

Orthotics and Me (?surgeons)

Greg Etherington
Spine Surgeon

Orthopaedic & Neurosurgery backgrounds

Subspecialty training

spine, upper limb, trauma, pelvis.....

What do you do in spine?

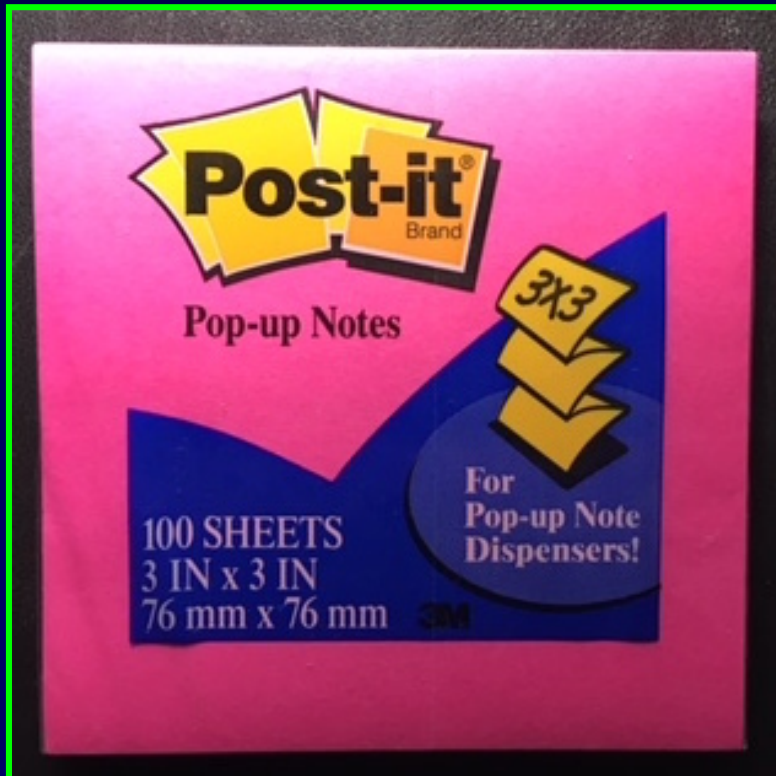
Lumbar
Cervical
Trauma
Paed deformity

Variation

My training/knowledge of orthotics...

AFOs, wrist splints, ... plastic & plaster...

Cervical collars, Halos, T-L braces



Thoraco-Lumbar Trauma

Non-op Treatment & Controversies

Classification

Stability

Prognosis/Natural History

Non-Op Vs Op

Non-op techniques

Op

- timing
- approach
- techniques



Treatment aims..

Prevent neurological deterioration

Minimise spinal deformity

Fracture healing

Minimise complications

Stable 'end point'

Acceptable function

We know

60% at T11-L1

25% multilevel –depending on Ix

Most vertebral injuries are 'stable'

- non-op care is satisfactory
- but definitions vary

All treatments have complications

- bad surgery gives worse results than bad non-op care
(Bad surgery is harder to salvage)

Some randomised trials

and validity is argued about

Large numbers of cohort/observational studies

Several 'Zealots'

Myths & Legends

We know ...

Paraplegia is bad for you

Neural deficit + pressure on cord/nerves

→ decompression is not absolutely needed

(but it's hard to resist!)

All bone fragments do not 'resorb'?

(CSF flow importance?)

'Significant' bony deformity does not always causes problems

(Sagittal balance is important)

Not all unstable #s get an operation

(and some stable #s do)

“I've never had a complication with this treatment”

'Stability'

Bone/Mechanical?
Neurological?
Short or long term?



Classifications

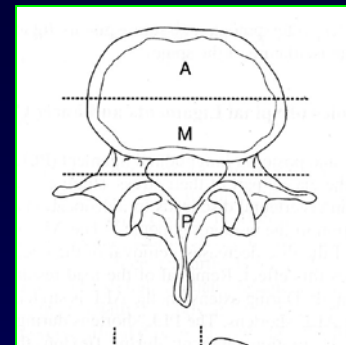
1929 Bohler

Predominantly vertebral body &
Possible mechanism of injury

1943 Watson-Jones

1949 Nicoll

1963 Holdsworth 2 columns



1983
(CT)

1994

(MRI)
2005
2013

Spine

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DIAGNOSTICS

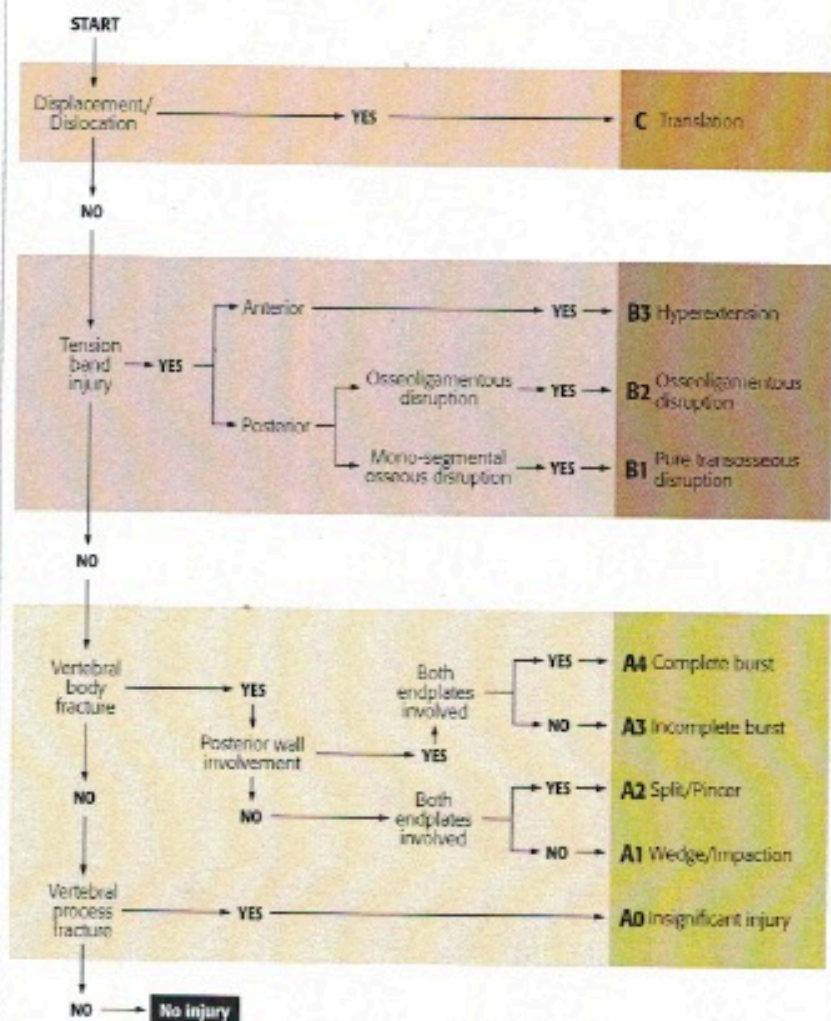
AO Spine Thoracolumbar Spine Injury Classification System

