

MIS Techniques Applied to Deformity:

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Spine Society**

Twin Cities Spine Center

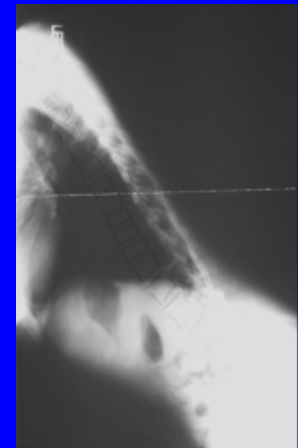
Minneapolis, MN

USA

FACTORS to CONSIDER: Pre-operative Surgical Planning

- **SURGICAL OBJECTIVES:**
 - **DEFORMITY CORRECTION**
 - Sagittal and coronal
 - **DECOMPRESSION NEEDS**
 - **BONE QUALITY**
 - **PATIENT COMORBIDITIES**
 - **FUSION TECHNIQUES**
 - Interbody, Facet, Posterolateral

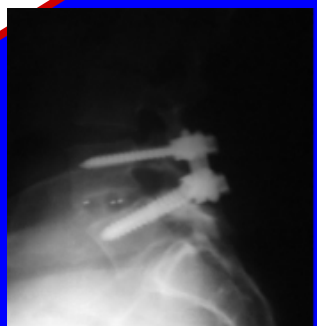
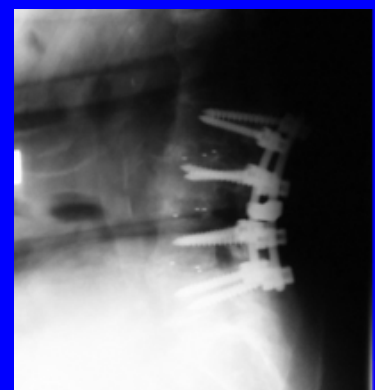
THE MIS TECHNIQUE FOLLOWS THE SEVERITY OF PATHOLOGY



