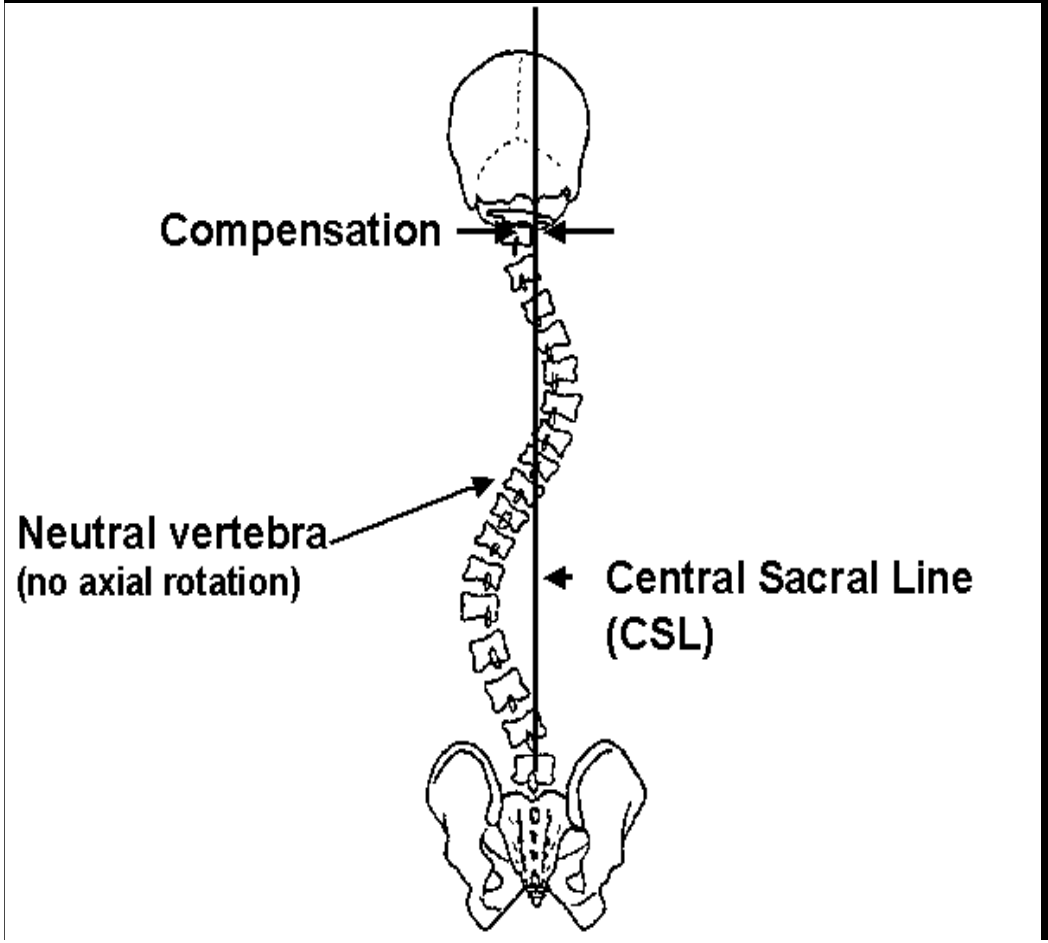
Adult Spinal Deformity

David Fender
Freeman Hospital
Newcastle upon Tyne

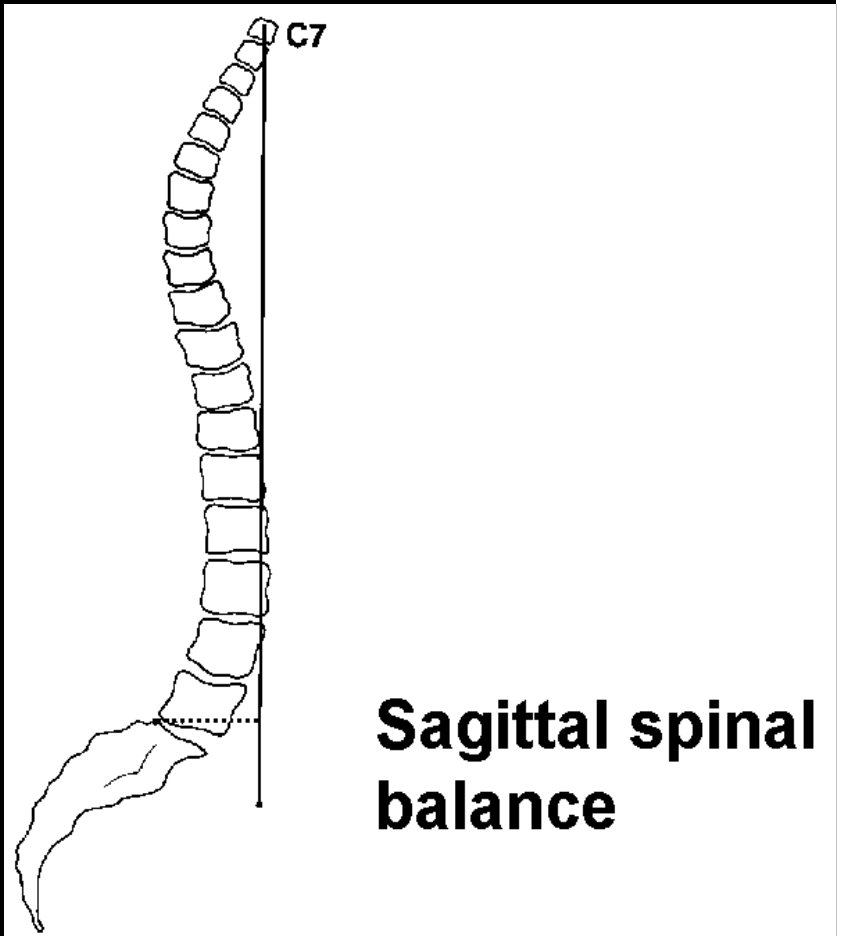
- The ‘Basics’
- Degenerative Scoliosis
- Cases

