

# Interbody in Deformity

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*Deer Valley, Utah*

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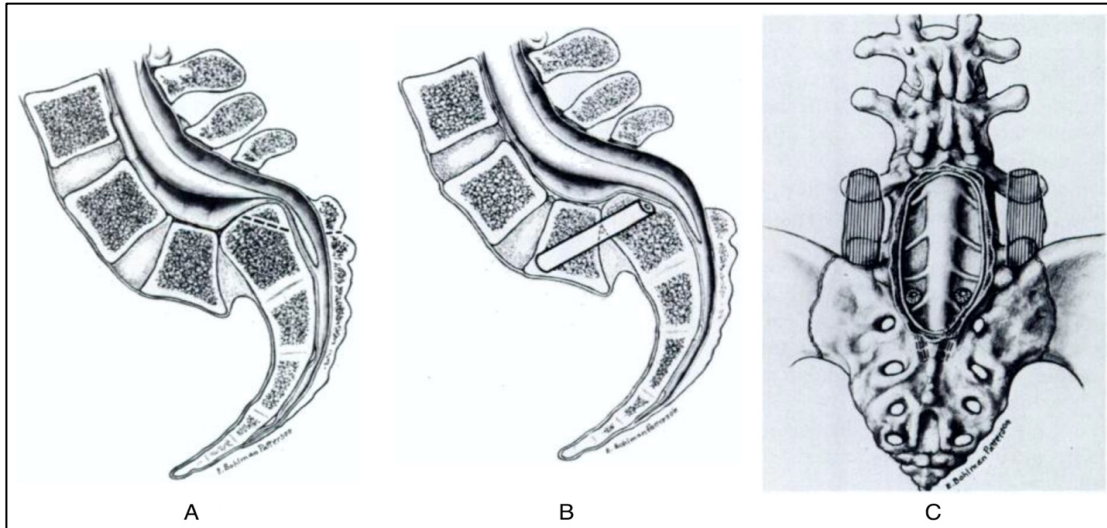
GEORGETOWN UNIVERSITY  
School of Medicine