TLIF and DLIF or OLIF with percutaneous screws



Trans
psoas



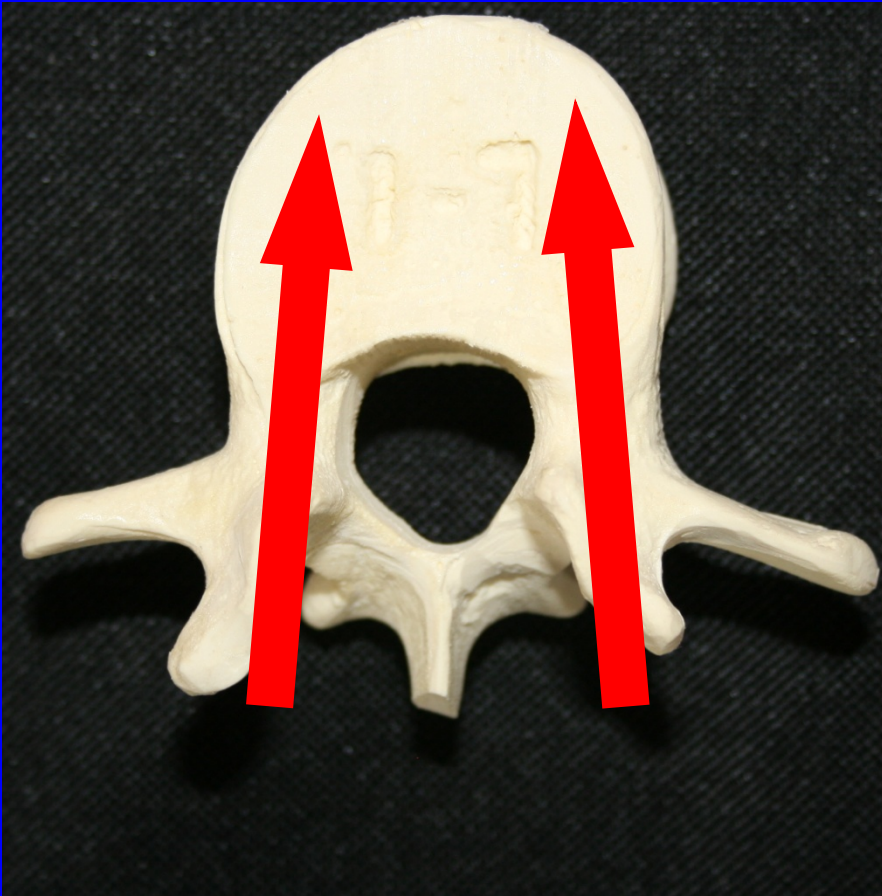
MIS TLIF

Pre-operative imaging

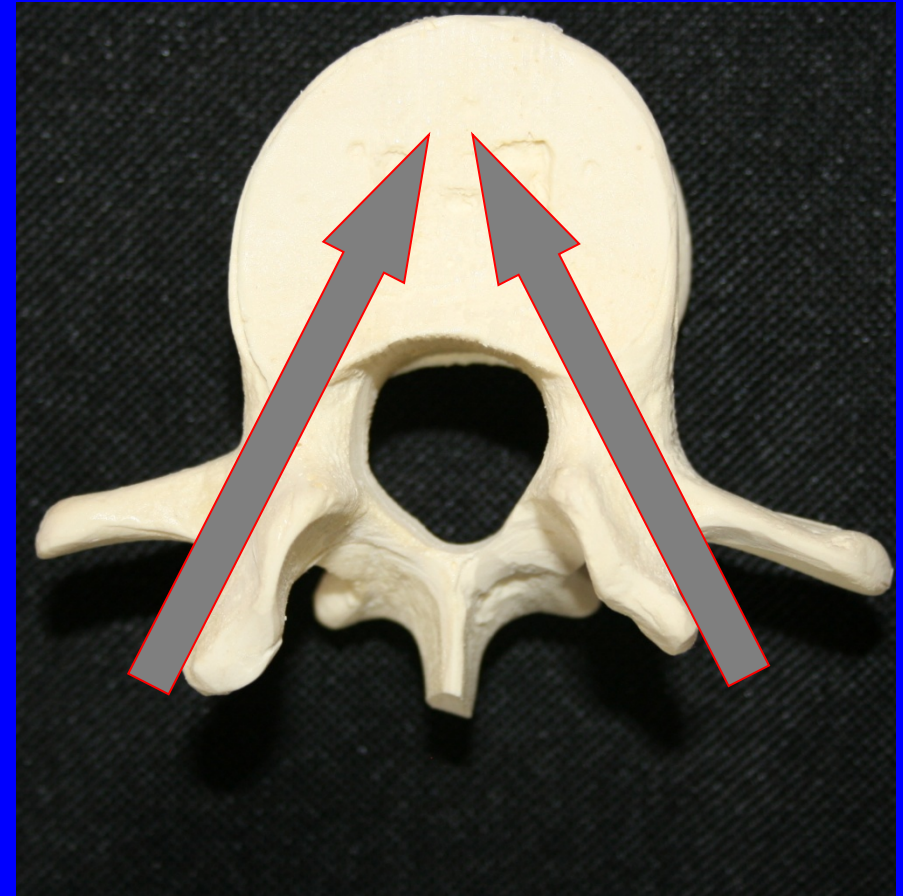
- Review plain radiographs and advanced imaging to determine the approximate diameter of the pedicle and lengths required
- Especially in the midthoracic and upper lumbar levels
- Advanced imaging (O-arm, robotics) maybe helpful if significant deformity or revision procedures