Fracture Description, Neurological Status, and Key Modifiers

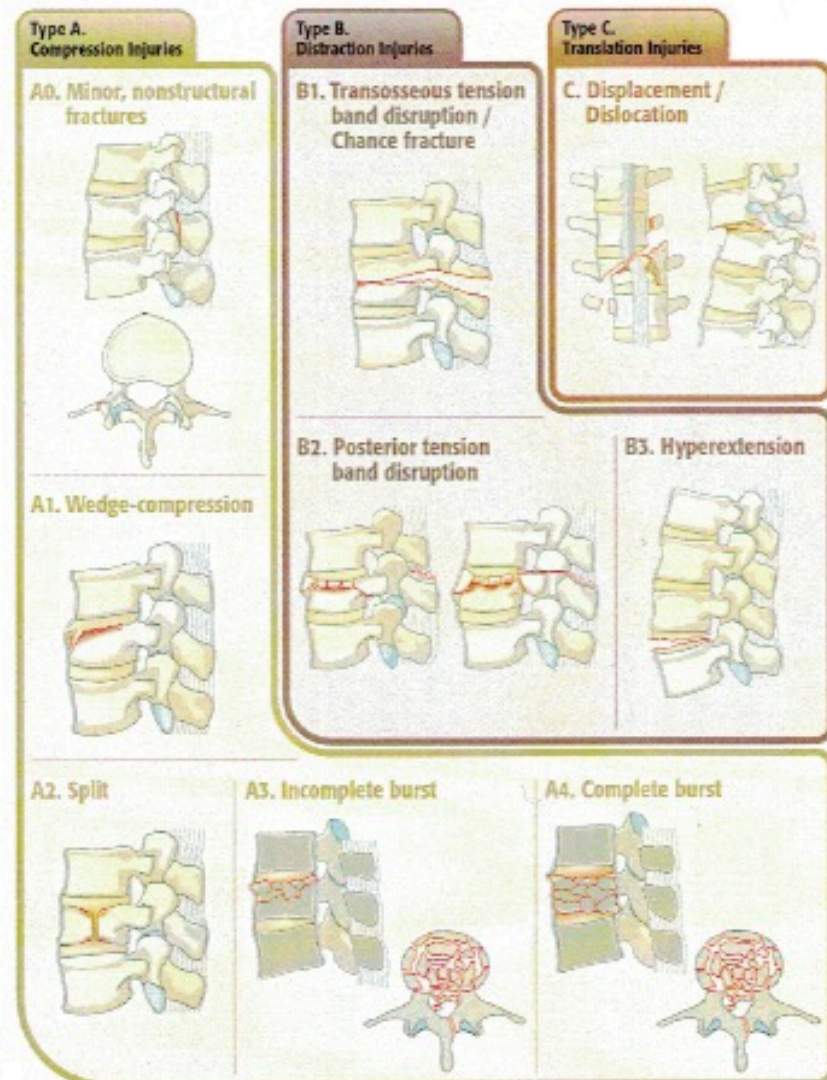
Alexander R. Vaccaro, MD, PhD,* Cumhur Oner, MD, PhD,+ Christopher K. Kepler, MD, MBA,*
Marcel Dvorak, MD,‡ Klaus Schnake, MD,§ Carlo Bellabarba, MD,¶ Max Reinhold, MD,||
Bizhan Aarabi, MD,** Frank Kandziora, MD, PhD,§ Jens Chapman, MD,††
Rajasekaran Shanmuganathan, MD, PhD,‡‡ Michael Fehlings, MD, PhD,§§ Luiz Vialle, MD, PhD,¶¶ and for
the AO Spine Spinal Cord Injury & Trauma Knowledge Forum

AOSpine Thoracolumbar Classification System

Algorithm for Morphologic Classification



AOSpine Thoracolumbar Classification System



| | Points |
|--|---------------|
| Fracture Mechanism | |
| Compression fracture | 1 |
| Burst fracture | 1 |
| Translation/rotation | 3 |
| Distraction | 4 |
| Neurological Involvement | |
| Intact | 0 |
| Nerve root | 2 |
| Cord, conus medullaris, incomplete | 3 |
| Cord, conus medullaris, complete | 2 |
| Cauda equina | 3 |
| Posterior Ligamentous Complex Integrity | |
| Intact | 0 |
| Injury suspected/indeterminate | 2 |
| Injured | 3 |

Score of ≤ 3 —nonoperative treatment

Score of ≥ 5 —operative treatment

Score of 4—either nonoperative or operative treatment, depending on qualifiers such as comorbid medical conditions and other injuries

Imaging –who needs what

CT

For best definition of bones

‘Pan scan’ head/neck/chest/abdo/pelvis for trauma
– often adequate

MRI

Direct visualisation of cord & soft tissues
esp ligaments & lig flavum

Sagittal views over large area
- multilevel injuries)
- bone ‘bruising’
-other pathology

Xrays

Upright/flexion/extension
Follow-up

Most people get multiple everything

Surgical indications

Increasing neuro deficit - early or late

Rotational component of deformity
(instability)

Disco-ligamentous injury mainly
(less likely to unite)

?Multiple trauma

?Quicker to sit/stand/rehab?

Old # - increasing deformity
- non-union/mal-union
- increasing pain?



More factors/considerations

Patient – age, osteoporosis, BMI, home, gen health

Surgeon- training, experience

Which fracture

Which hospital- theatre, Xray, ITU, orthotic dept,

Availability of follow-up/Salvage

If surgery...

When?

Posterior Vs Anterior Vs Both → Surgeon factors

Posterior – direct Vs Indirect reduction

- bone graft/augmentation

- planned fixation removal

Length of fusion

Post-op regimes

Non-op care

No restrictions
apart from pain

'Advice'
Avoid various activities

FOLLOW UP!!!

External splint
POP/Orthosis

Best rest
with traction/brace/hyperextension/POP bed

Non-op care

Some challenges...