# Overview

## Main Rational

1. Enhances Fusion Rate and Success
2. Protects distal fixation

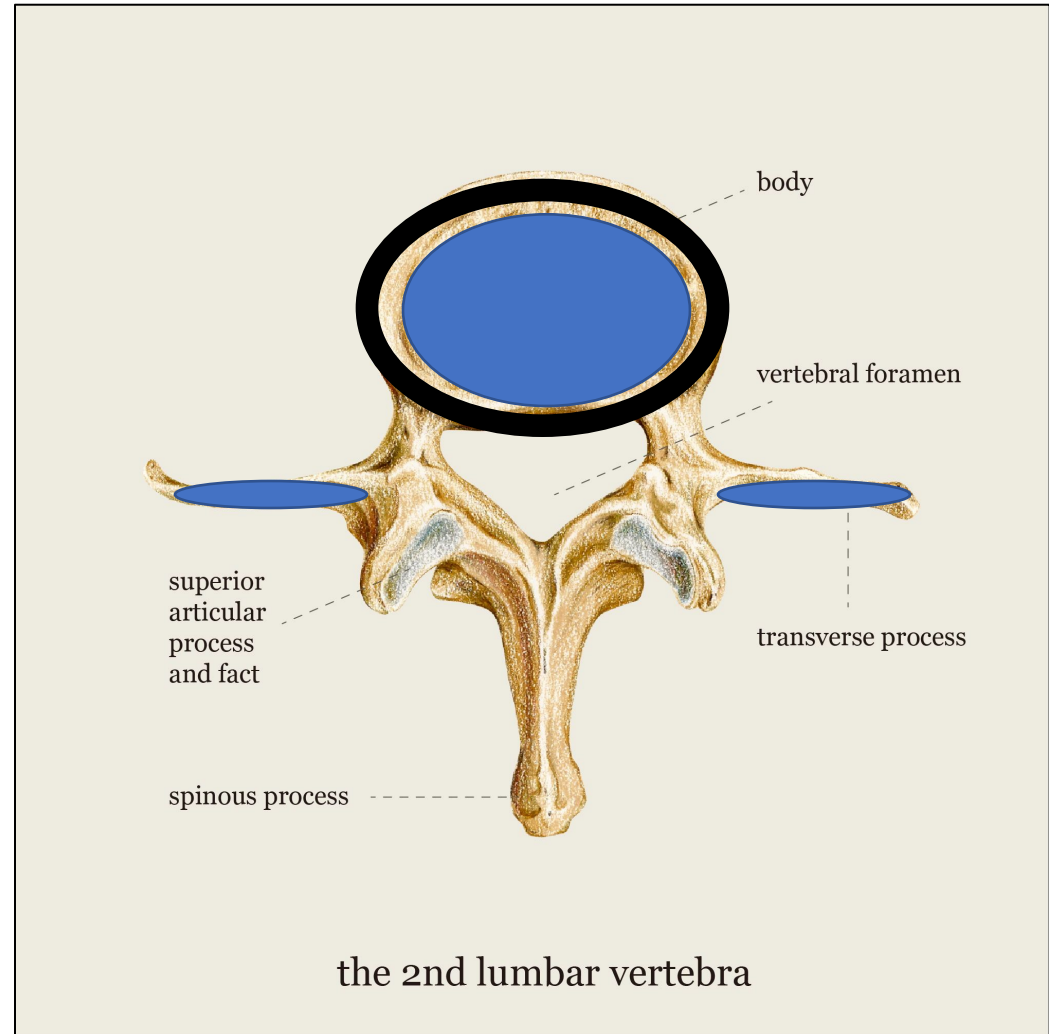


## Other Important Factors

1. Sagittal Plane Correction:
2. Coronal Plane Correction
3. Foraminal Opening/Indirect decompression
4. Considered part of "full" lumbopelvic fixation
5. Implant materials

# General Principles of Interbody for Fusion Success

- Greater surface area
- More osteoprogenitor cells
- Graft loaded in compression
  - Wolff's law
- Structural
  - Apophyseal ring
  - Deformity correction
- On-label BMP