Screw Trajectory

Open



MIS

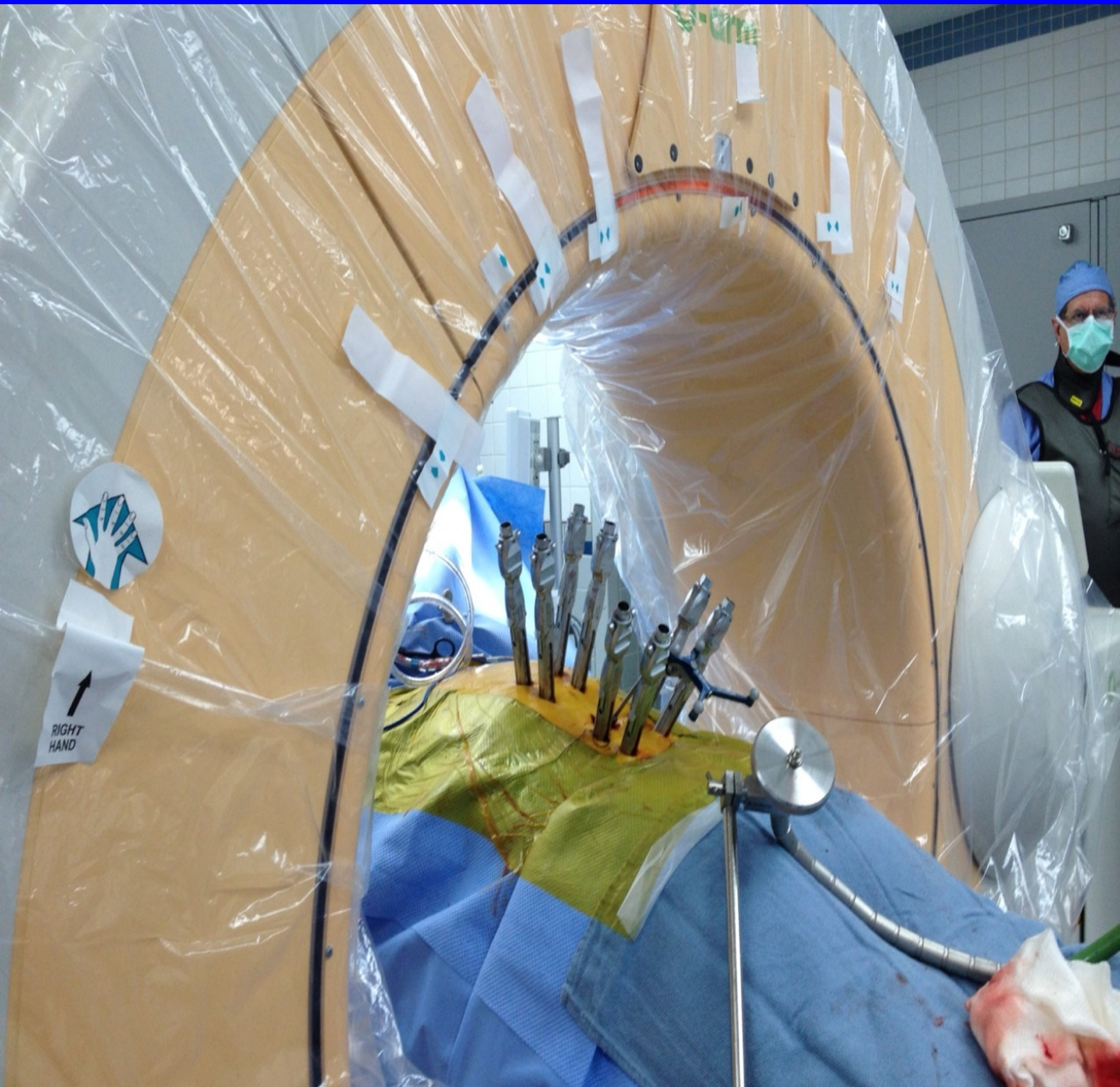


Percutaneous Screw Placement Advantages

- Improved pullout characteristics
- Screw-head more lateral avoiding boney obstacles (facet joint, SP)
 - ? Less adjacent segment disease
- Easier rod insertion

Methods to reduce Inter-operative X-ray exposure

- Always wear protective lead including thyroid shield
- Move as far away from the C-arm as possible
- No 'live' fluoroscopy
- Trust yourself!
- Advanced imaging
- Mini-open techniques. Combining direct visualization of screw starting point with perc. technique





Role of Interbody Techniques: TLIF and Transpsoas

- **Correction of coronal and sagittal balance**
- **Increased fusion rates**
- **Less pedicle screw failure**
 - **Load sharing**

PREFERRED Trans-psoas APPLICATIONS

- **L4-5 and above**
- **Single and multiple level involved**
- **Deformity correction**
 - **Sagittal > 15 degrees per level**
 - **Coronal deformity**
- **Indirect decompression alone is acceptable**
- **Obesity where MIS-TLIF approach is >8cm depth**

Oblique Lateral OLIF

- **Can be used at all levels lumbar spine**
- **No need for entry through the psoas**
 - **Less risk to the lumbar plexus**
- **In many cases spine surgeons still use vascular surgeon exposure**
- **Remains difficult at L5-S1**

PREFERRED MIS TLIF APPLICATIONS

- END OF LONG SEGMENT POSTERIOR FUSIONS
 - DESIRE INTERBODY FUSION WHERE HIGH RISK PSEUDOARTHROSIS LEVELS
 - LUMBOSACRAL JUNCTION----- L4-5-S1
- SEVERE STENOSIS REQUIRING FORMAL DECOMPRESSION
- MODERATE LOCAL SAGITAL DEFORMITY CORRECTION
 - LESS THAN 10 DEGREES SAGITAL CORRECTION PER LEVEL.

Pre-op Planning

- **Left or right side approach?**
 - In most cases it doesn't matter
 - Go in on side that appears easiest to access on x-rays (e.g., due to crest, ribs, collapse, etc.)
 - Correction can be equally good from either side; consider ease of access
 - Surgeon comfort
 - approaching from the convex side will make disc localization easier but may make L4-5 problematic



Hybrid Construct for Deformity

- 64 yo with mild scoliosis
 - chronic renal failure, DM, CHF, heart dz, COPD.
 - LBP and LE pain due to foraminal stenosis

TCSCXG5000

TWIN CITIES SPINE CENTER

Ex:

252@95

Se: 1009/2

Im: 1009/3

2008 Aug 14

Acq Tm: 11:51:55.250

CHEST



Lin:DCM / Lin:DCM / Id:ID
W:2495 L:1392

SIZES ARE APPROXIMATE

TCSCXG5000

TWIN_CITIES.SPINE_CENTER

Ex:

Se: 1001/2

Im: 1001/3

JH

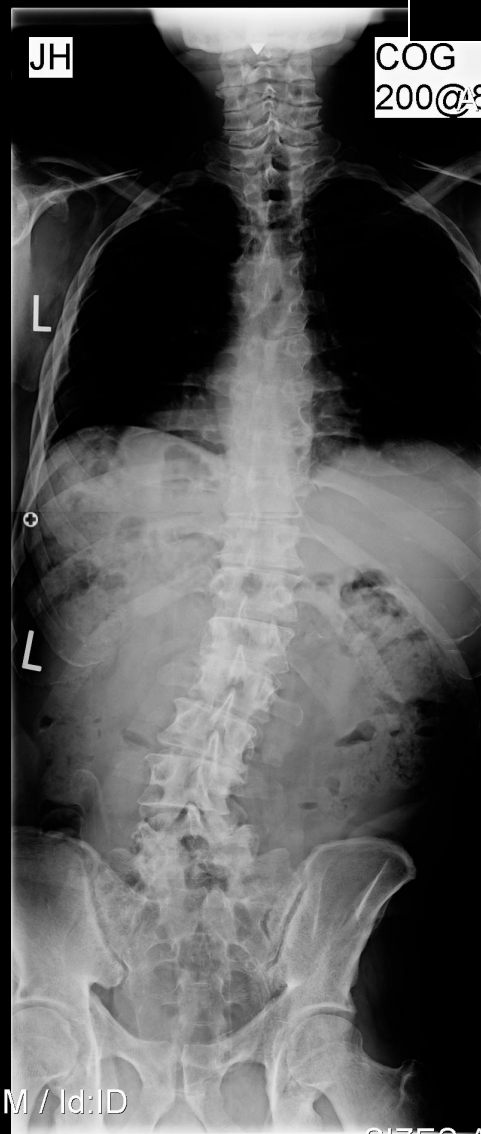
COG

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CHEST



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TCSCXG5000

TWIN CITIES SPINE CENTER

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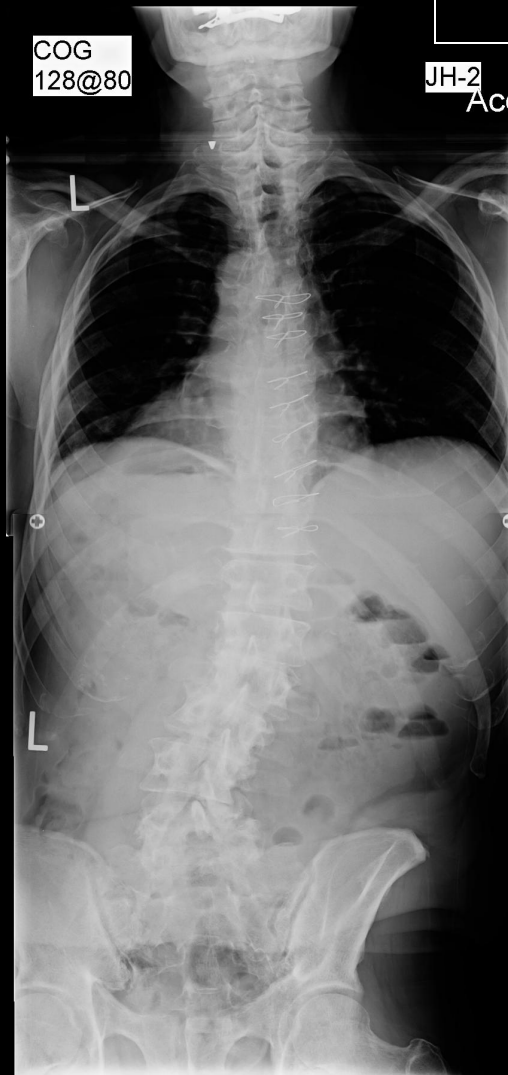
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JH-2

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CHEST



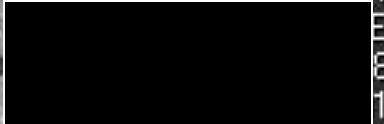
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SIZES ARE APPROXIMATE

1.5T MRC14009
Ex: 326
Sag T2 Tse 4MM
Se: 2/6
Im: 9/17
Sag: L6.8 (COI)

Sr
COI Mid SLP MR 1



2011 Oct 04
Acq Tm: 09:44:02.167483

384 x 346
LUMBAR

As

Pr

ET: 15
TR: 3880.0
TE: 105.0

4.0thk/1.0sp
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W:514 L:178

Is

DFD: 28.0 x 28.0cm



1.5T MRC14009

A_i

C01 MN SLR MB 1

Ex: 326

Ax T2 rst 4MM

Se: 5/6

Im: 10/28

Ax: 126.1 (COI)

2011 Oct 04

Acq Tm: 10:03:58.452485

320 x 288

LUMBAR



ET: 15

TR: 3300.0

TE: 112.0

4.0cm/11.0sp

Id:DCM / Lin:DCM / Id:ID

W:626 L:329

P_i

DFOV: 22.0 x 22.0cm

Surgical Plan

- DLIF L2-3, L3-4 and possible L4-5
- TLIF L4-5 and L5-S1
- Percutaneous Pedicle screw placement L1-S1
- Decompression L3-S1
- Facet (Posterior) fusion L1-S1

TCSCXG5000

TWIN CITIES SPINE CENTER

Ex:

Se: 1001/2

Im: 1001/3

CHEST



E
8
3
160@80
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2012 Apr 12
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SIZES ARE APPROXIMATE

TCSCXG5000

Ex:

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Im: 1009/3

CHEST

128@90=3

TWIN CITIES SPINE CENTER

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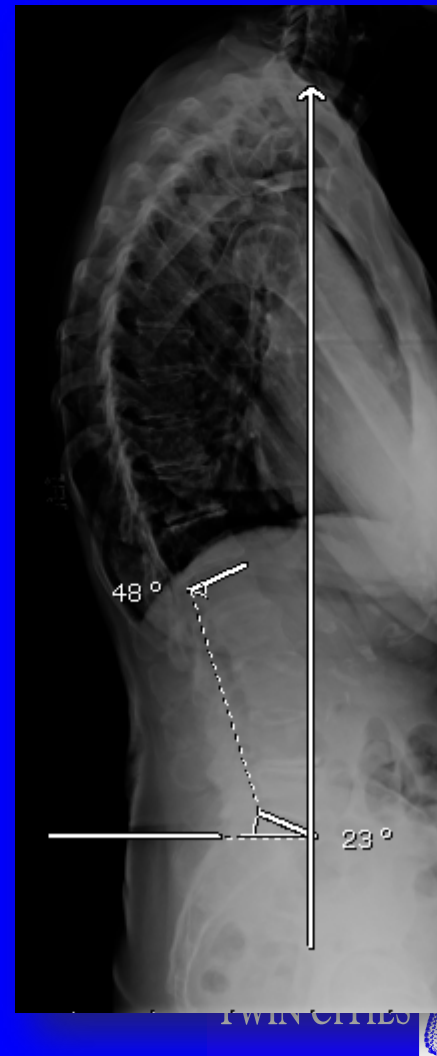
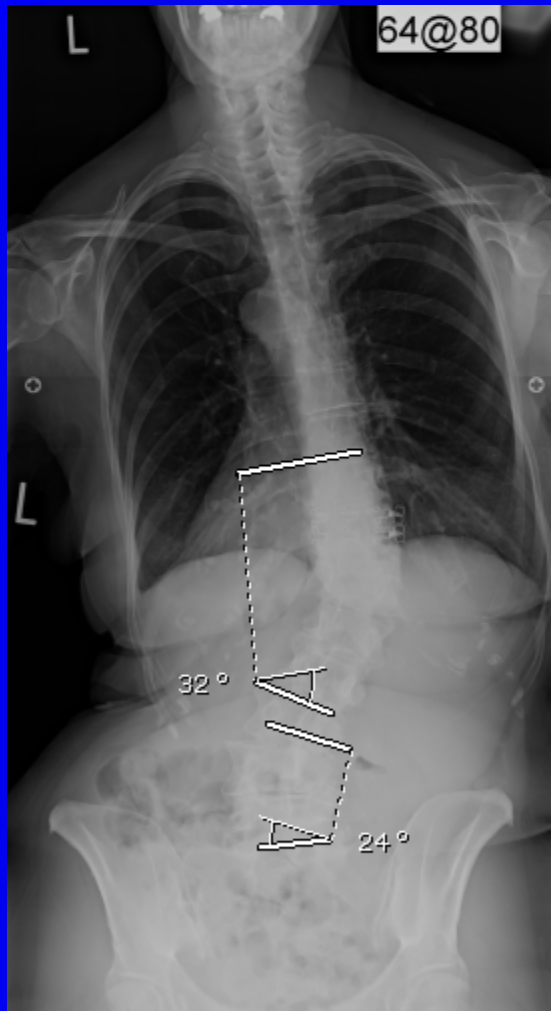
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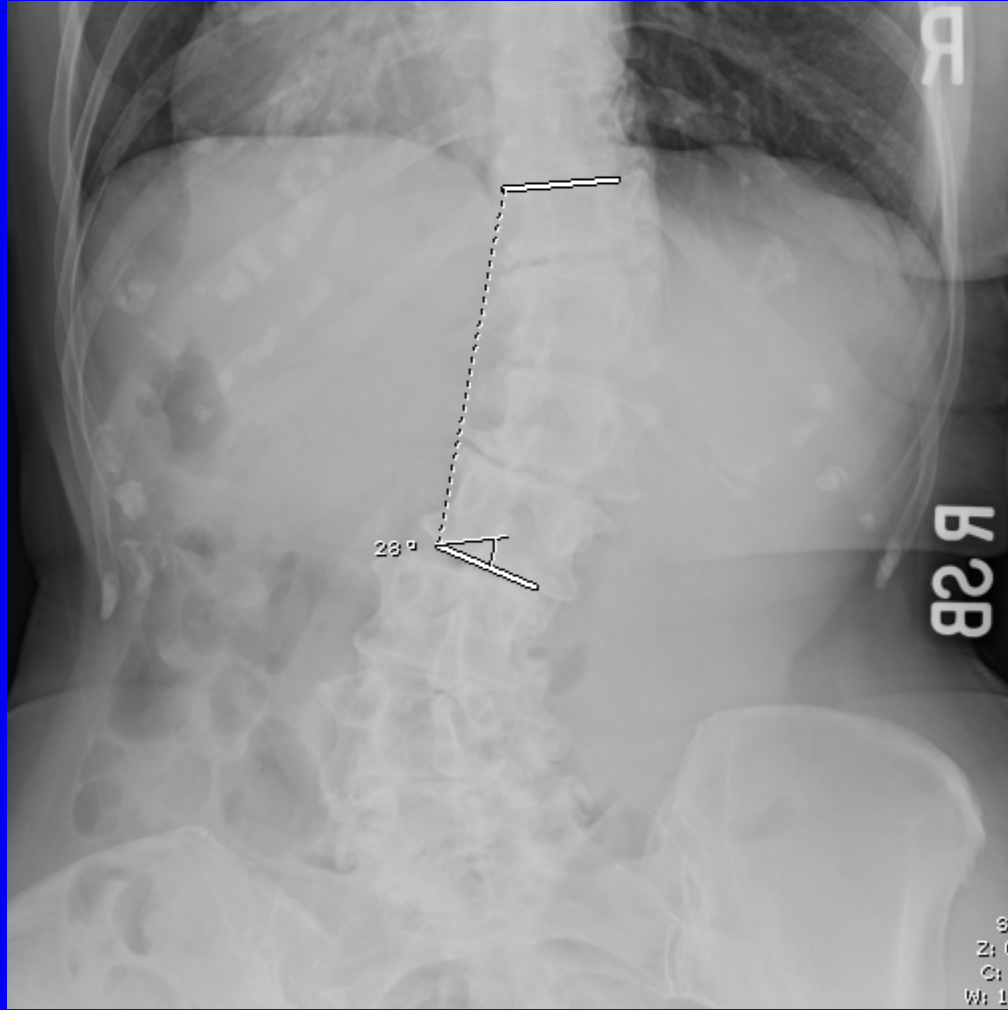




