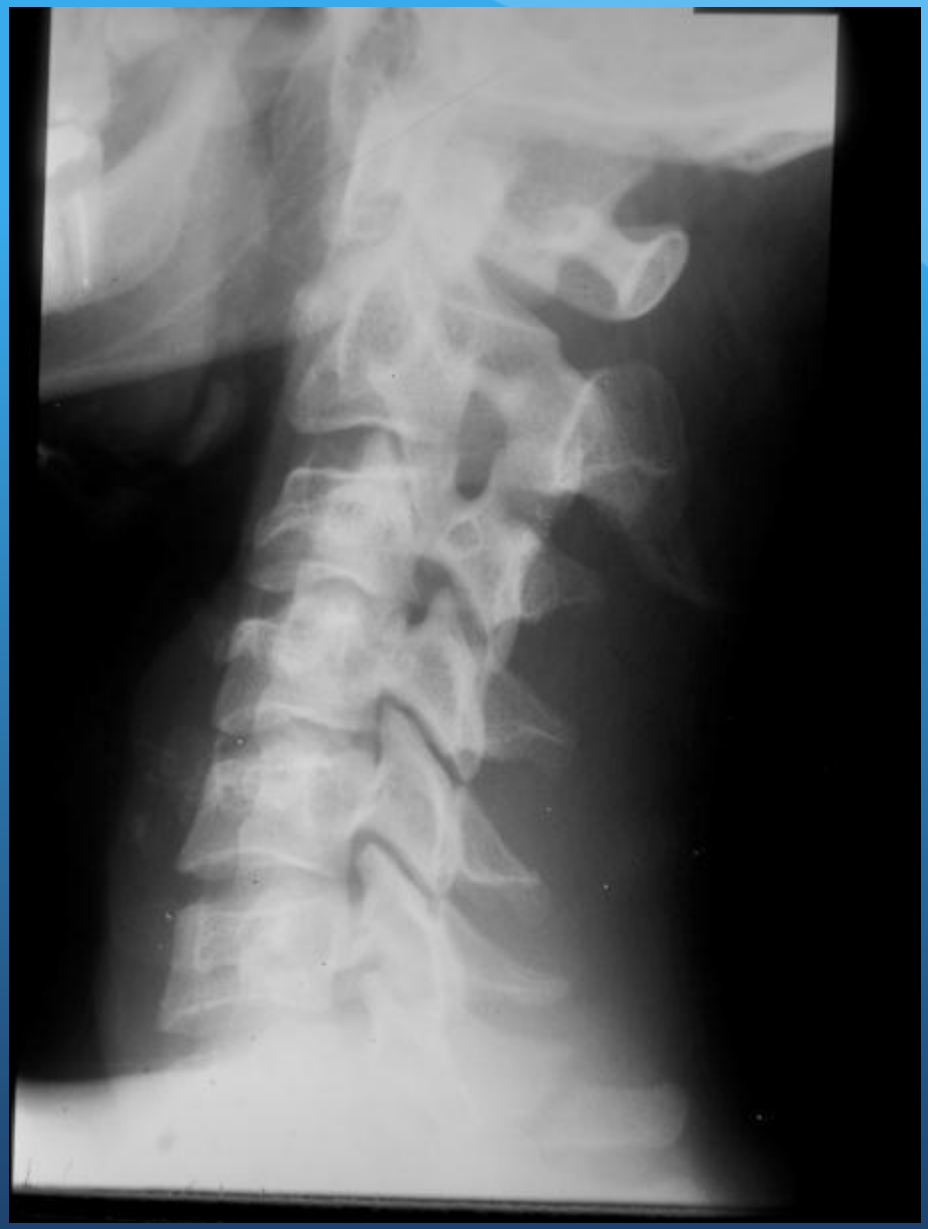

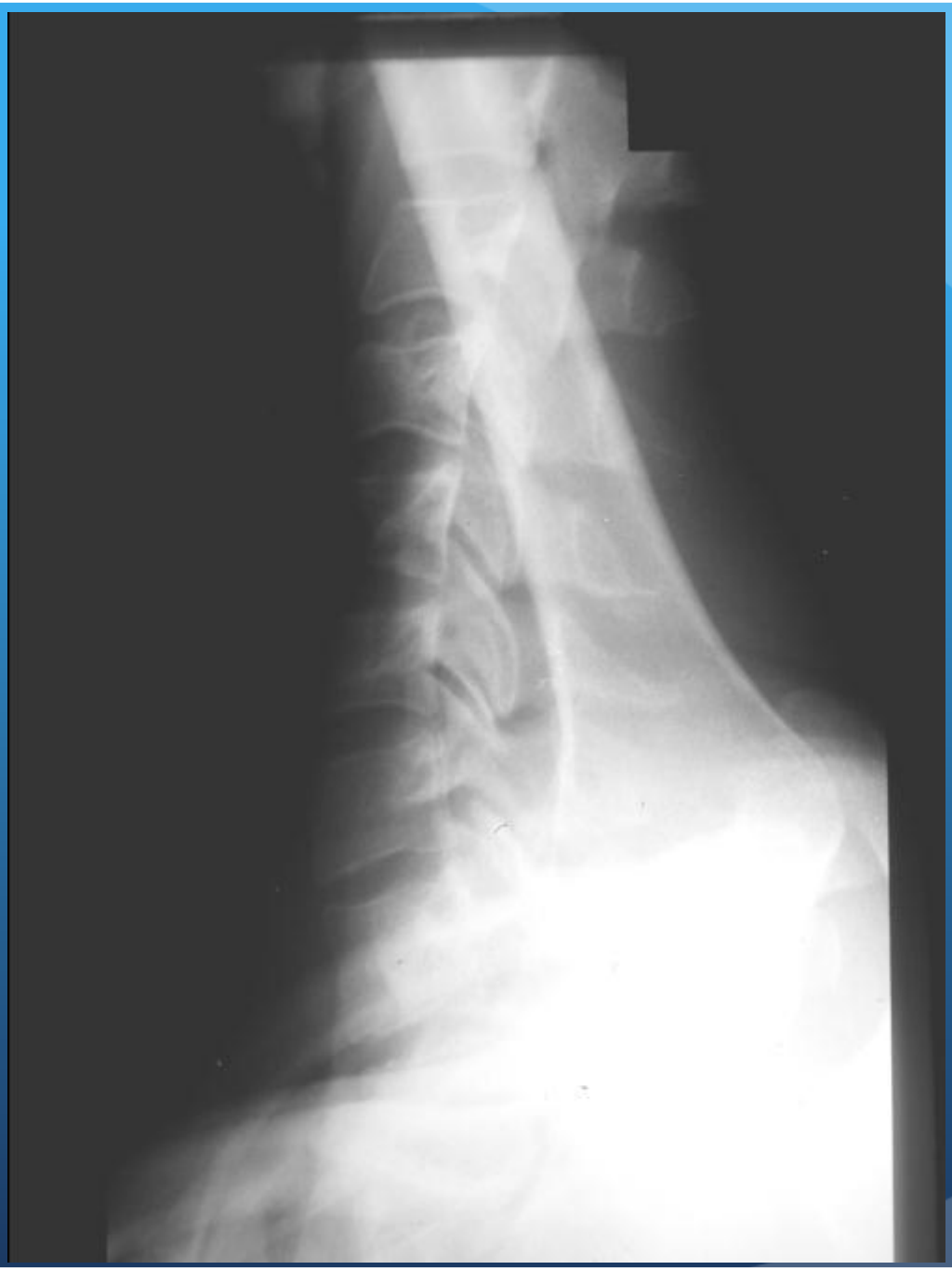