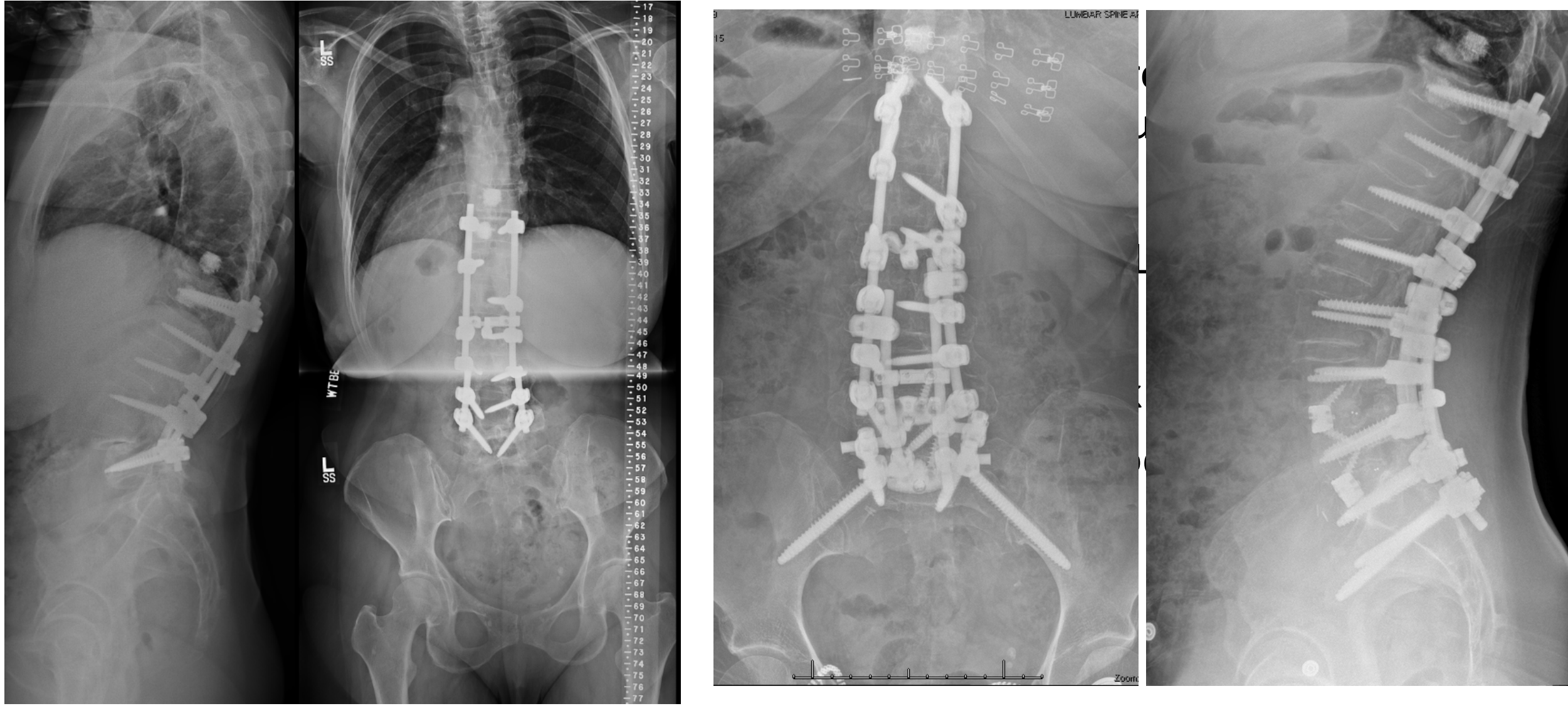
# Protect Distal Fixation

- Blocks Flexion, Lateral Bending, and Rotation Moments
- More Levels the better
- 66 yo Female
  - Plowed L5, 3 mos post-op
  - Lost correction, miserable