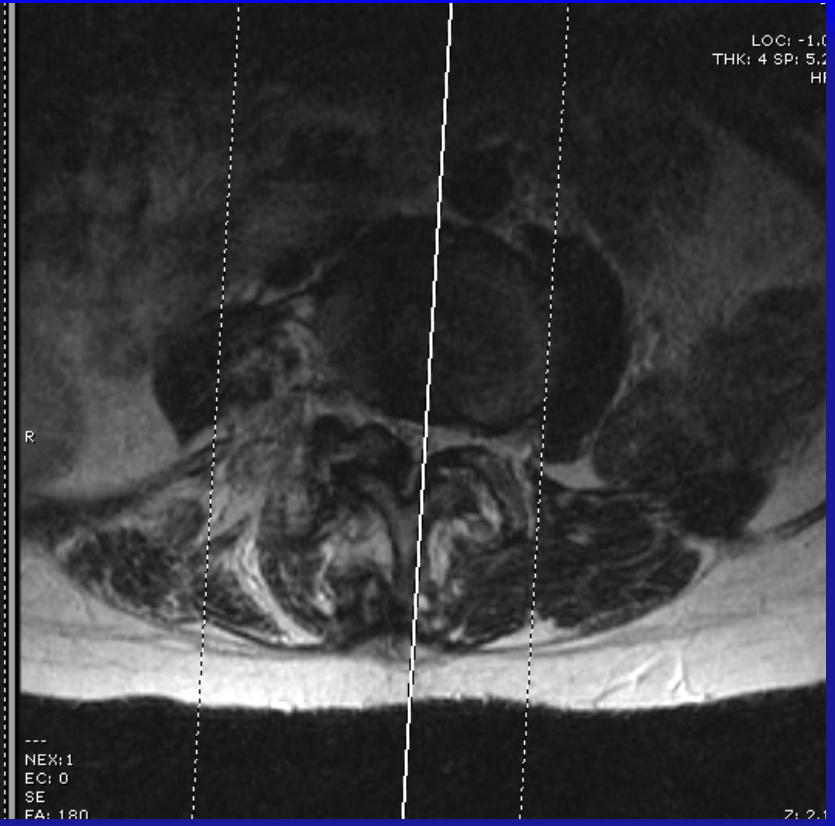
68 yo healthy female

- Progressive deformity
- Worsening psuedoclaudication symptoms



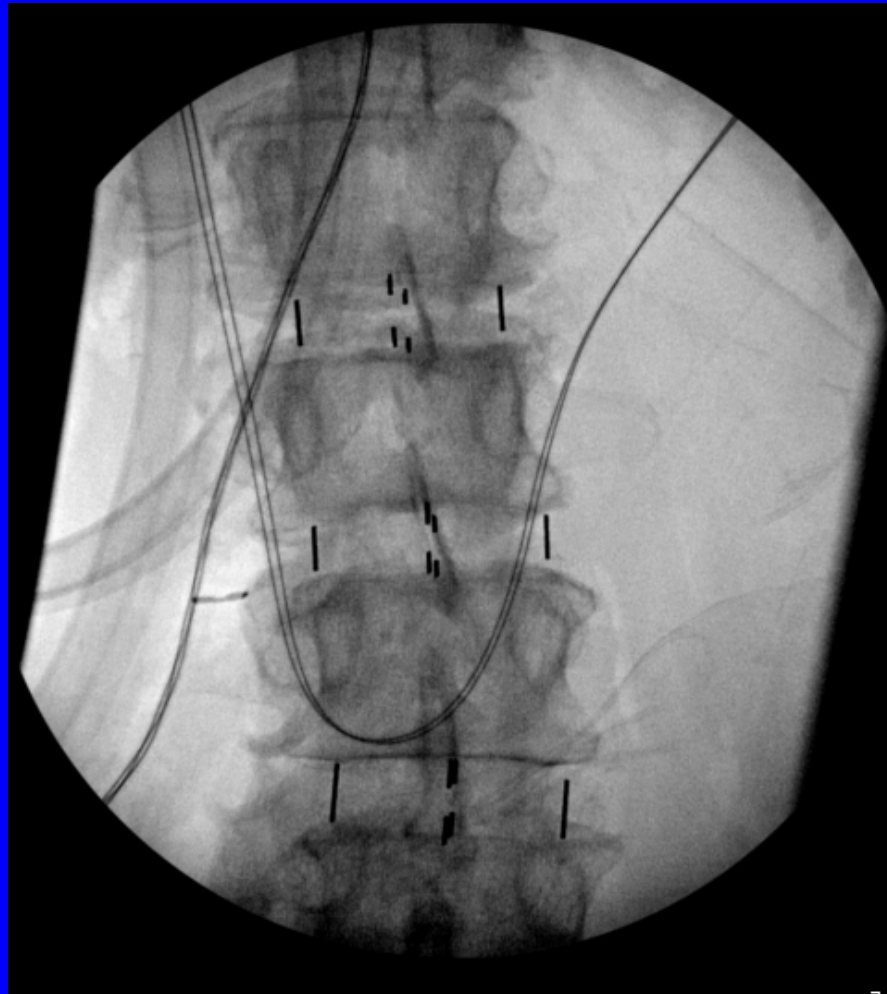