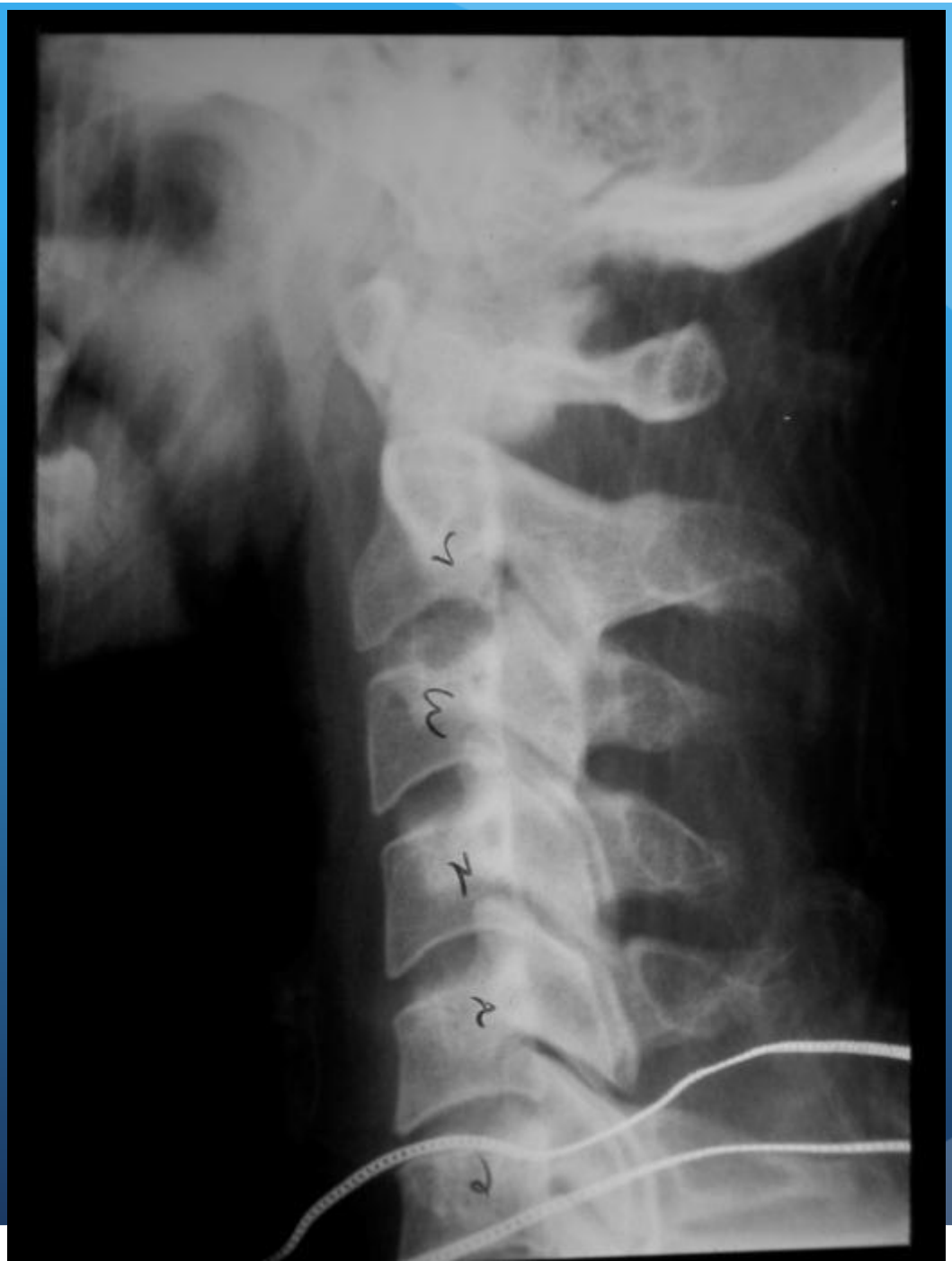

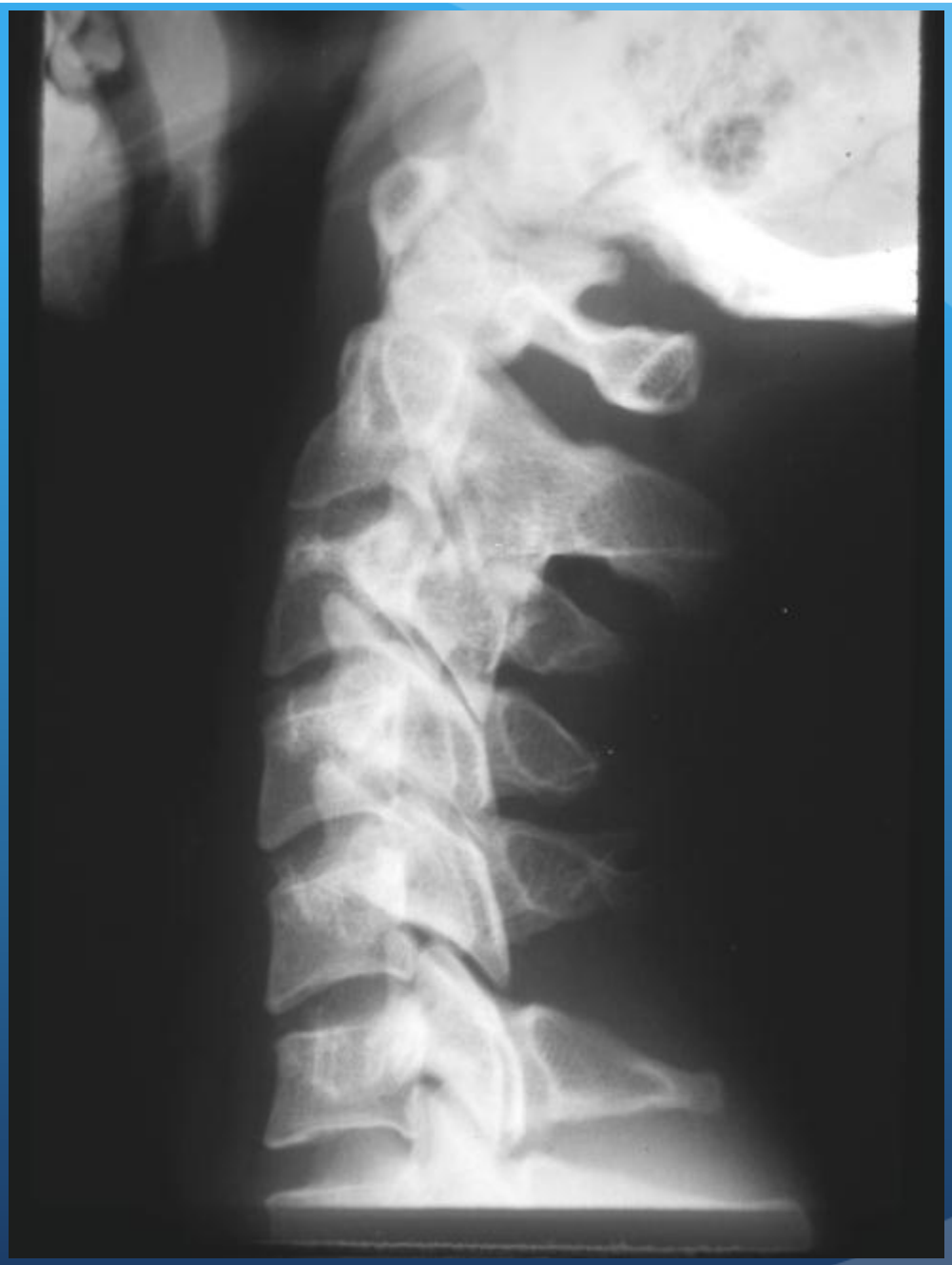