Terminology

Scoliosis



Kyphosis/Lordosis

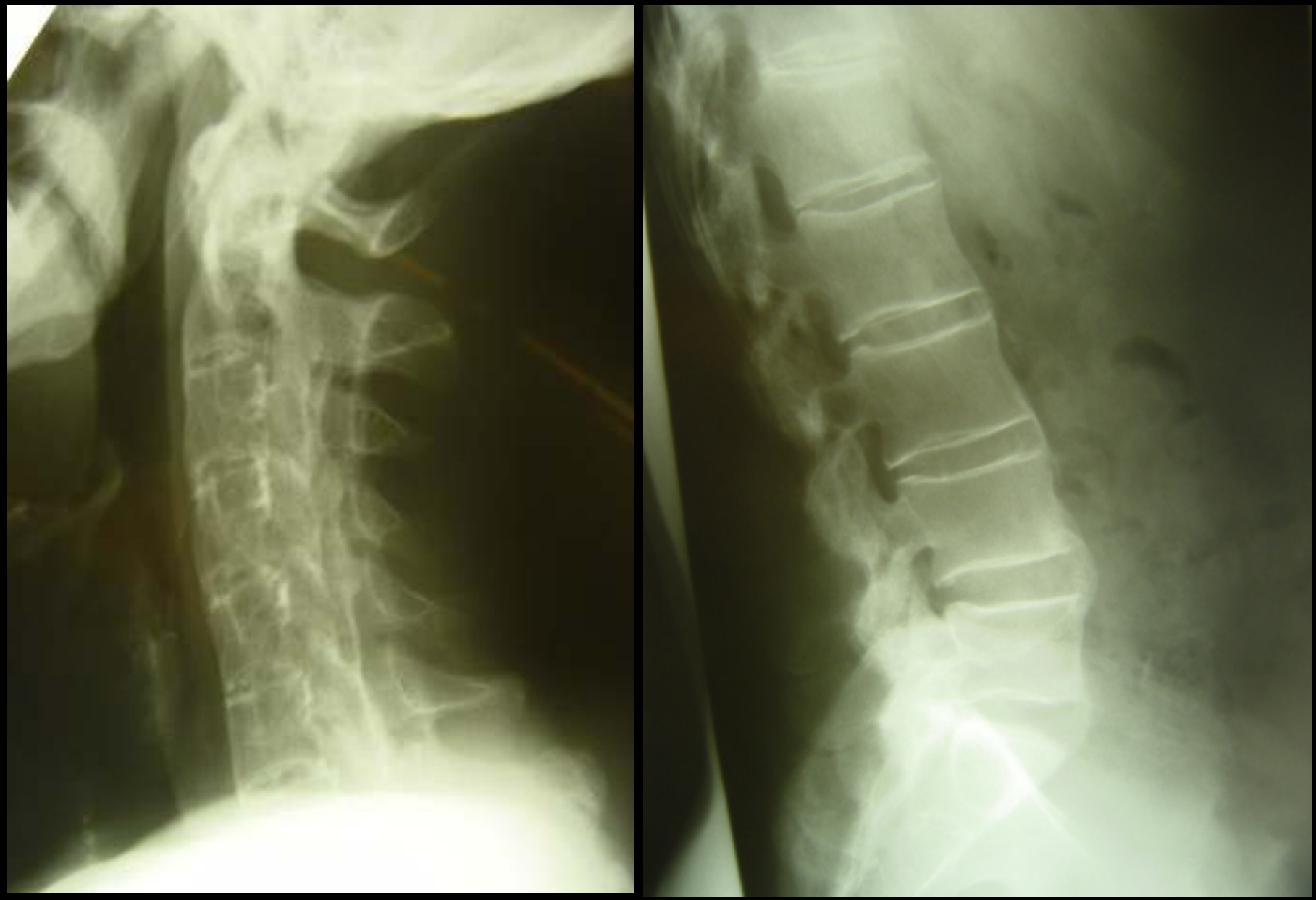


Types of Adult Deformity

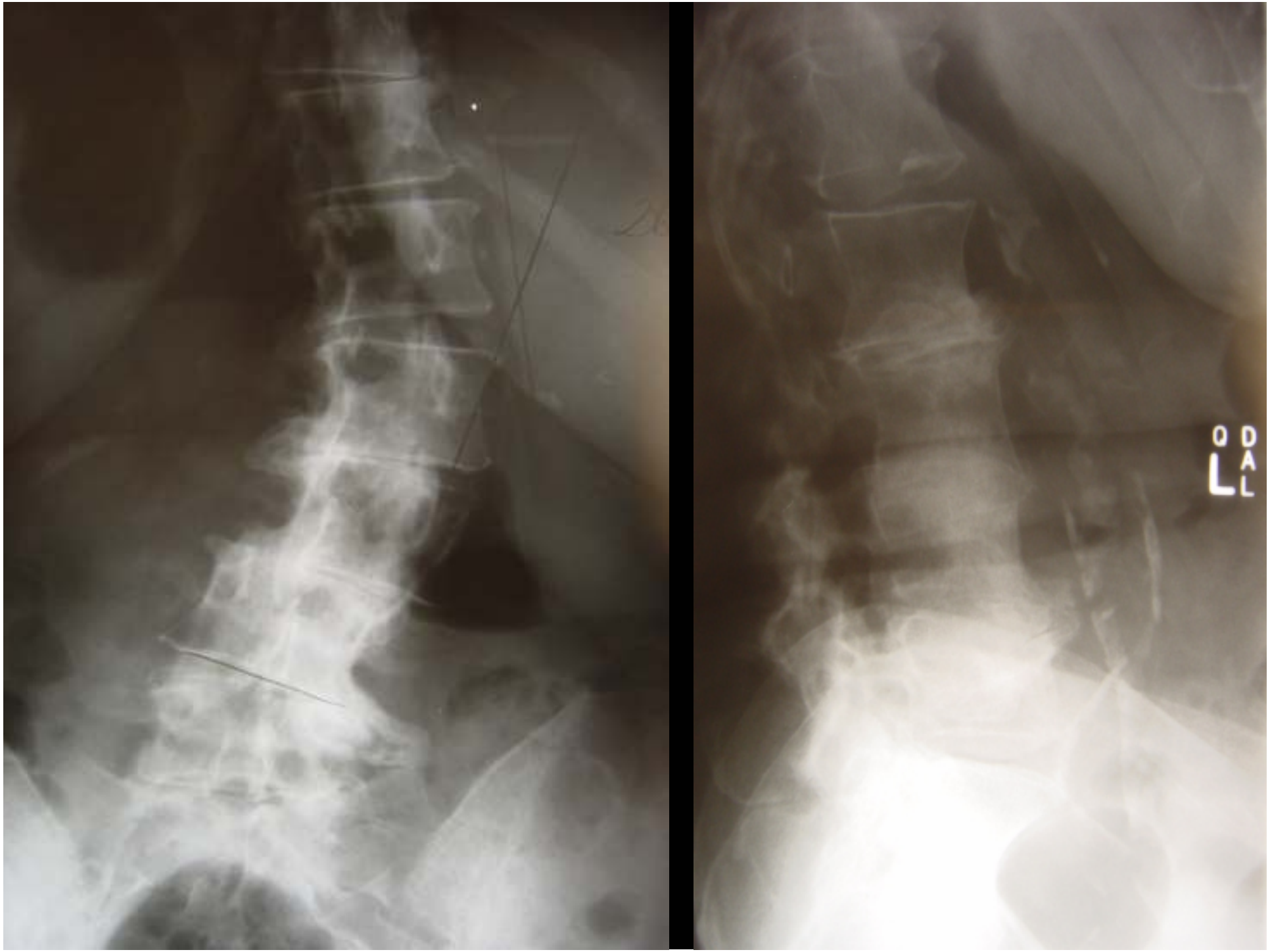
- Present pre adult
- Adult onset

Aetiology

- Congenital
- Acquired
  - Degenerative
  - Inflammatory
  - Metabolic
  - Infective
  - Neoplastic
  - Traumatic
  - Iatrogenic




ERECT
LT


OD
AL
L


CT
TOSHIBA
FORMAT
years
2002
12
CORONAL CU
500

Symptoms

- Pain
- Neurology
- Red Flags

Considerations

- Comorbidities
- Medications
- Smoking
- Patient expectations

Imaging

- Scoliosis radiographs
- MRI
- CT +/- myelography
- (DEXA)