Techniques & Complications

Follow –up

How often?

What is acceptable treatment?

How long for?

Plan B

How long do you wait?

What is 'acceptable' pathology?

What is the 'break point'?

What is the salvage?

Expectations

Patient

Surgeon

Orthotics

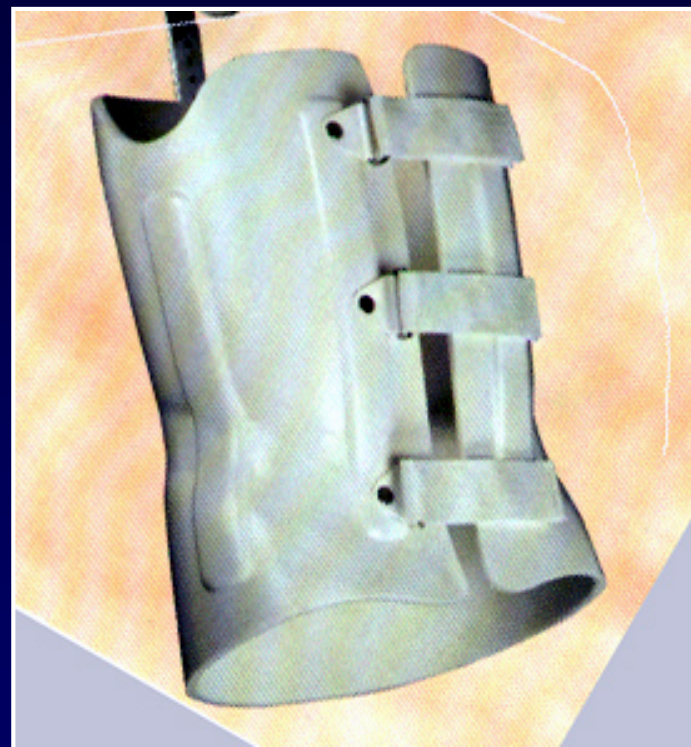
Nursing

Physio.....

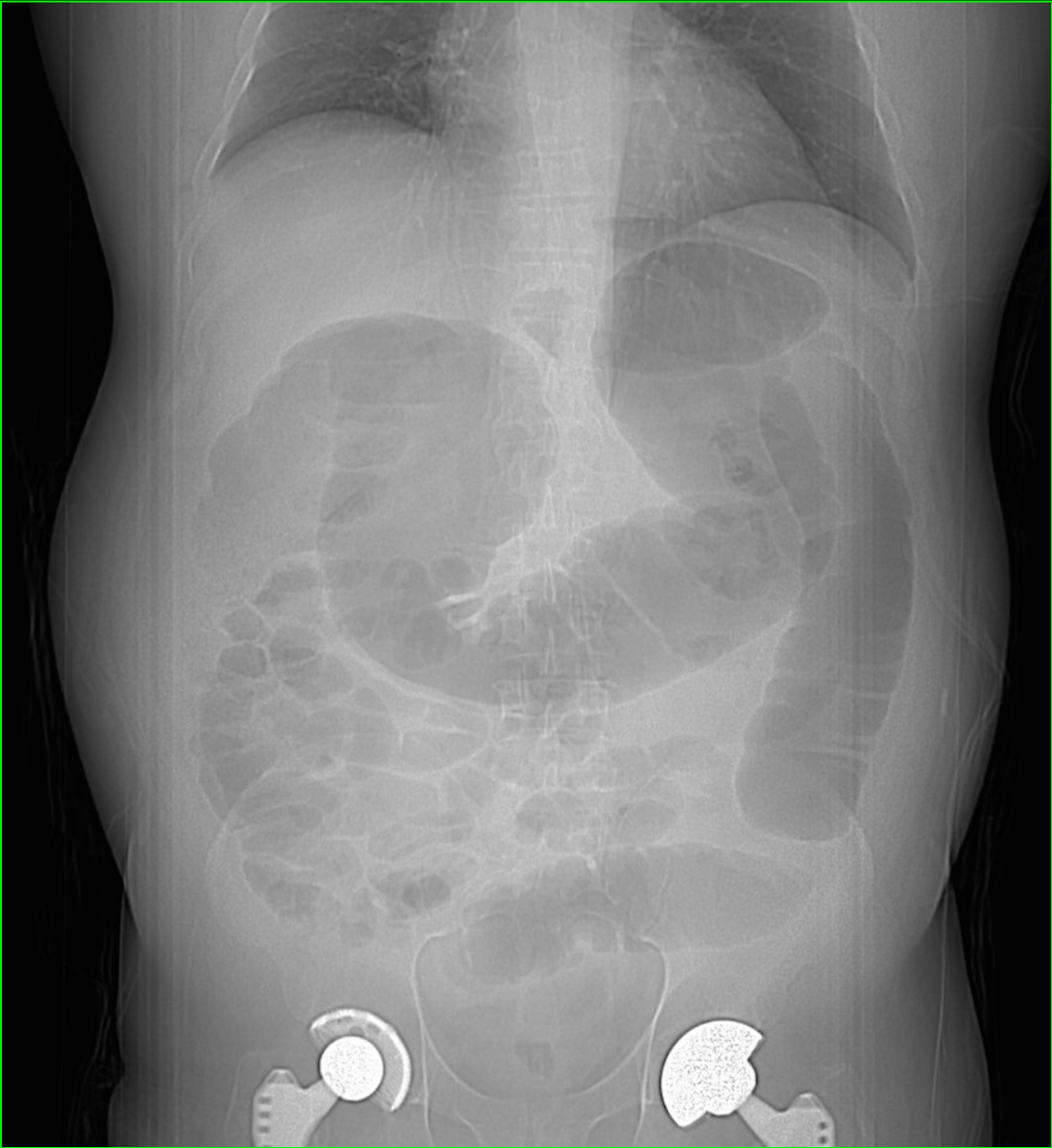
Good old days...



As advertised...



Real life..



AP 54y
27/6/16

27

a spine surgeon

Being ~~I~~sh, he had
an abiding sense of
tragedy, which sustained
him through temporary
periods of joy.