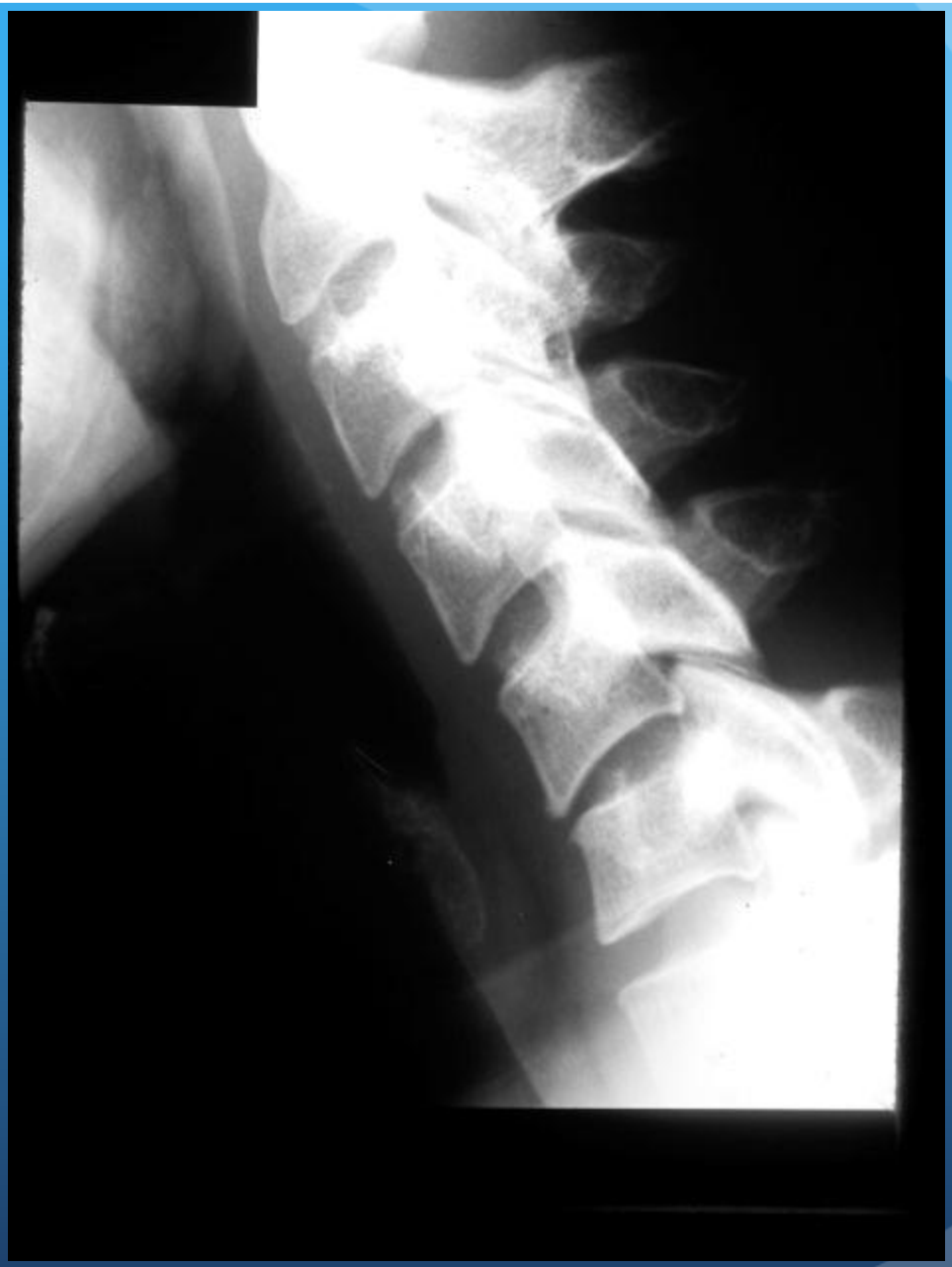

- 32-37% of fractures/dislocations occur