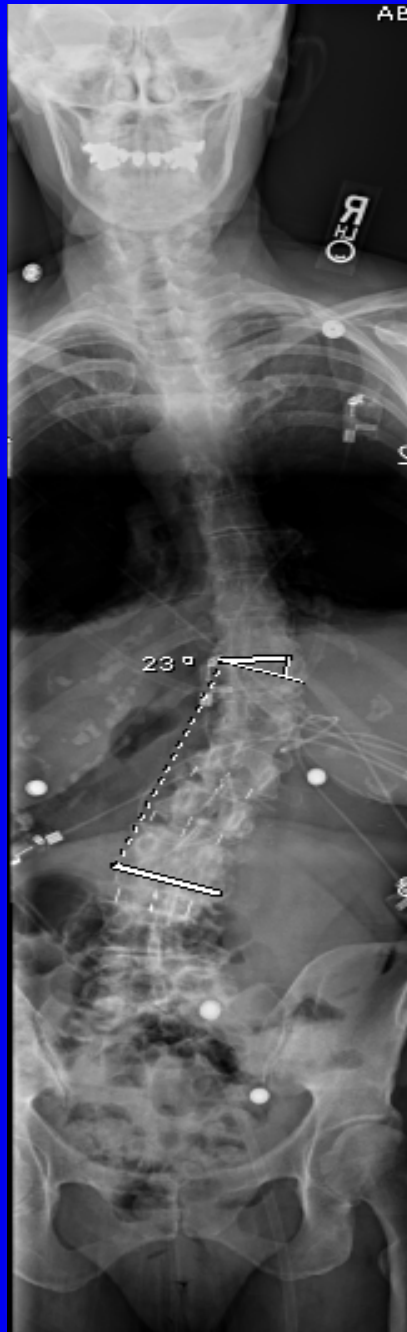
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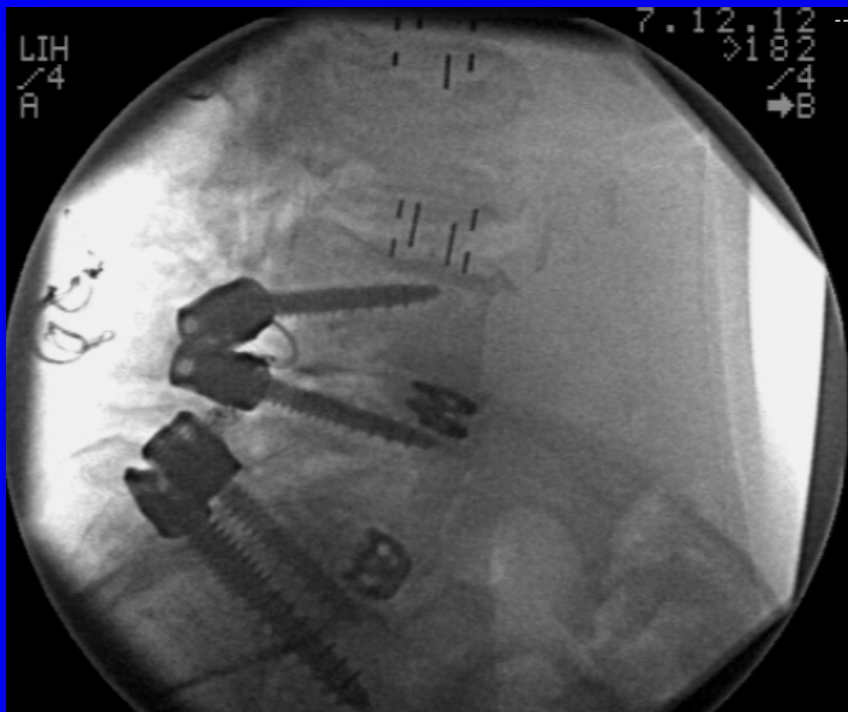
Surgical Plan