Diagnostic tests

- Selective nerve root block
- Facet blocks
- Provocative Discography

Treatment

Non Operative

- Neglect
- Informed consent
- Physical therapies
- Medications

- ORTHOSES

Treatment

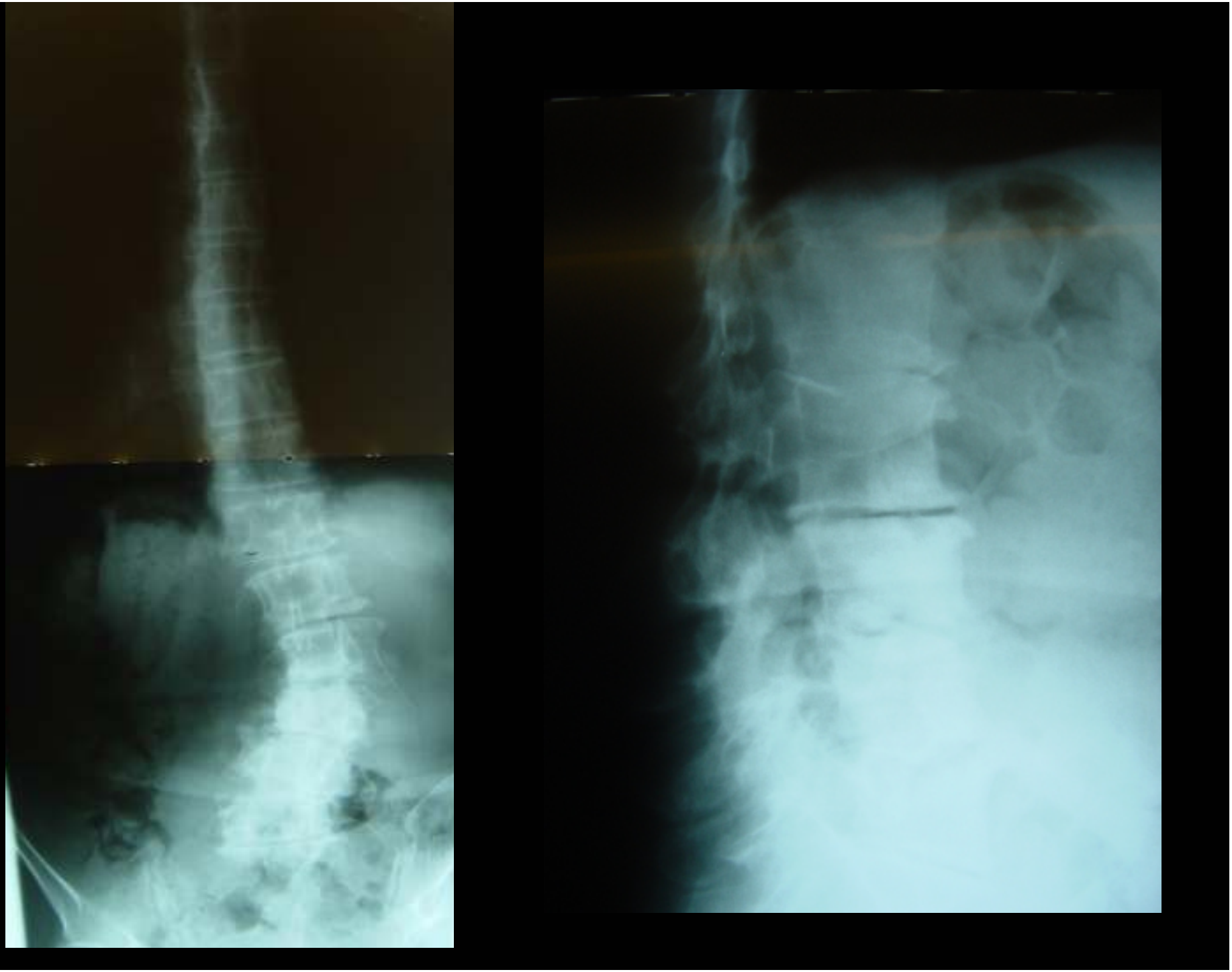
Operative

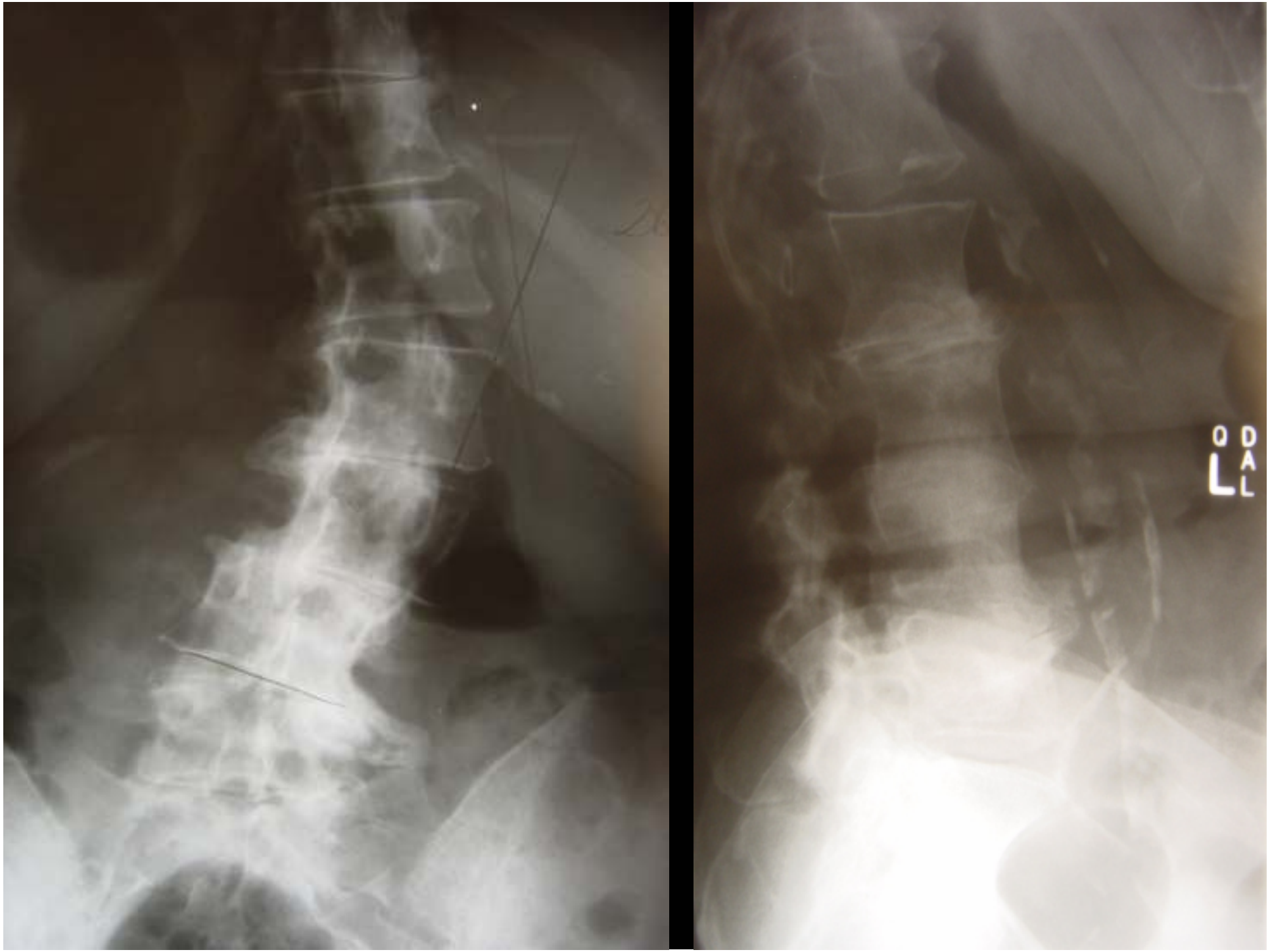
- Decompression
- Fusion

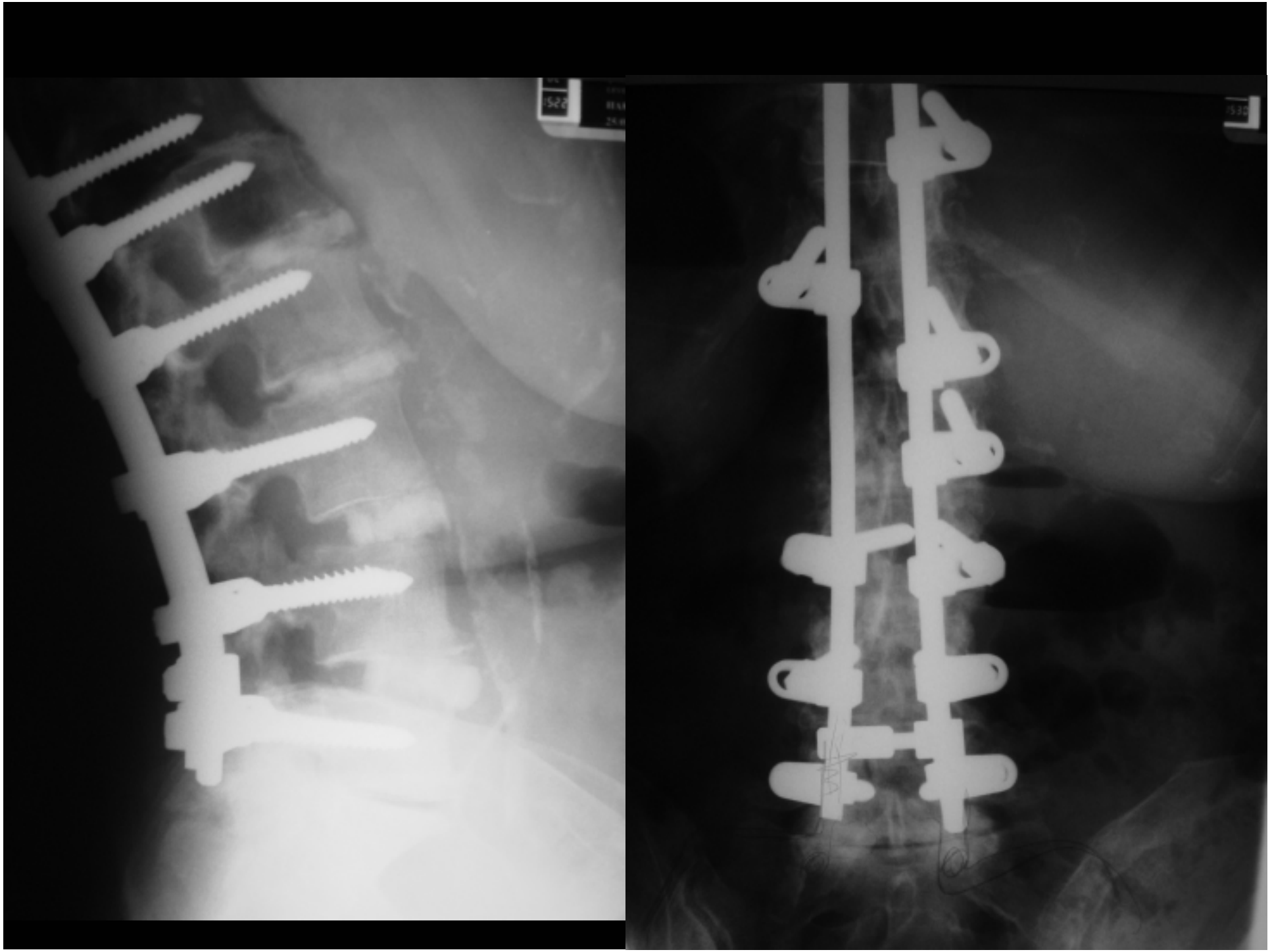
Options

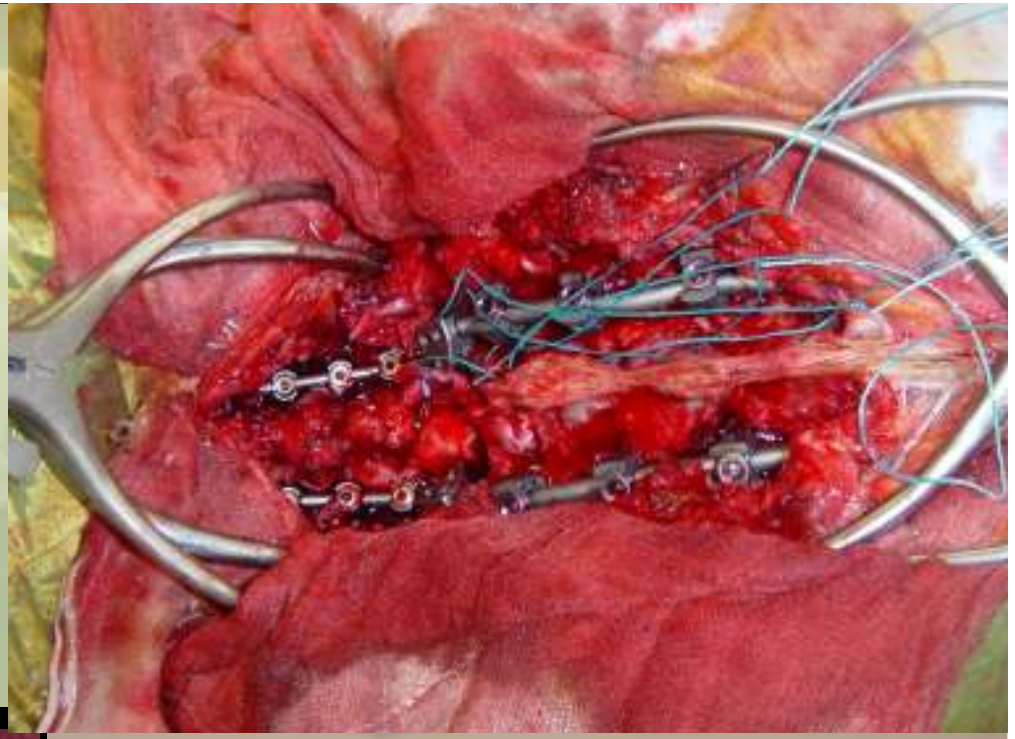
- Instrumentation
- Correction
- Reconstruction

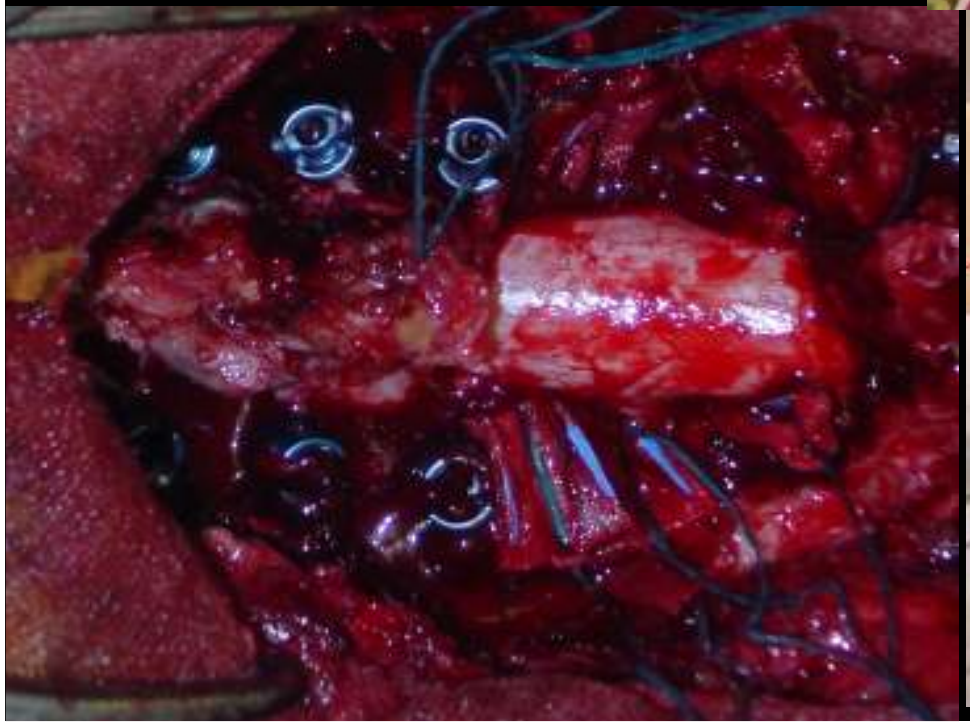
- Anterior Vs Posterior
- Osteotomy




OD
AL
L

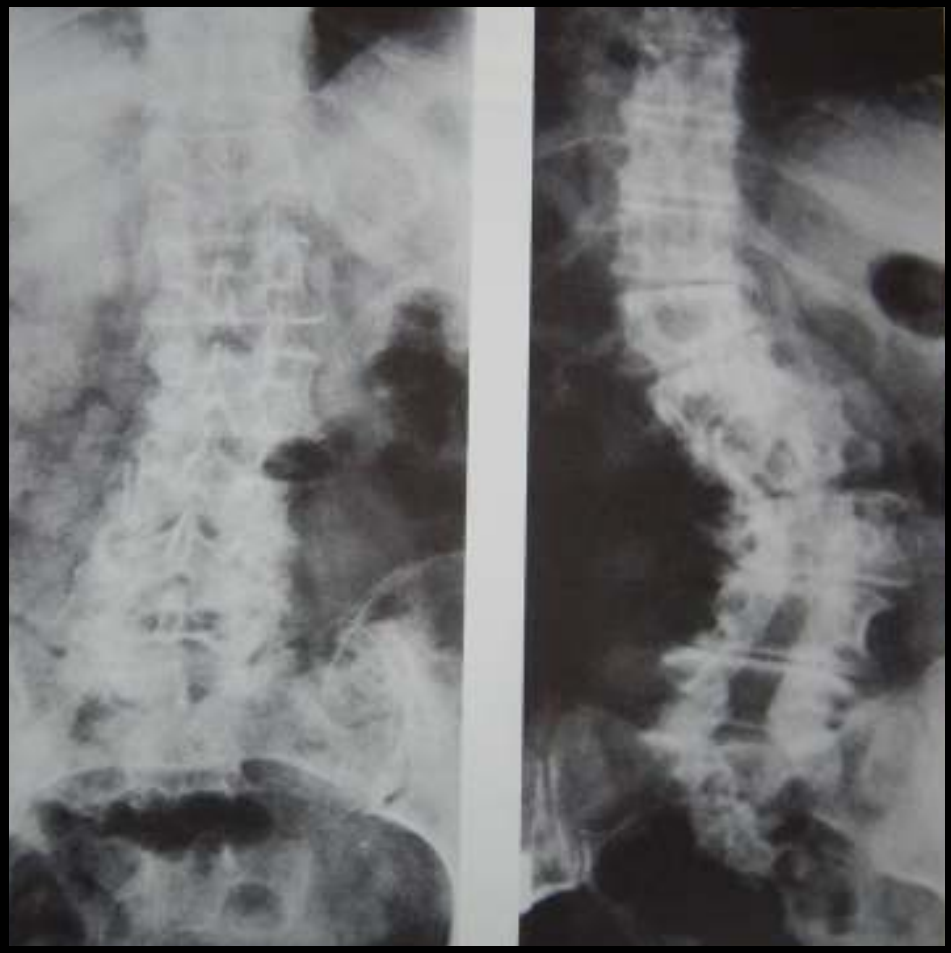







S
QDI HO
I
Feb 2003
20:35
P
I
Vitrea®
W/L:1558/467

Degenerative Scoliosis



Degenerative Scoliosis

What is it?