at C1-C2

- 45% of fractures/dislocations occur at C6-C7

BEWARE THE CERVICO-THORACIC JUNCTION

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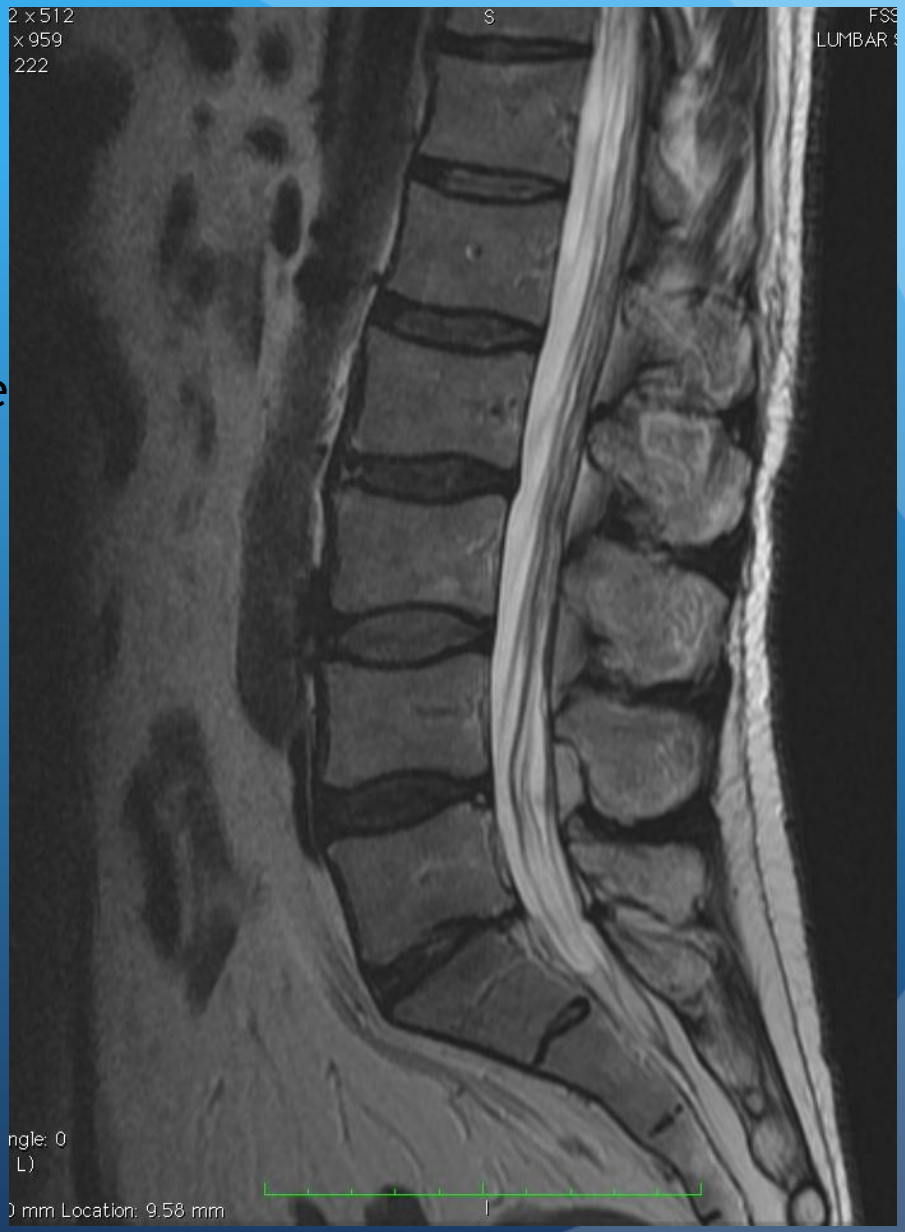
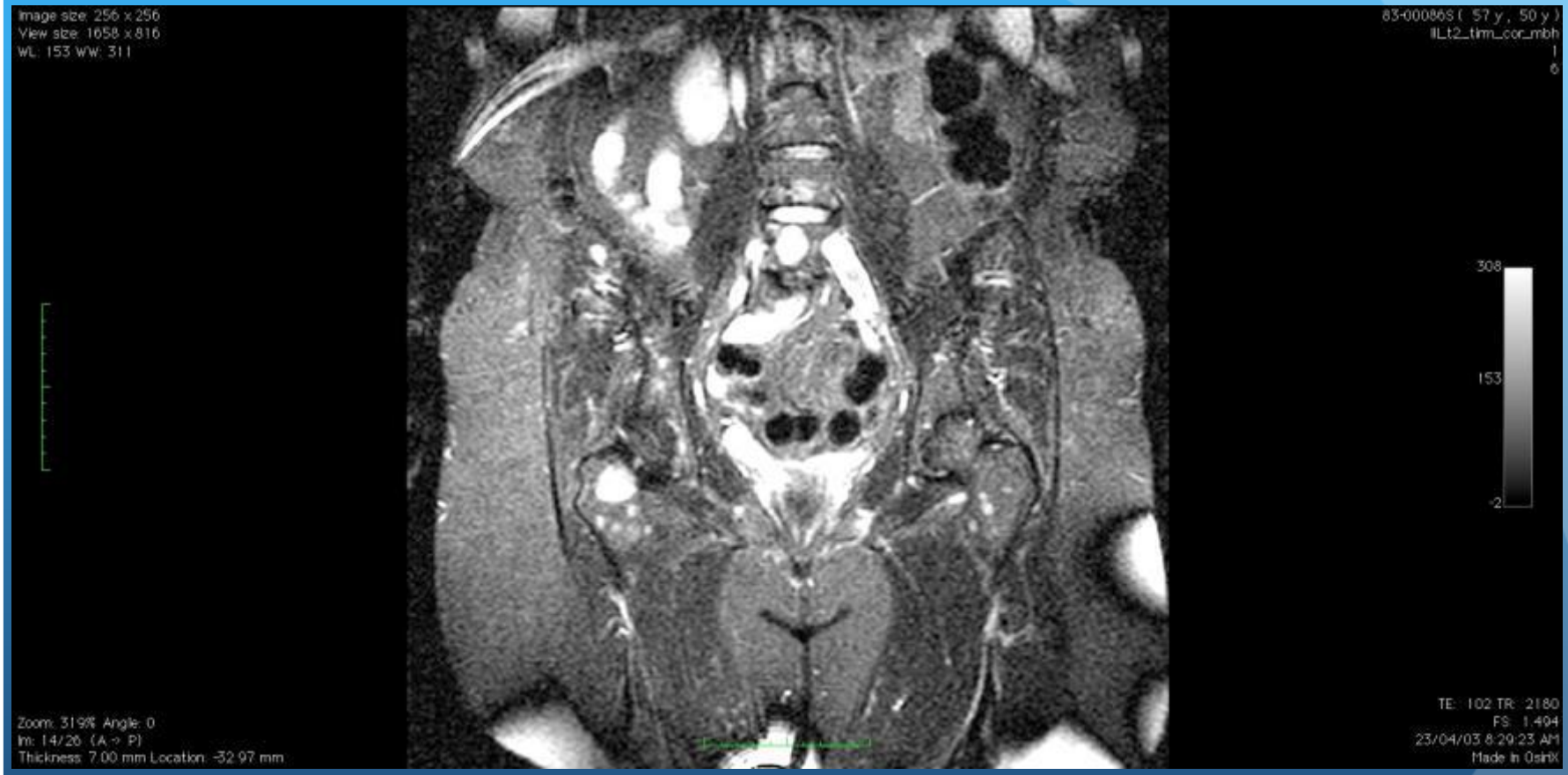
Weightbearing