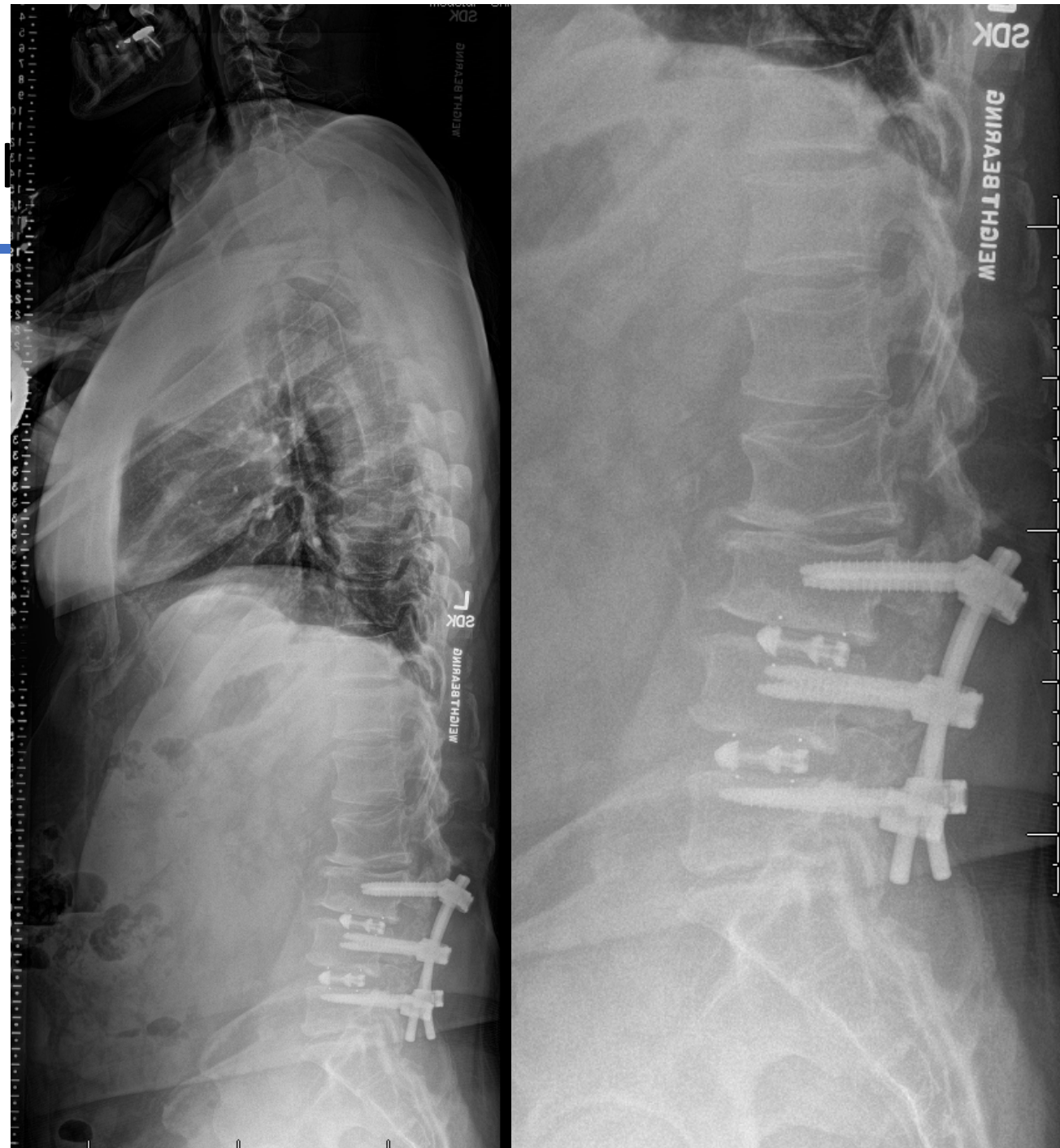


# Protect Distal Fixation



# Sagittal Plan

- Lordotic and hyperlordotic cages are powerful
  - Up to 30 degrees
  - Customizable with Additive manufacturing
  - ALL resection is key
  - Bump
- L5/S1 gives you greatest corrective capacity
- Instead of PSO?





# Retrospective Comparative Study *OLIF vs PSO in Deformity*

- Neurologic Injury