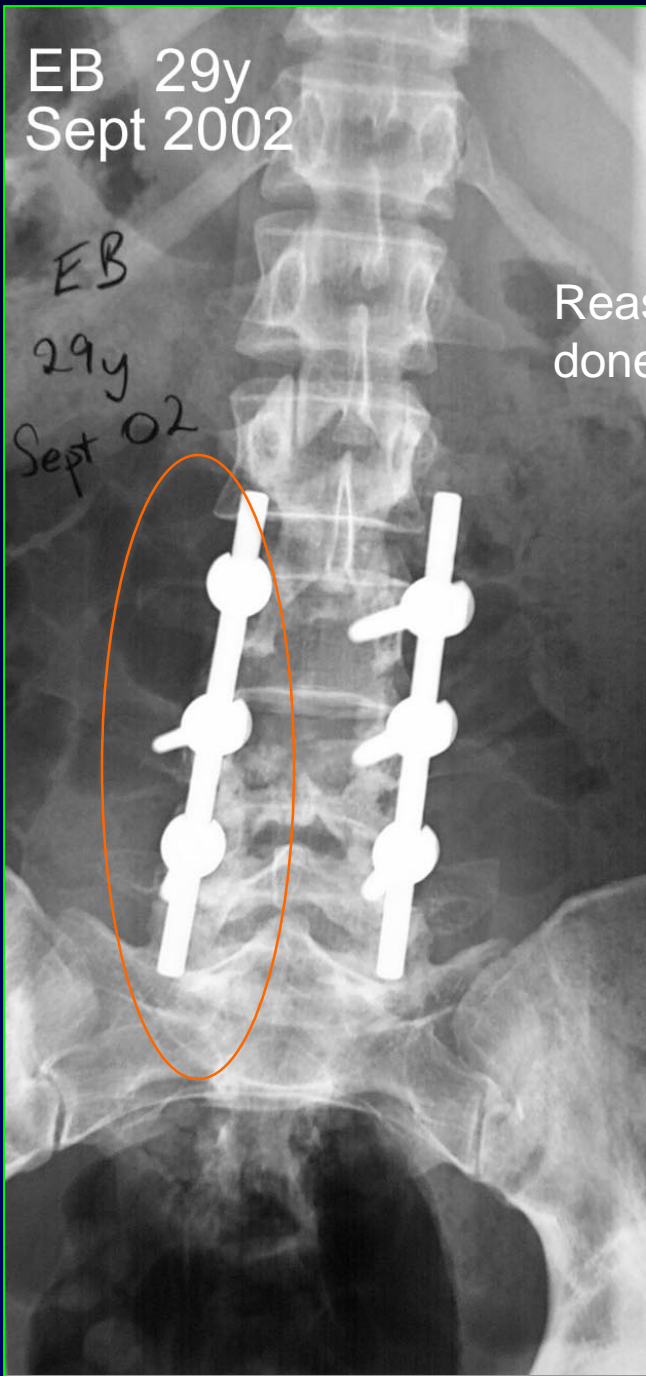
William Butler Yeats



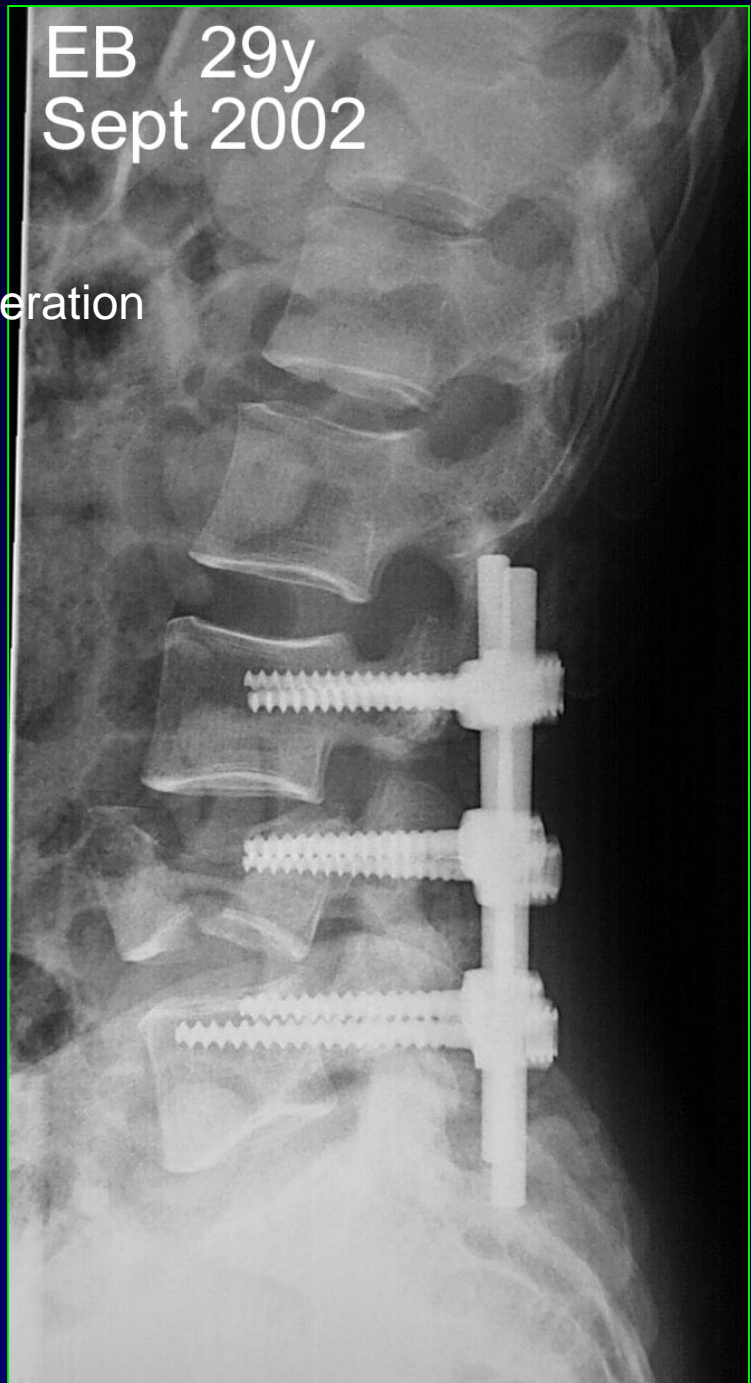
EB 29y
Sept 2002

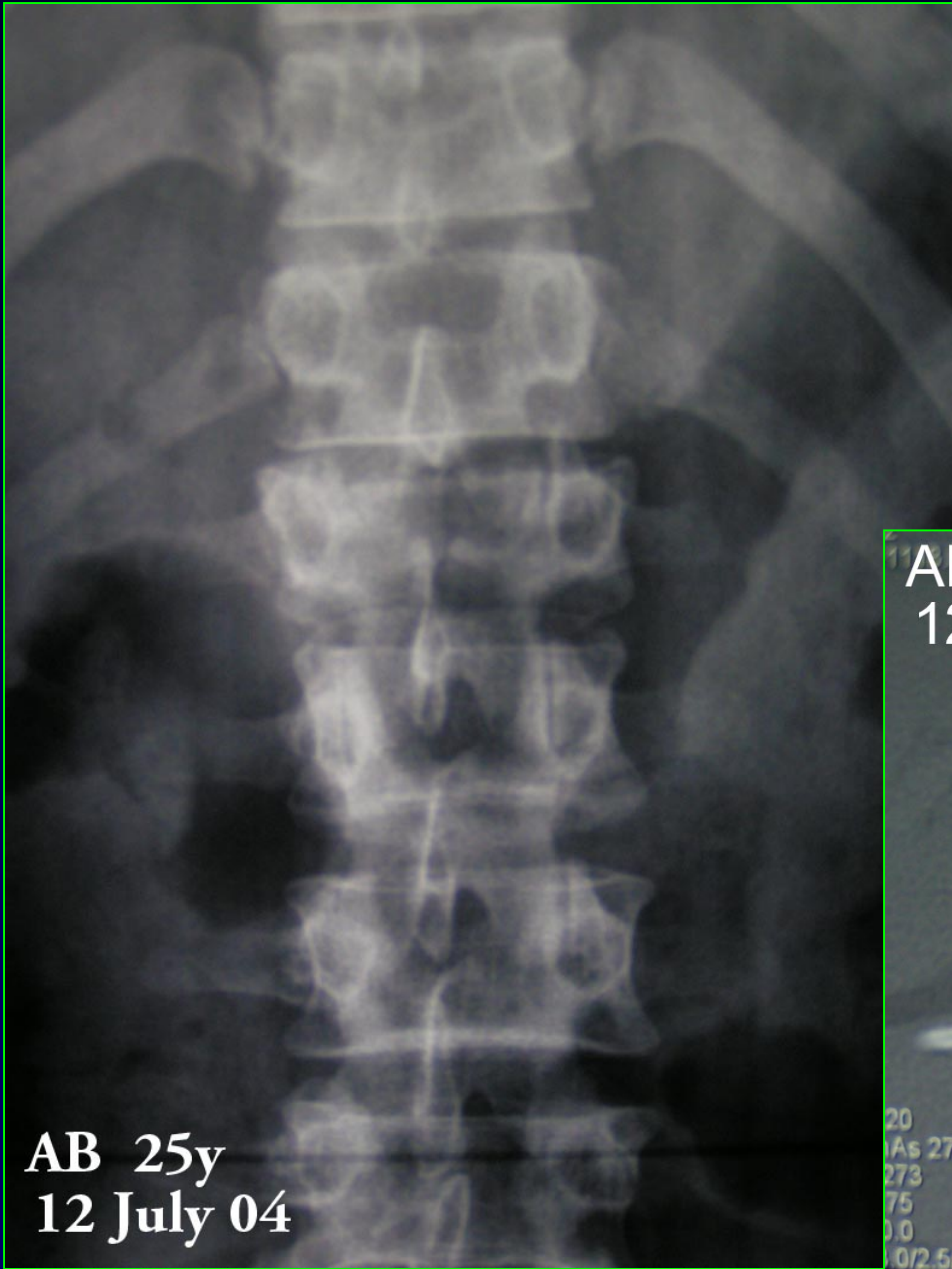
EB
29y
Sept 02

Reasonable operation
done badly



EB 29y
Sept 2002





Good op with no improvement