Advantages of multislice technique

Water map

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Zoom: 319% Angle: 0
Im: 14/26 (A -> P)
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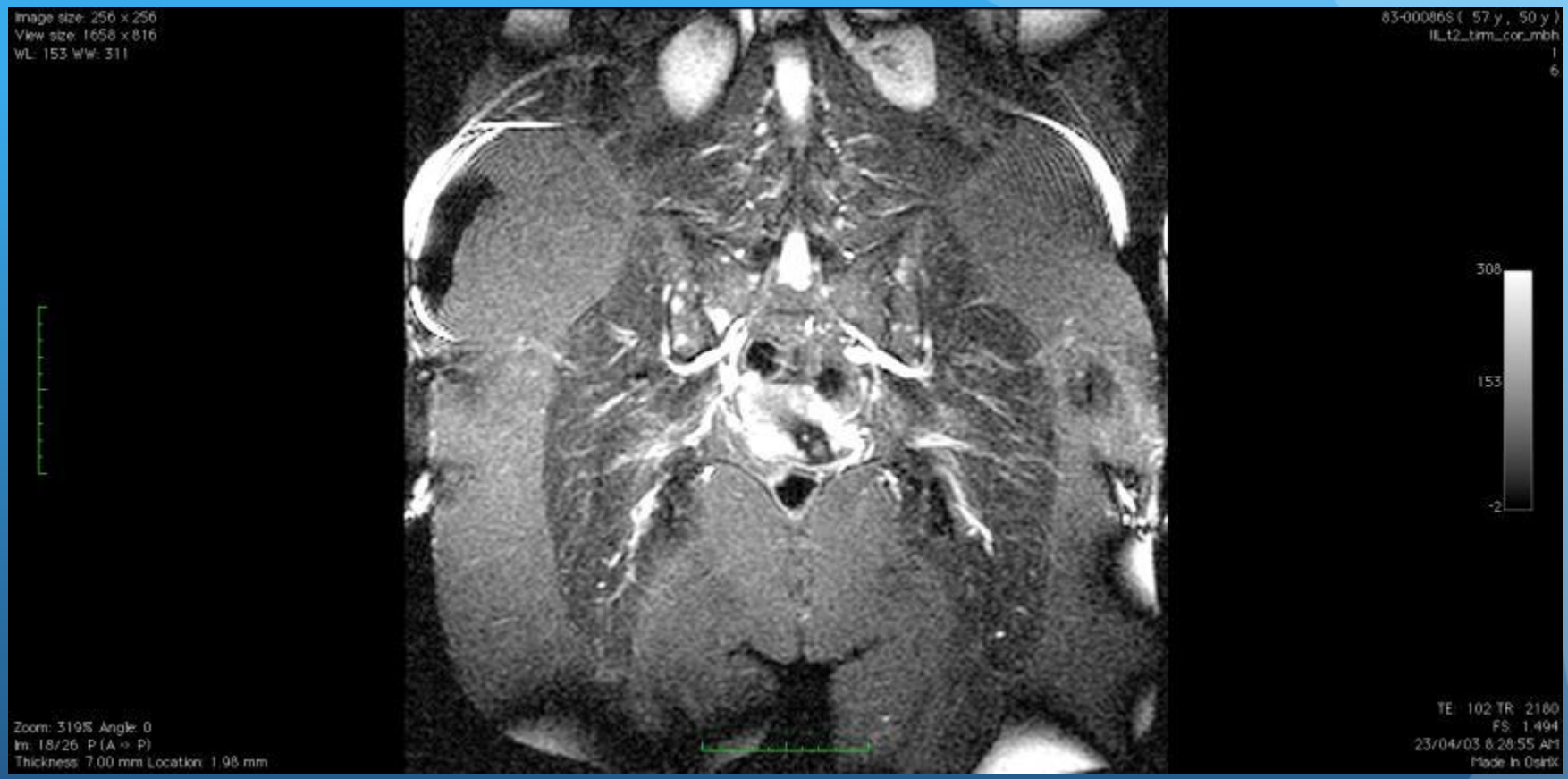
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Zoom: 319% Angle: 0
Im: 18/26 P (A => P)
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FS: 1.494
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WB MRI has shown higher sensitivity than PET CT
In detection of bone metastasis in several series

This is at least partly due to higher resolution
(Less than 5mm)
Compared to PET CT