  - 64 patients: 32/group
  - 2.94% vs 14.7% (PSO)  $p=.026$
  - All injuries resolved in OLIF
  - All injuries were permanent in PSO
  - More SCM events in PSO (2.9% vs 8.8%)
- Blood Loss
  - PSO 3x greater ( $p=.001$ )



# Indirect Decompression

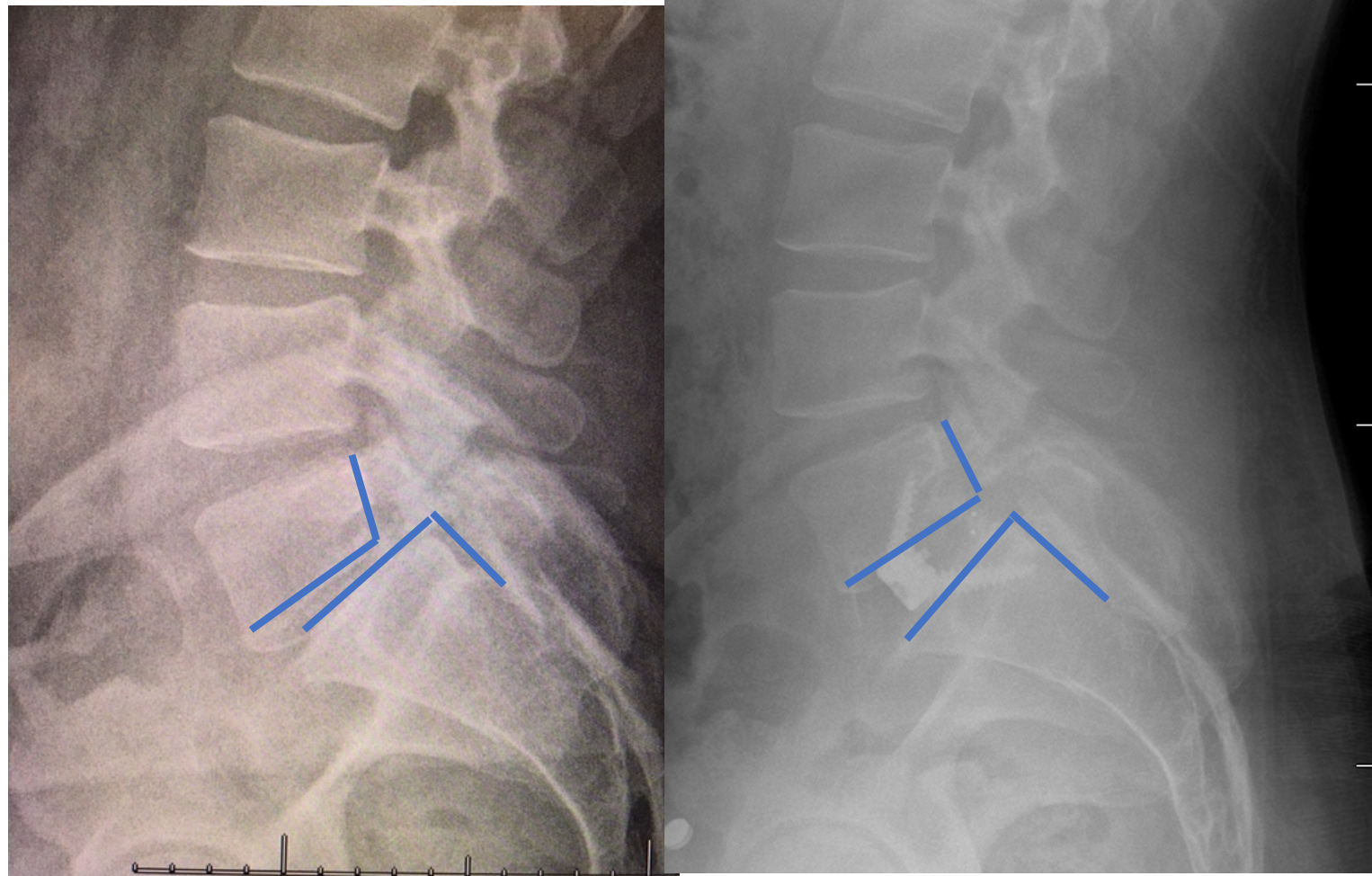
- Foraminal stenosis at lumbosacral junction