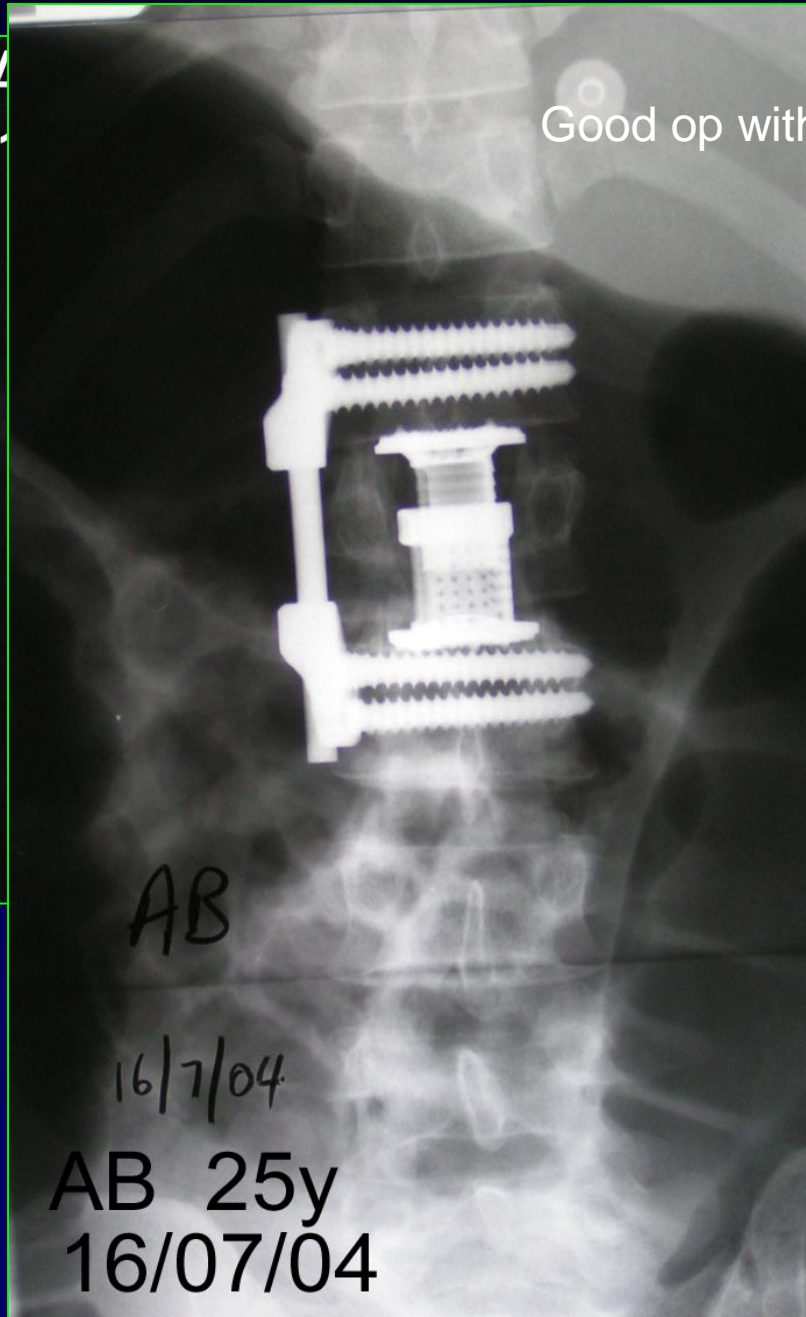
AB

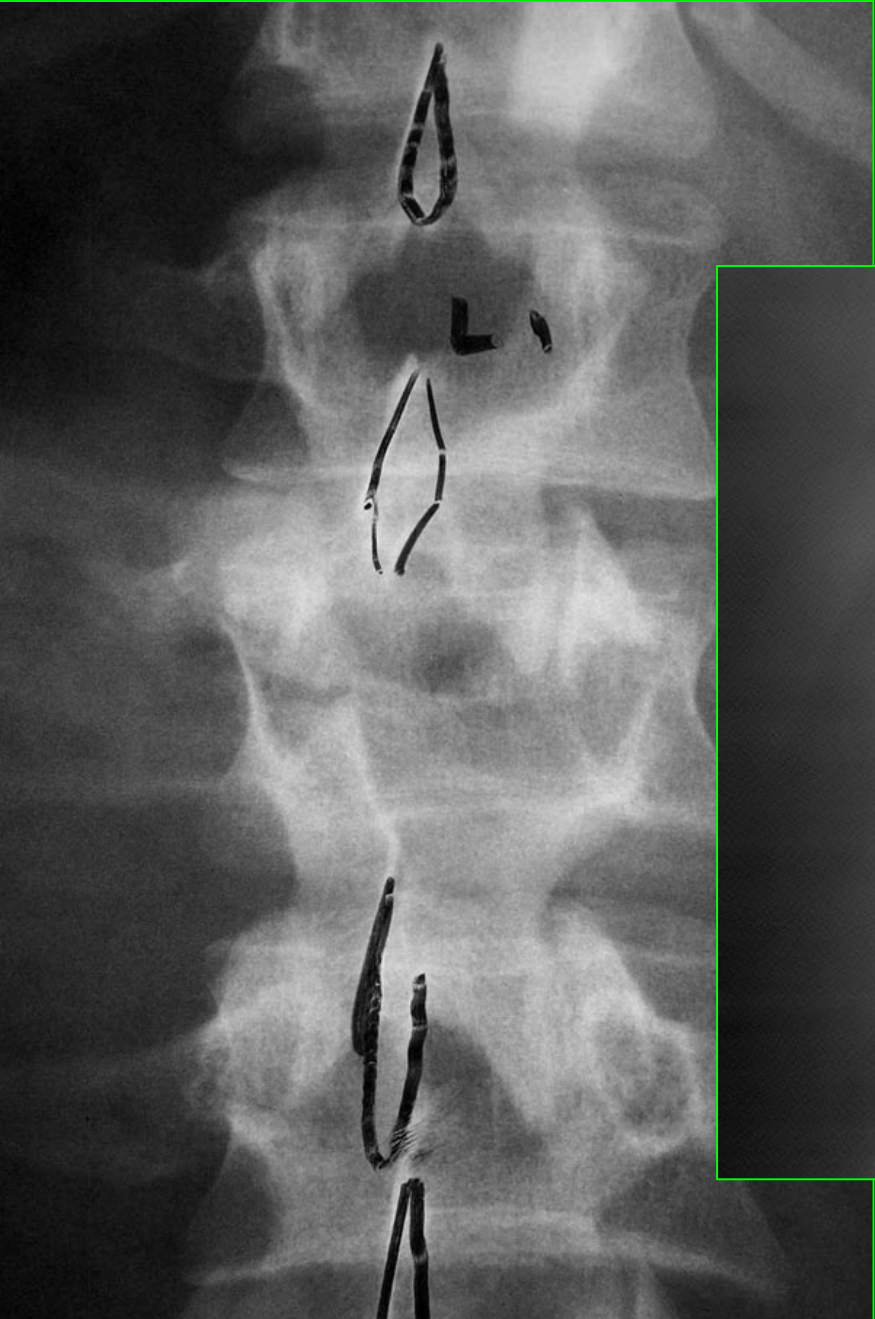
16/7/04

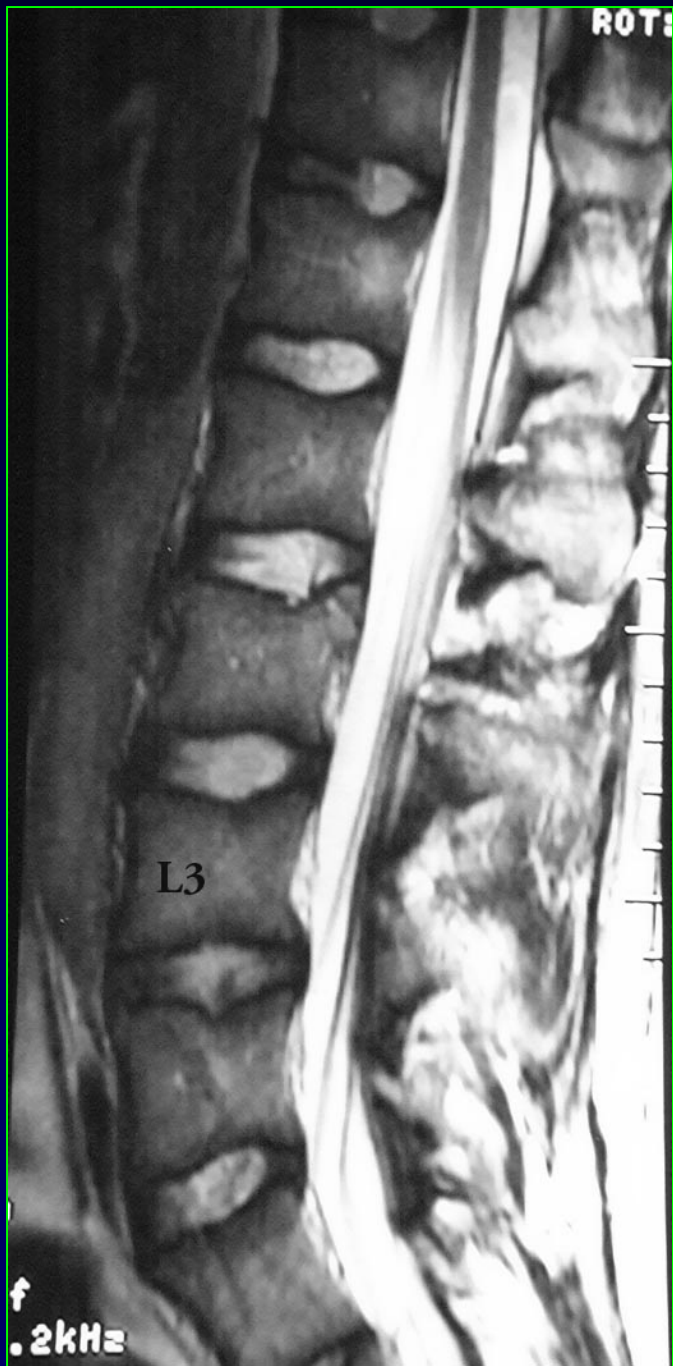
AB

16/7/04

AB 25y
16/07/04

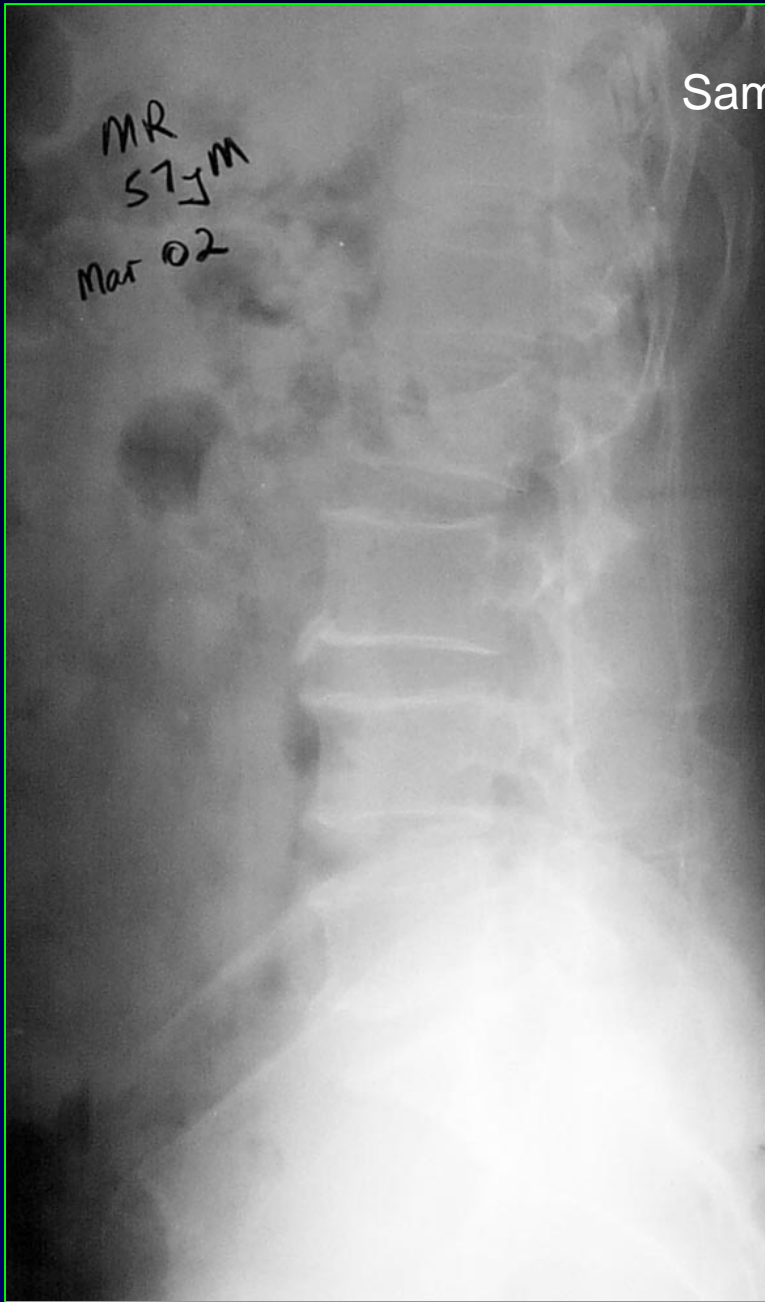




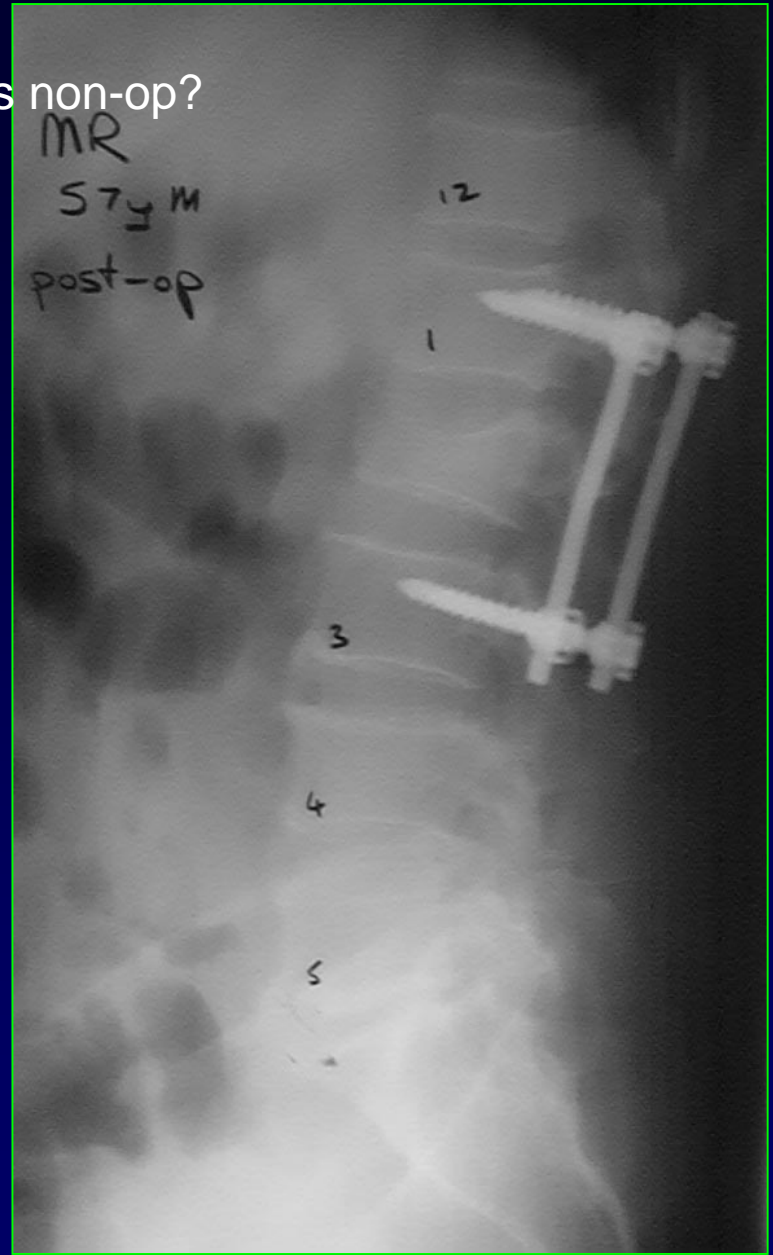


Too much metal





Same as non-op?



MR 51y
30/05/08