Better resolution in latest PET CT scanners, but also in new MRI

Specificity slightly better in PET CT
80% vs 76% for WB MRI

Primary tumours with highest incidence of bone Metastasis
Prostate and Breast

Followed by Thyroid, Renal, Lung carcinomas

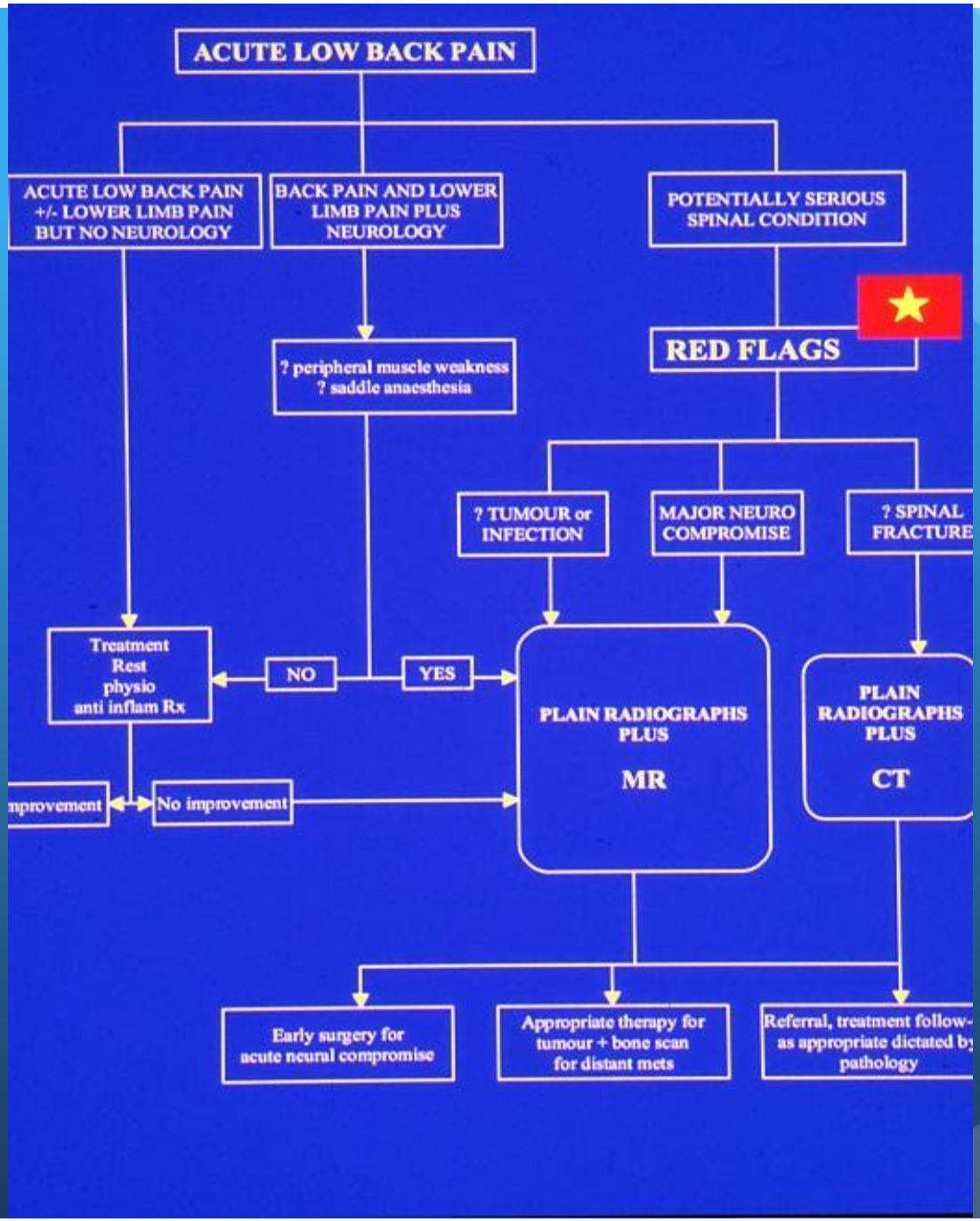
These tumours account for about 80% metastatic Bone disease

Sclerotic metastases usually behave like their
Lytic counterparts on MRI. Even when very marked, sclerotic lesions rarely remain hypointense on all sequences.

After successful treatment, bone lysis or osteoblastic change remains at site of metastasis.

This is a potent reason for low sensitivity of indirect means of tumour assessment.

CT Scintigraphy Plain XR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