# ALIF for Indirect Decompression

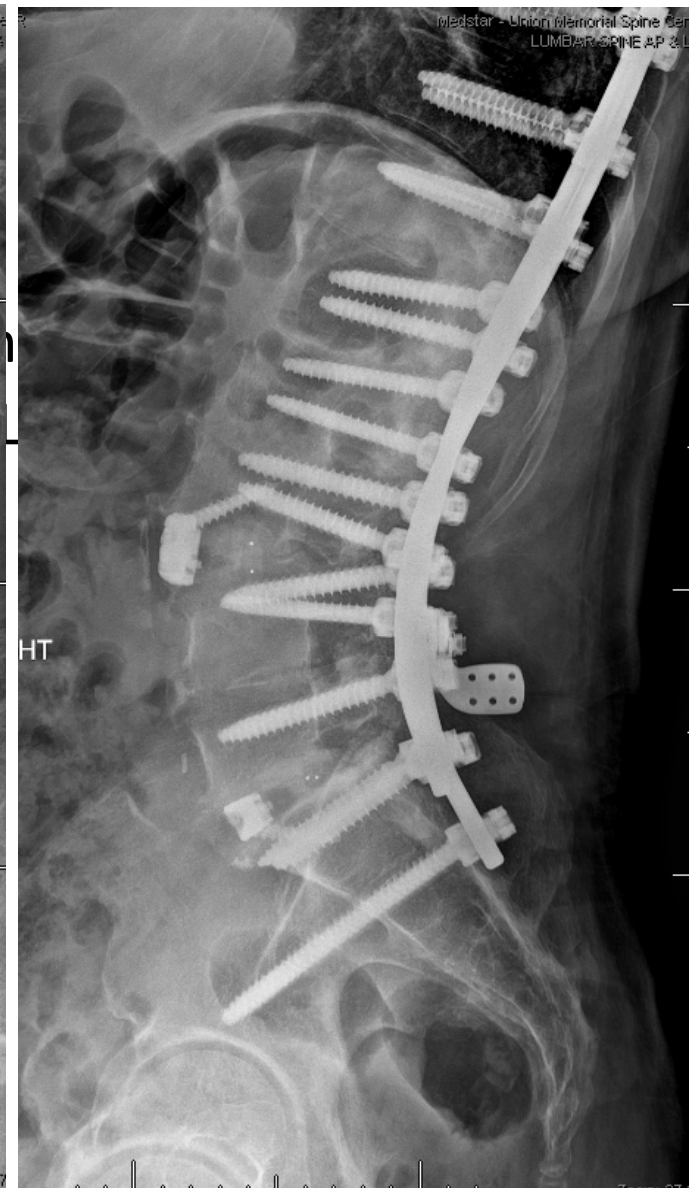
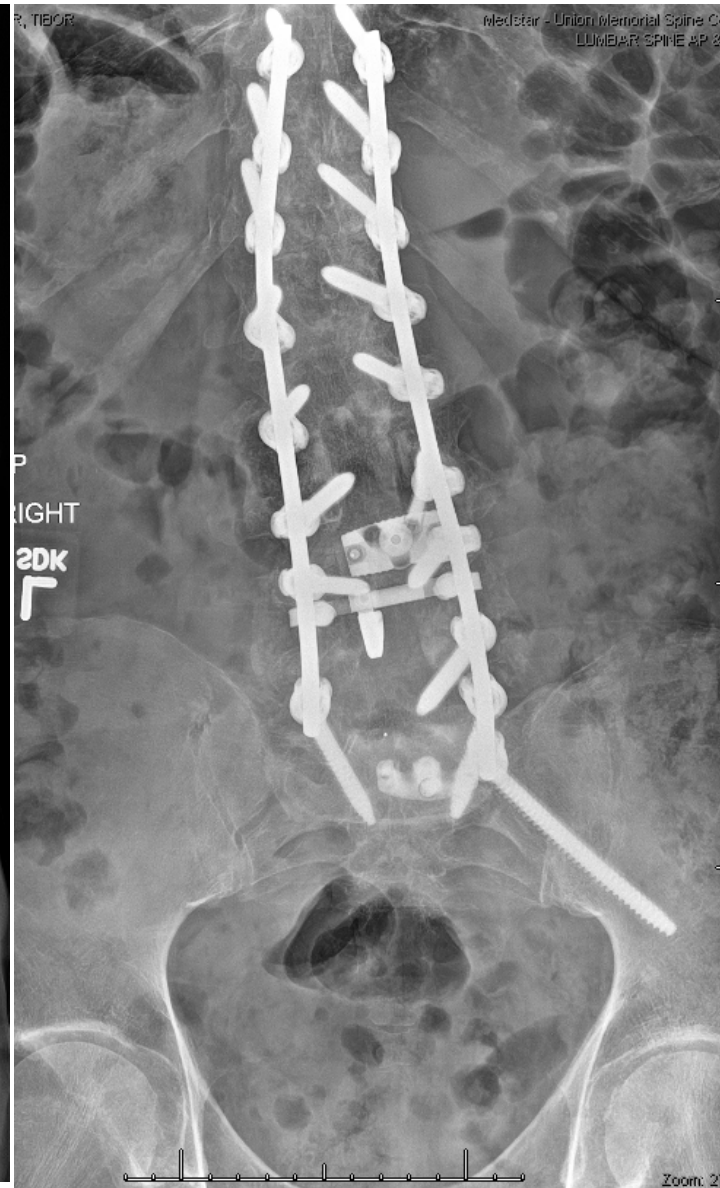
## Lytic Spondylolisthesis

- Increase in foraminal volume
  - Reduction of slip (A-P)
  - Increased interbody ht (Cr-Ca)
- Park interbody deep
- Radical discectomy
- Stand alone
  - Compliant patient