Clinically 'good'

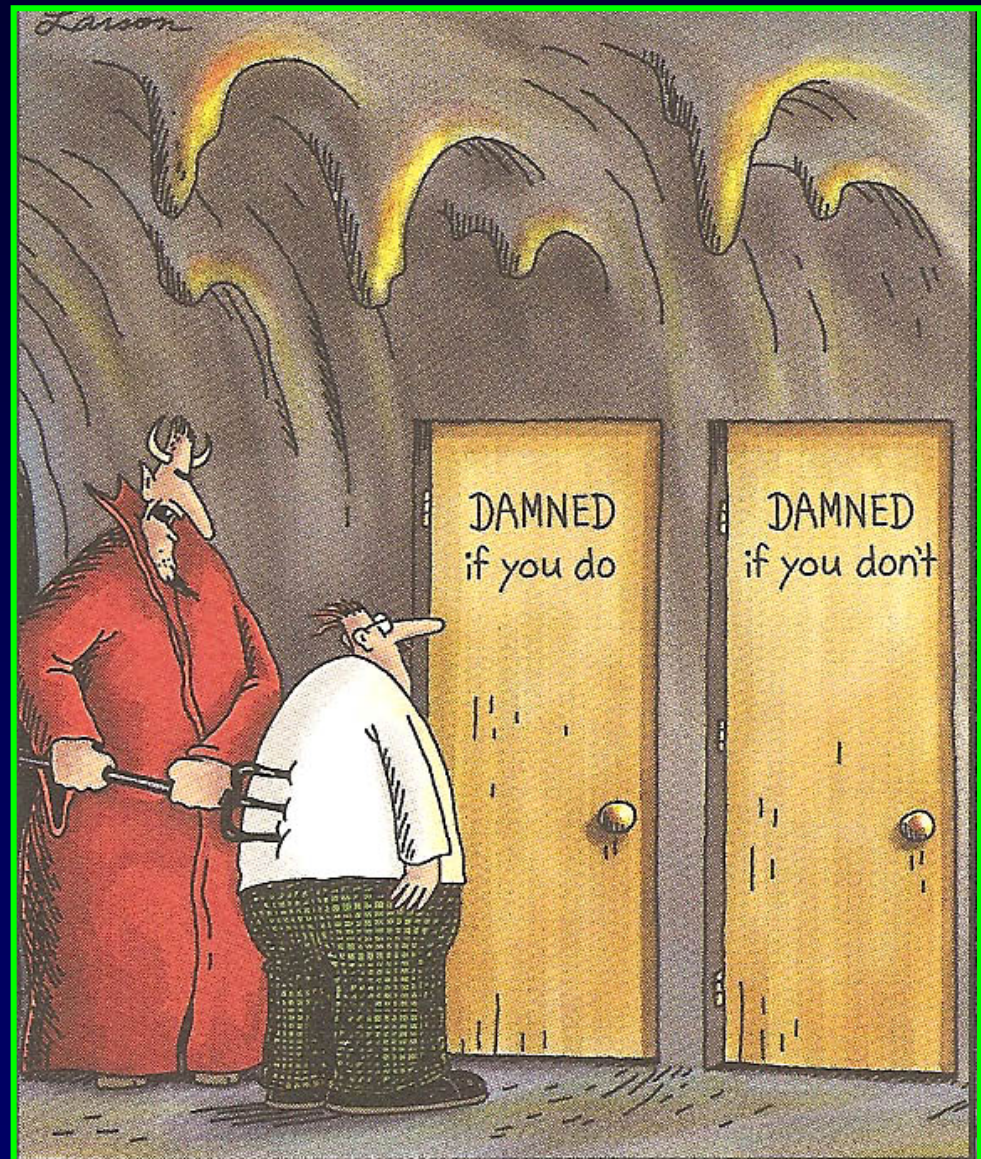
30/5/08

MR 51y
22/05/08

MR
53y
Nov 09



Asking a surgeon
a question..

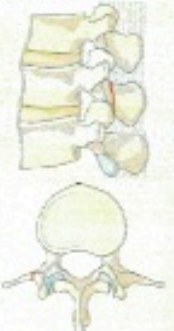


“C’mon, c’mon—it’s either one or the other.”


AOSpine Thoracolumbar Classification System

Type A. Compression Injuries


A0. Minor, nonstructural fractures



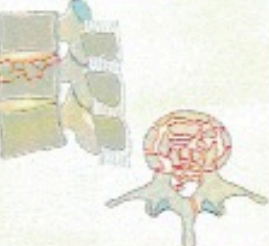
A1. Wedge-compression




A2. Split



A3. Incomplete burst




A4. Complete burst




Type B. Distraction Injuries

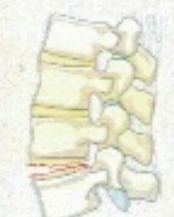
B1. Transosseous tension band disruption / Chance fracture



B2. Posterior tension band disruption

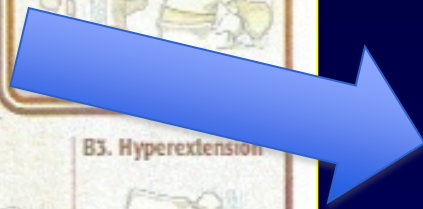



B3. Hyperextension



Type C. Translation Injuries

C. Displacement / Dislocation



Type B. Distraction Injuries

B1. Transosseous tension band disruption / Chance fracture