What problems does it cause ?

What can we do?

What is it?

‘Adult Scoliosis’

Mixed bag
- important as make up majority of literature

2 major groups
1. History of scoliosis pre adult
2. ADULT ONSET

De novo Vs Secondary
- osteoporosis
- osteomalacia
- iatrogenic

CONTROVERSIAL, BUT….

‘Adult Onset’

Characterized by:
Degenerative changes
Specific pattern of deformity

‘Adult Onset’

Incidence 6 – 36 % (> 50 yrs)

- ⬆10% 5yrs later

Male = Female

Age 60 yrs +

Lumbar curve

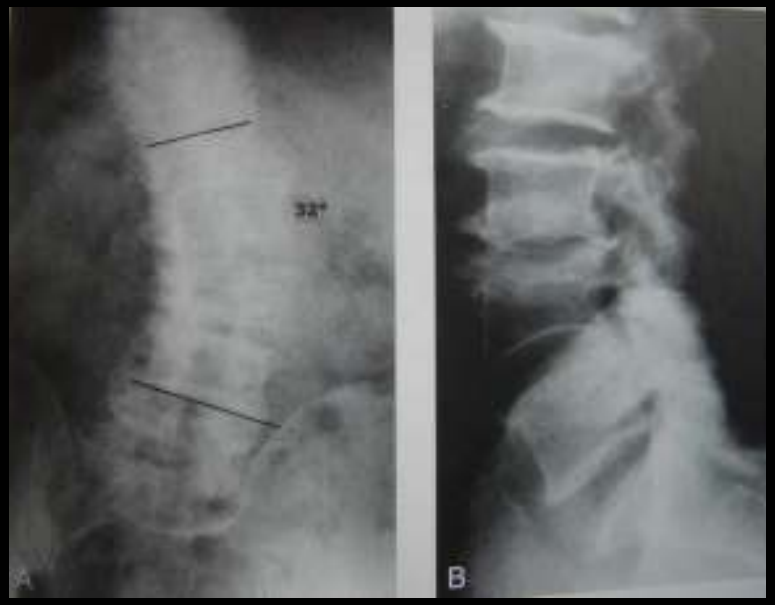
Right = Left

Small proportion double

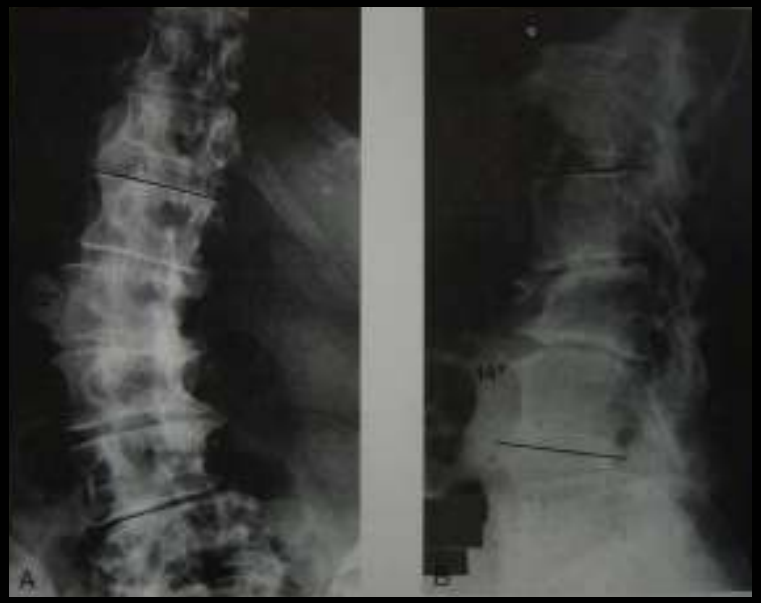
Lateral/rotational listhesis (85%), usually L3/4

Loss of lordosis in 50%

Two patterns



Lumbar
Degenerate
Minimal rotation



Degenerate
Significant rotation
Loss of lordosis
? previous idiopathic

Simmonds CORR 2001

What problems does it cause ?

Neurology

Pain

Progressive deformity

Stenosis

- Central or root
  - Not relieved with sitting

Risk factors:

- Predominant symptom, incidence
  - Back pain
  - Unknown
  - Known sources, esp. facet
- Concavity of primary curve (not exclusively
  - Controversy:
  - Multiple levels

1. Lateral listhesis apical level
2. Harrington factor
3. Disc.index

$Y=1.884 + 0.63X_1 + 2.712X_2 -0.375X_3$

?Incidence = normal population

Korovessis Spine 1991

?Cobb > 45deg → pain

↓ >60 yrs

Same risk factors + sagittal malalignment = PAIN

Grubb Spine 1992

What can we do?

NOT OPERATE

INTERVENE SURGICALLY

Unknown majority either:

1. Don't present or
2. Manage with non-op treatment

'Big Series' → 3-7 ops per year

INDICATIONS

Neurology

+/- Back pain

(EXCUDE OTHER CAUSES)

INVESTIGATIONS

OPTIONS

Erect Xrays

MRI

Decompression

CT +/- myelogram

Fusion +/- Correction

Facet blocks

Root blocks

(discography)

Decompression alone

FOR

AGAINST

Indications subjective

Discrete stenosis

Minimal back pain

Minor deformity (risk factors)

Fragile patient

Anecdote

ains stability (van Dam 1988)

er series (Lenke AOA 2002)

- Back pain not addressed
- Fusion series have sig^{n} number of previous decompressions

Decompression + Fusion

AIMS OF FUSION

Resolution of symptoms
- achieve fusion
- spinal stability and balance

Avoidance of complications

FUSION OPTIONS

In situ	vs	Correction
Instrumented	vs	Non
Long	vs	Short
Posterior	vs	Combined

The literature

In situ vs Correction

Solid in situ fusion works for certain curves

Correction – expect 40% Cobb improvement

- Sagittal (+Coronal) balance

The literature

Instrumented vs Non

Non instrumented c

Modern pedicle scr

Long vs Short

Controversy regarc

Proximal level – litt

Guidance based on curve type

FOR

Majority L5/S1 diseased

33% L5/S1 stenosis on myelogram

90% chance of symptoms long-term

AGAINST

Realign

High ps

Poor fix

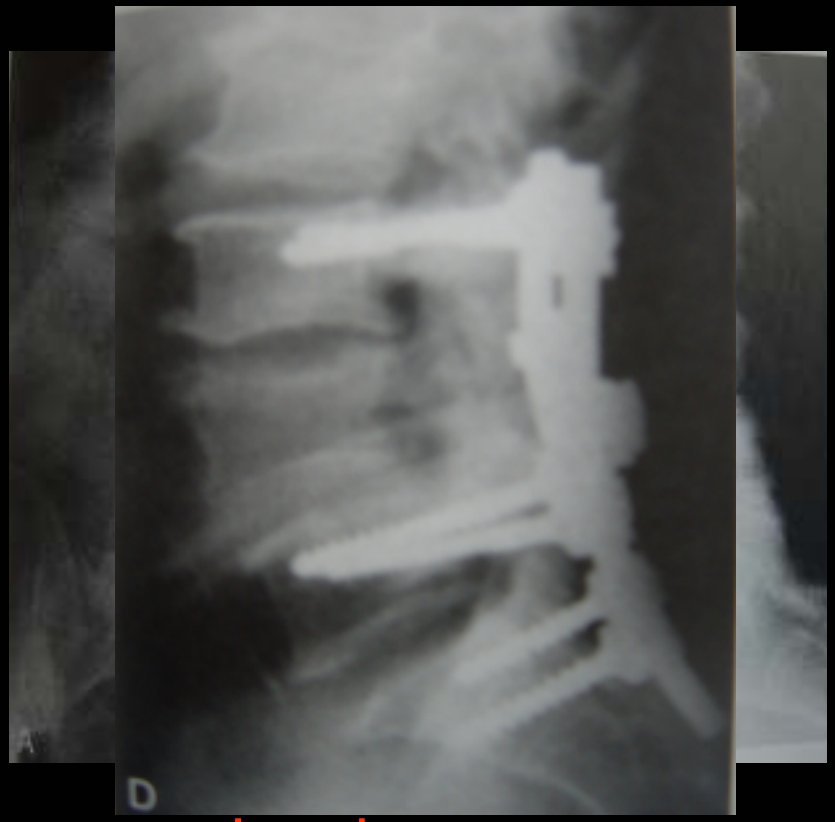
Avoid:

Junctional kyphosis

Retro/spondylolisthesis

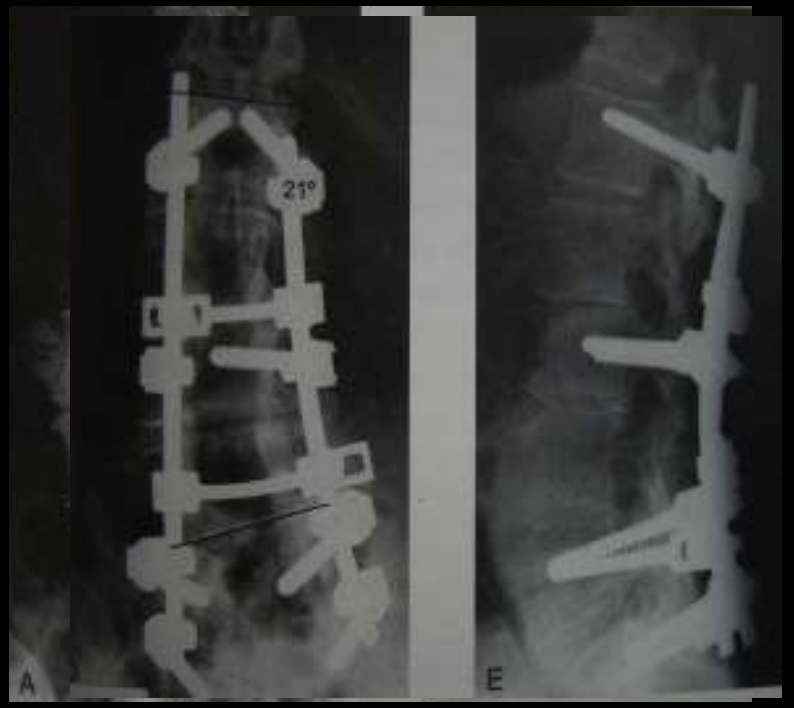
(Simmons CORR 2001)

Type I



Decompression + short instrumented fusion
Distraction on concavity

Type II



Degenerate

Decompression + long instrumented fusion
Derotation

Simmonds CORR 2001

The literature

Posterior	vs	Combined
Lower morbidity Able to achieve most goals		Better correction - sagittal reconstruction Higher fusion rate esp L5/S1
High		

OVERALL NO CONSENSUS
TAYLORED TO INDIVIDUAL PATIENT

?? PLIF IDEAL COMPROMISE
BUT NO EVIDENCE

Outcome – what to expect….