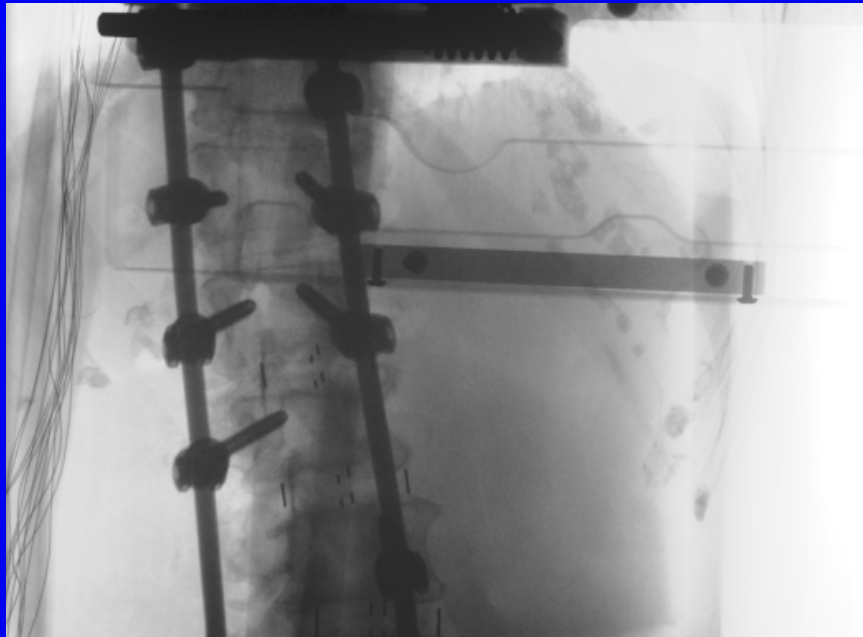
- **Stage 1**
 - Lateral transpsoas approach L1-2, 2-3, 3-4
- **Stage 2**
 - TLIF L4-5, L5-S1
 - Perc screws

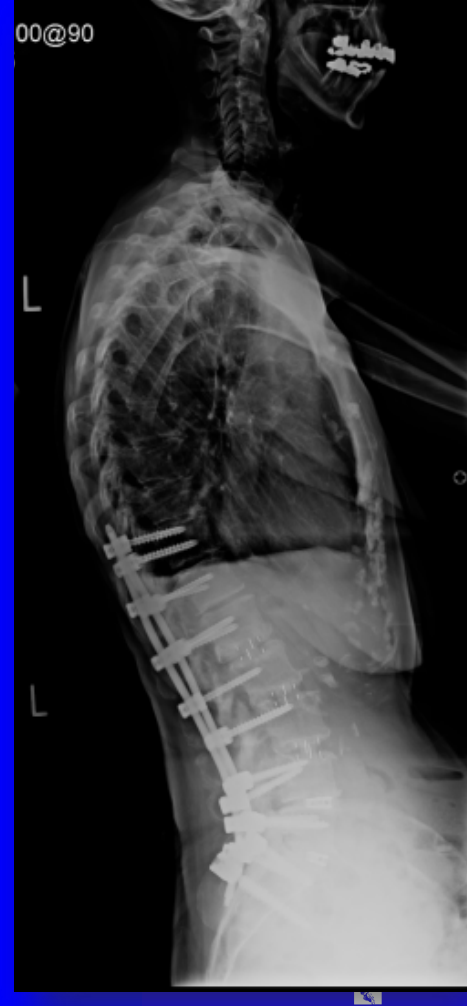
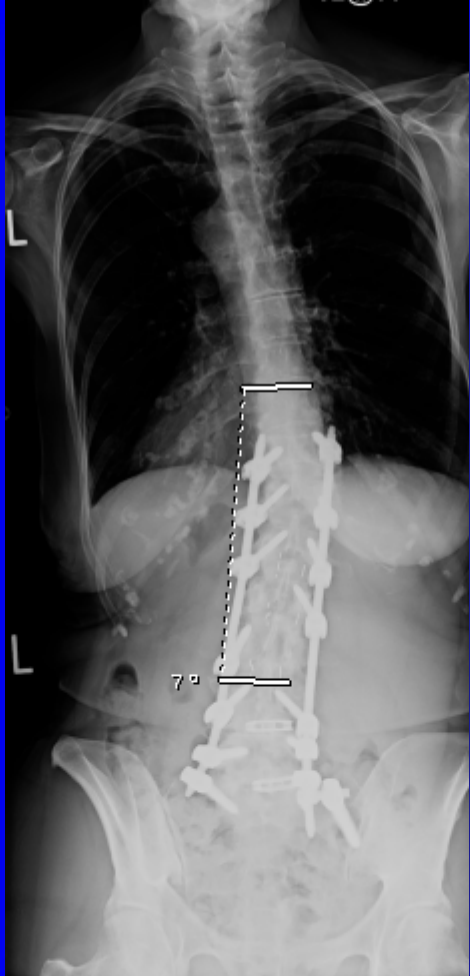




4 weeks later







CONCLUSIONS

- **Current technique (Hybrid Construct)**
 - DLIF L3-4 and above where formal decompression is not required
 - MIS TLIF at L4-5 and L5-S1
- **Tubular retractor facet joint fusion at all levels of the construct**
- **Segmental percutaneous pedicle screw construct**
- **+/- iliac fixation**
- **Same day when patient is healthy**

Thank You