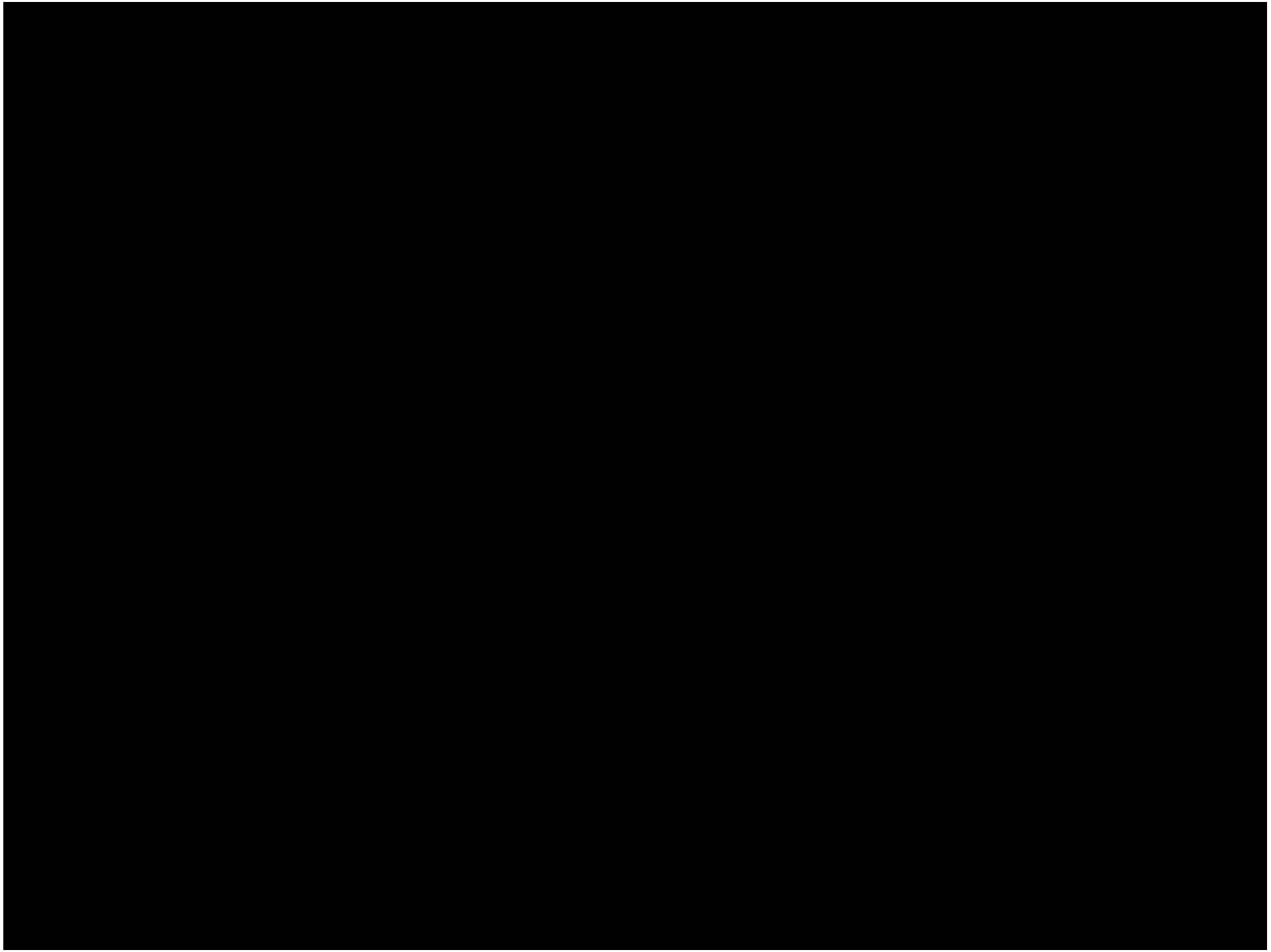
- Pain relief 70- 90%
- Correction 40 – 50 %
- Satisfaction 80 – 90%

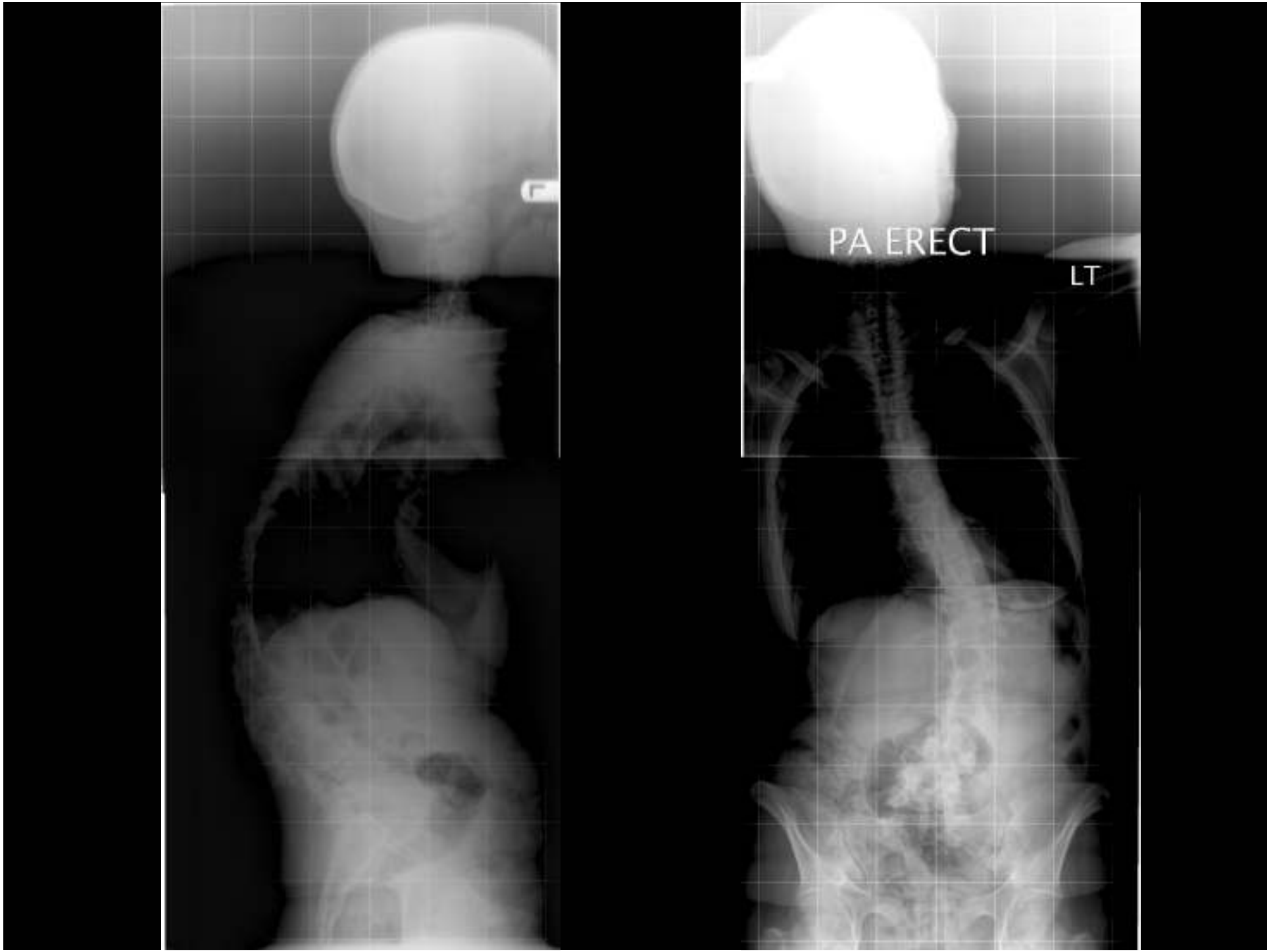
- Pseudarthrosis 0 – 30%
- Reoperation up to 36% at 4 yrs
- High rate of medical complications

What do I do?

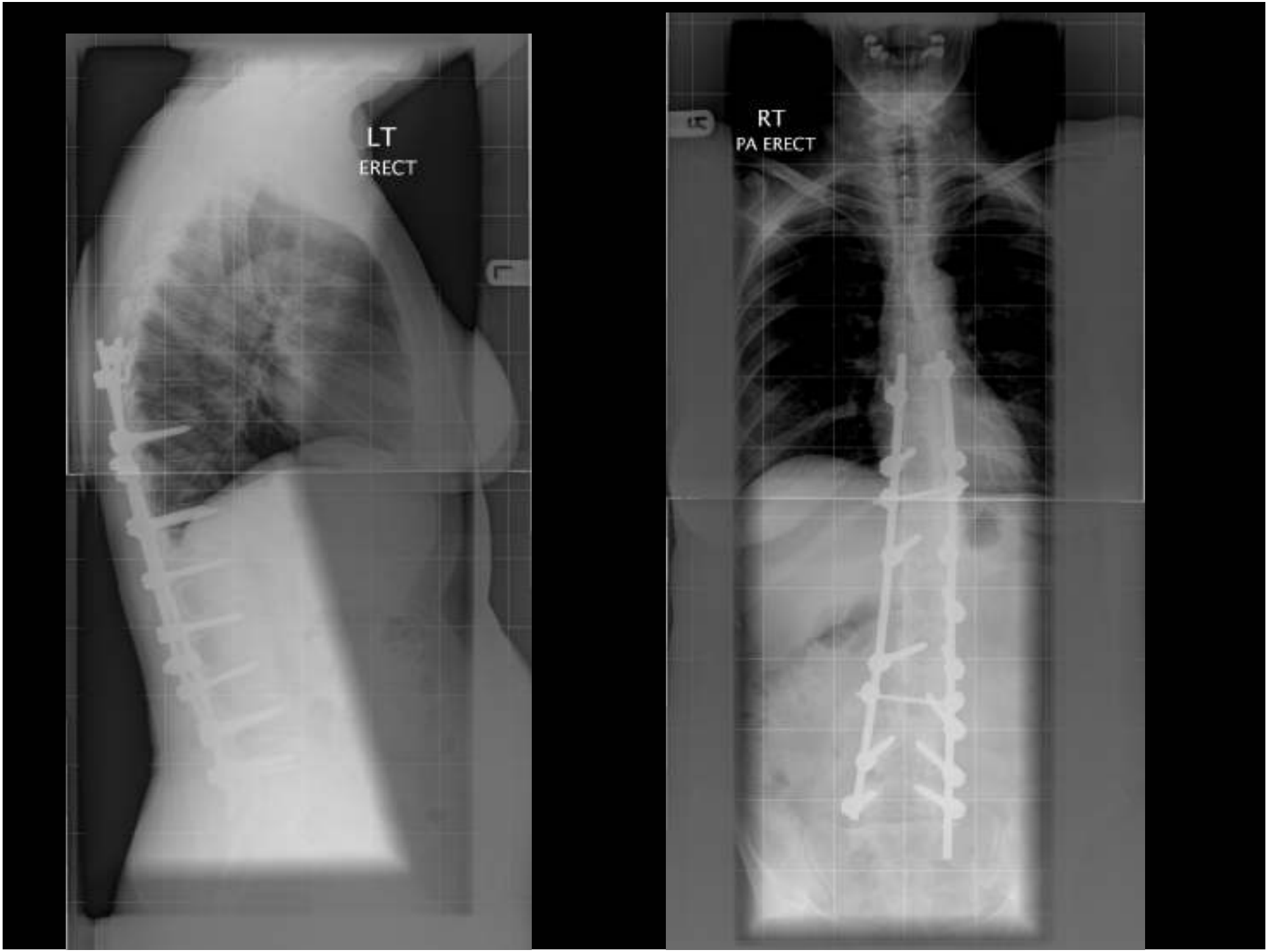
Aim: Minimal intervention for maximal benefit:

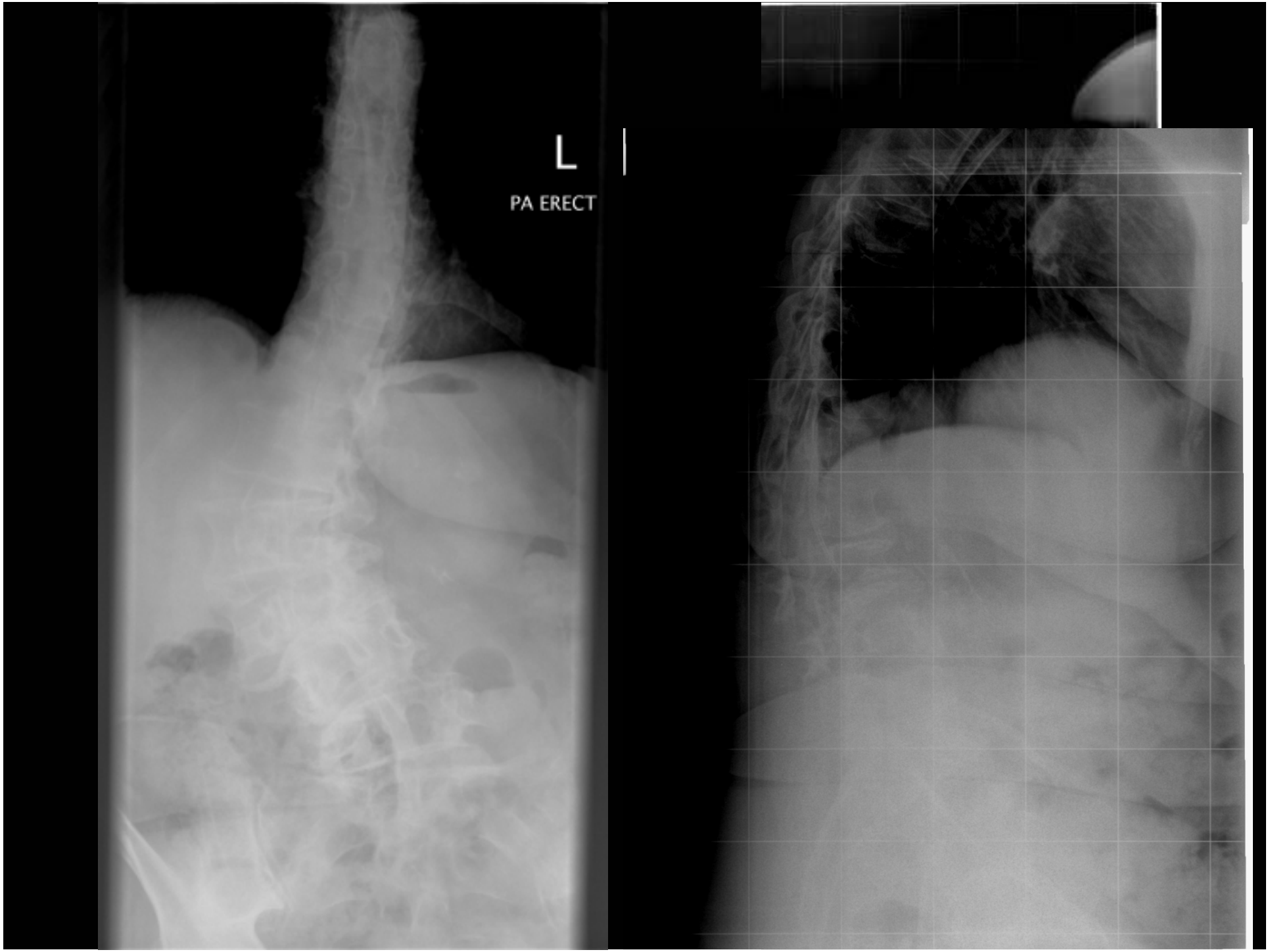
1. Decompression alone if previous criteria met.
2. Post decompression and fusion as per Simmonds
3. ? PLIF if fusing to sacrum

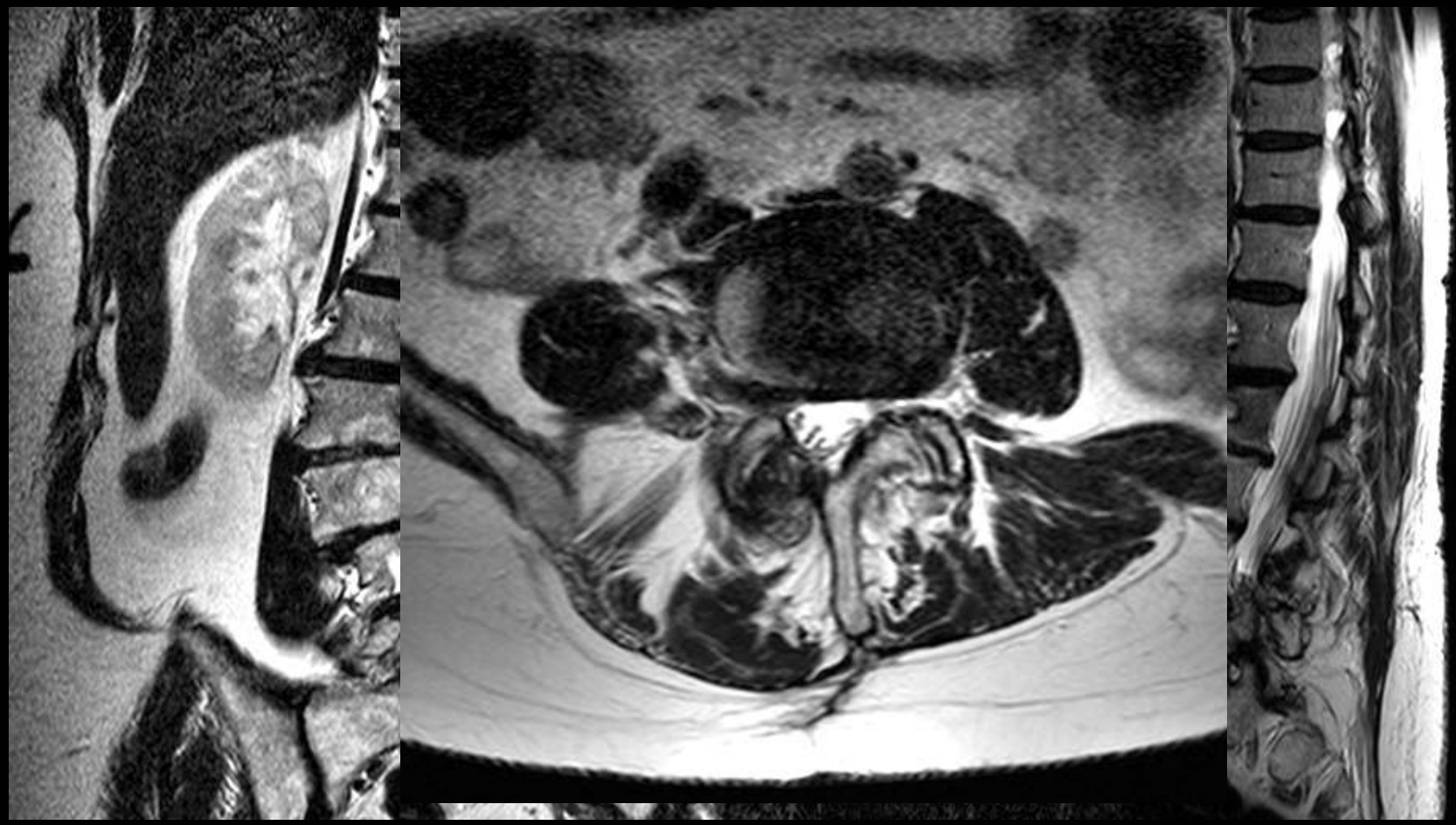


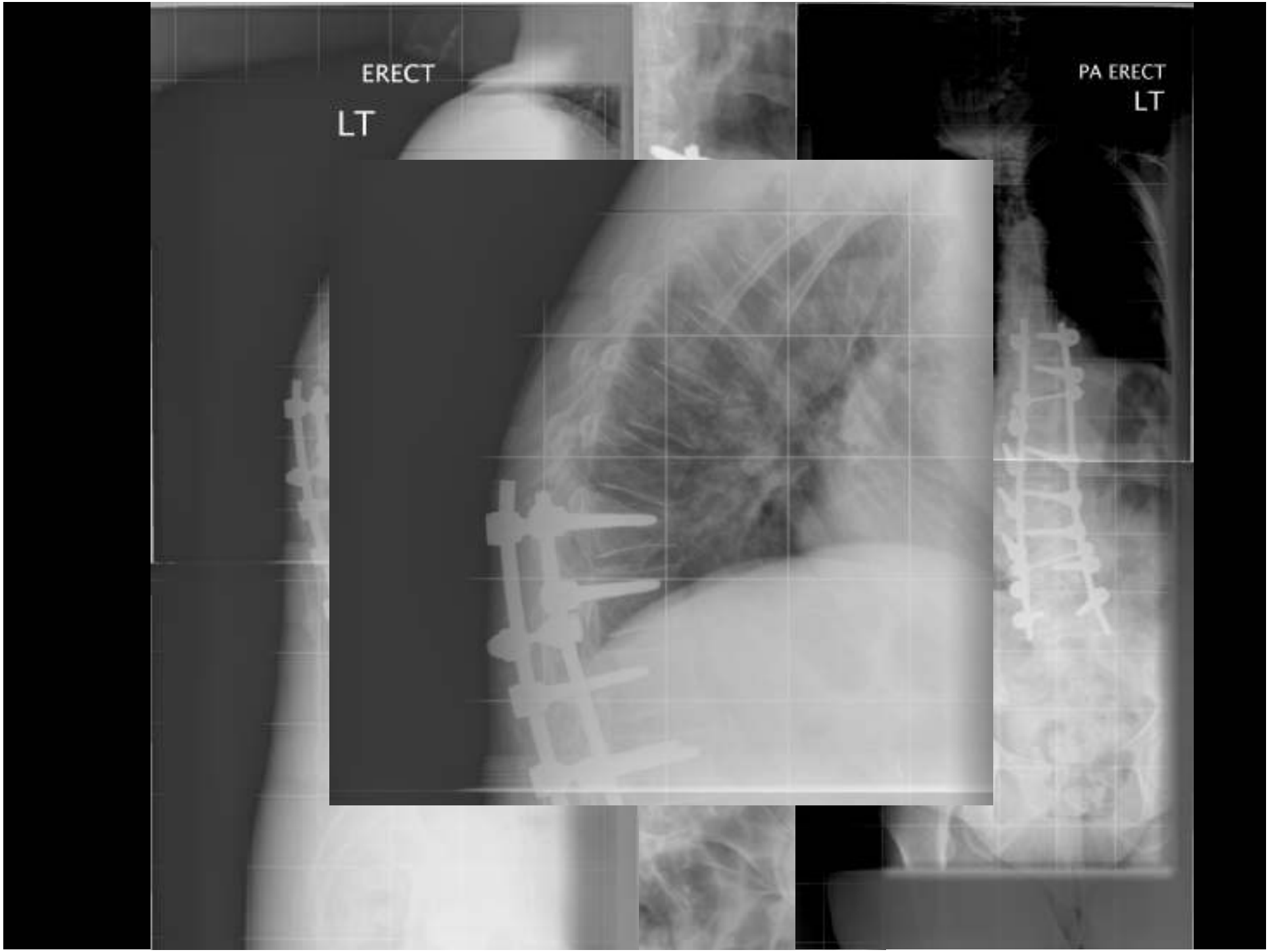

PA ERECT
LT

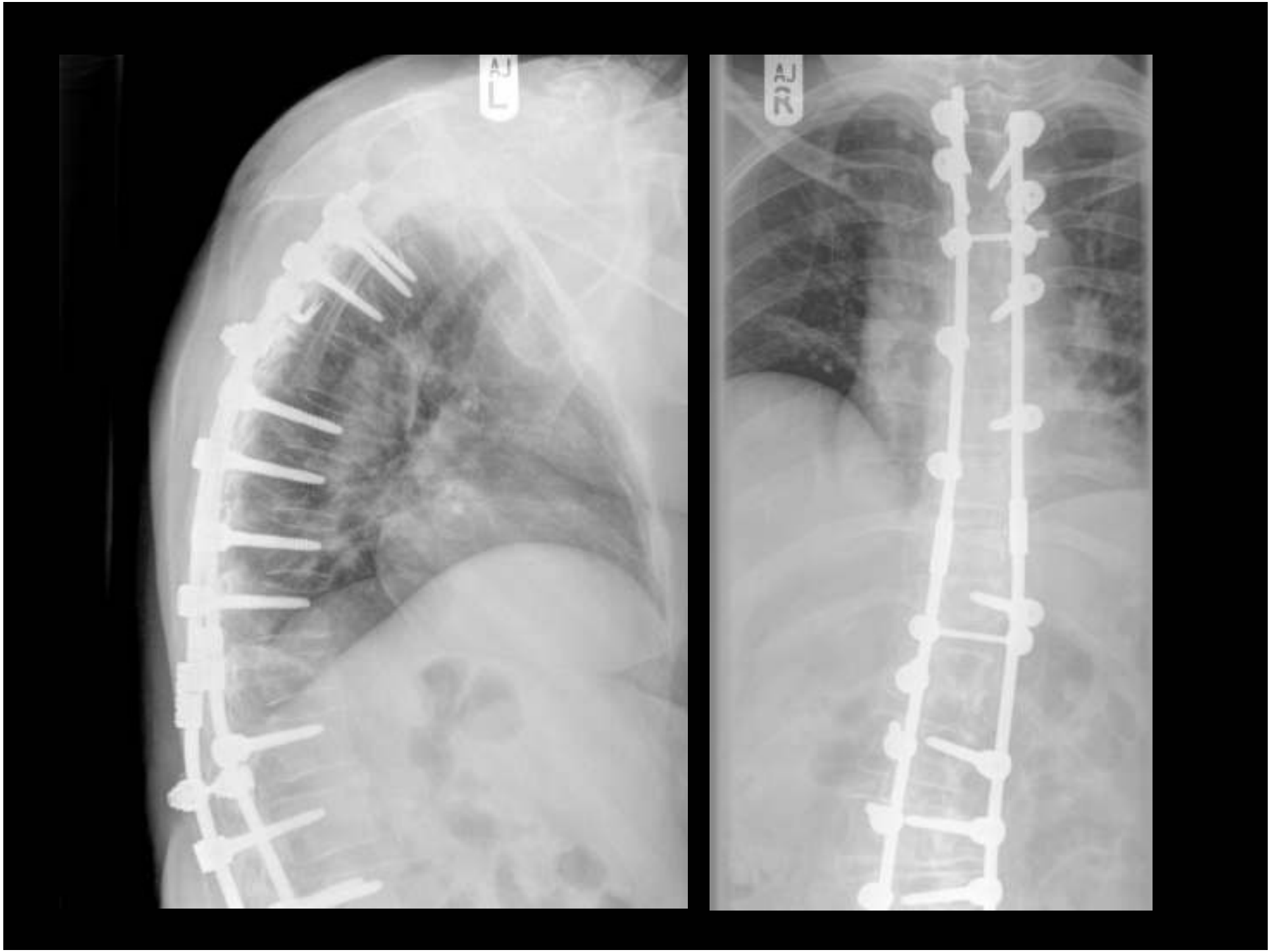

PA ERECT
RT

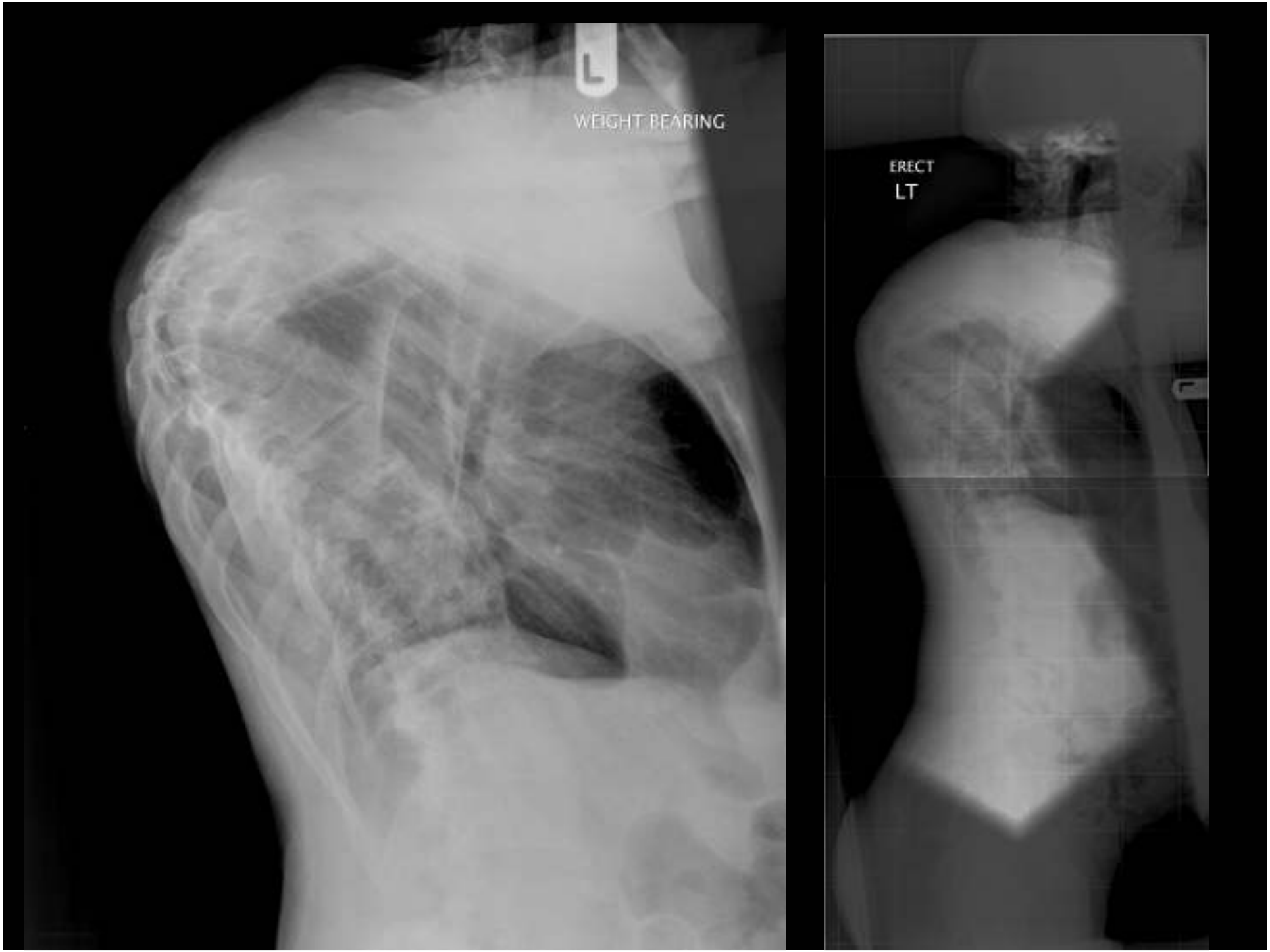

LT
ERECT
RT
PA ERECT

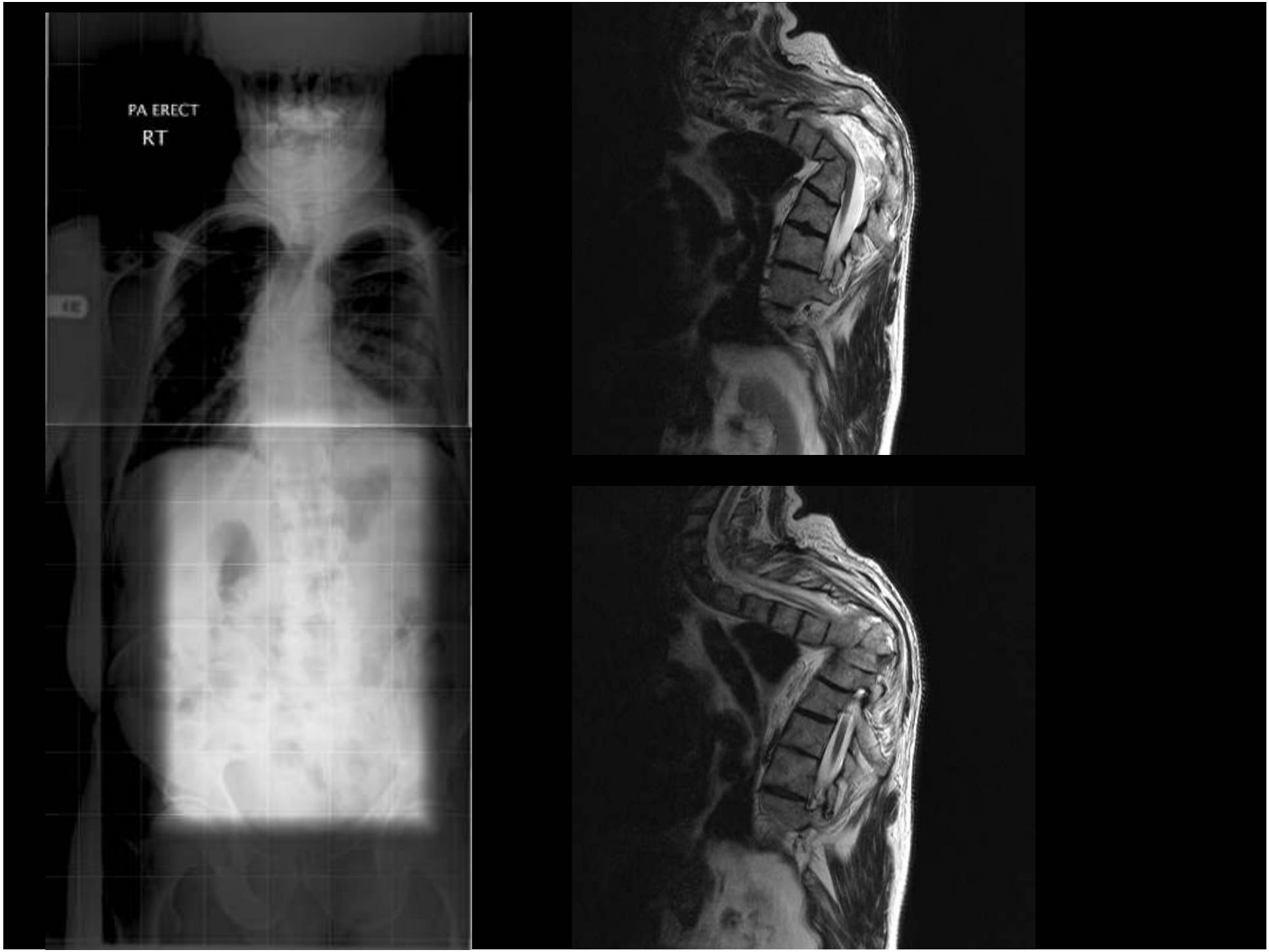

L
PA ERECT




ERECT
LT
PA ERECT
LT

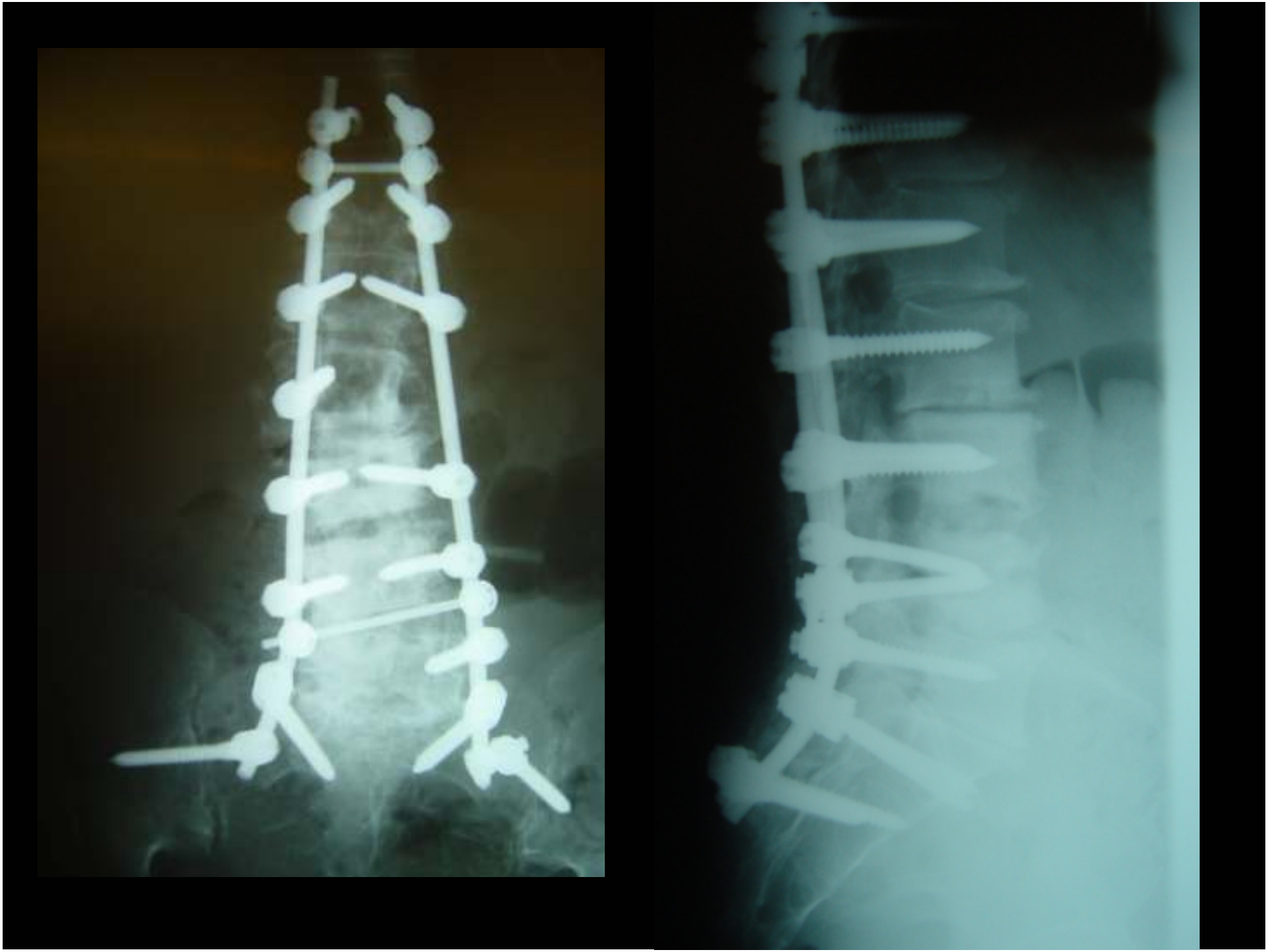


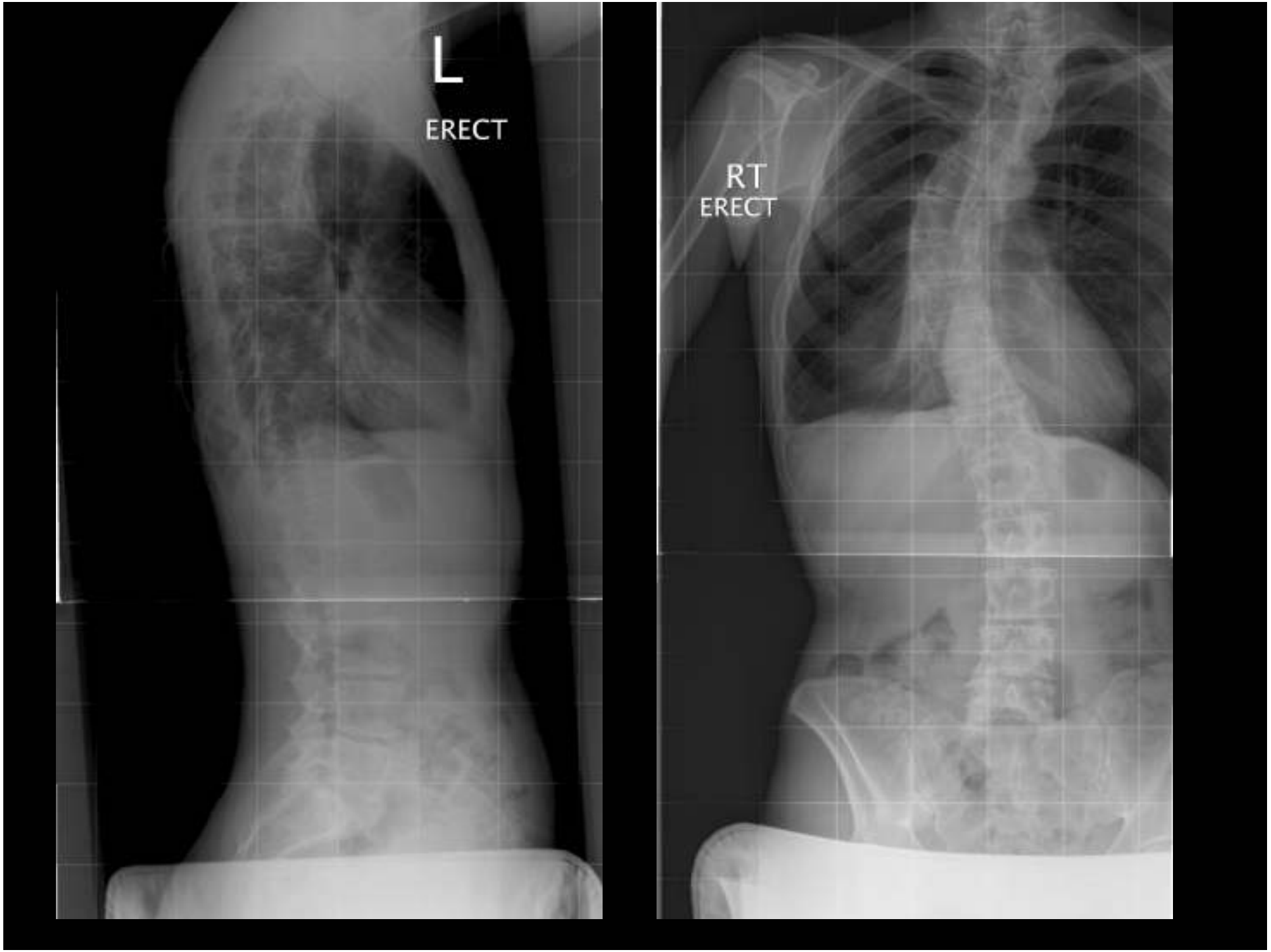

L
WEIGHT BEARING
ERECT
LT


PA ERECT
RT


ERECT
L
ERECT
L


Thank you




L
ERECT
RT
ERECT