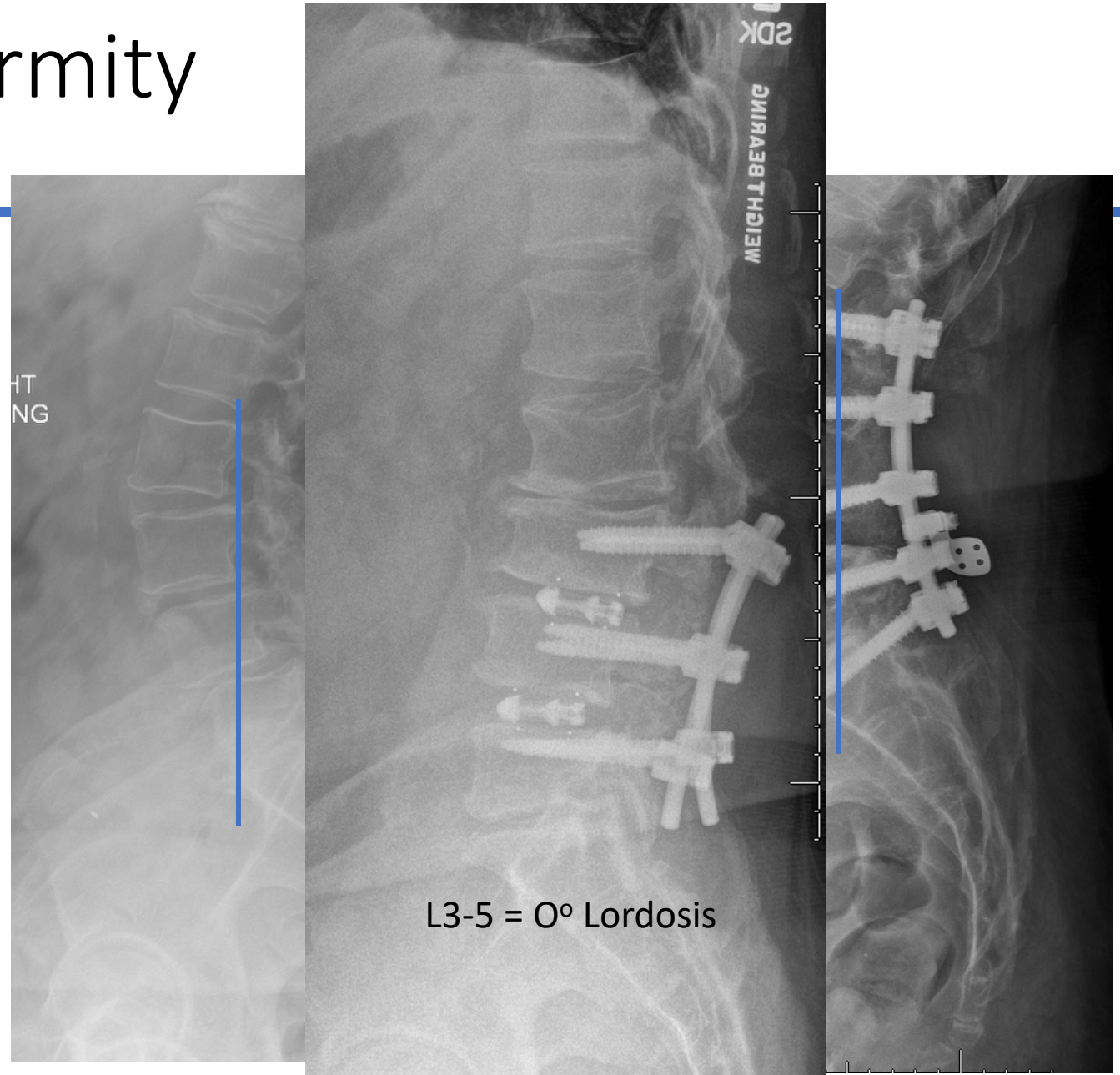
# Coronal Plane Correction





# TLIF for Deformity

- Less powerful than ALIF
- Careful case selection  
challenging decisions
- With ALIF, I'm pretty confident
- With TLIF, less predictable.
- Distractable TLIF is fools gold.



# Obvious advantages

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- “Posterior Only”
  - Surgical time
  - Blood loss
  - Cosmesis
  - Consent time
- Excellent fusion rates for degen. Cases
- Translation, kyphotic, and scoliotic deformities treatable

# Best Evidence

## Transforaminal *Versus* Anterior Lumbar Interbody Fusion in Long Deformity Constructs

*Dorward IG, Lenke LG, Bridwell KH, et al Spine 2013*

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- Matched Cohort Analysis
  - 42 ALIF vs 42 TLIF
  - Age
  - Curve Mag
  - Sex
  - Comorbidities
  - Fusion Length
  - Level for interbody

# Best Evidence

## Transforaminal *Versus* Anterior Lumbar Interbody Fusion in Long Deformity Constructs

*Dorward IG, Lenke LG, Bridwell KH, et al Spine 2013*

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- TLIF
  - 1.5 hour shorter OR
  - Greater blood loss (2L vs 1.2L)
  - Better reduction of coronal cobb
- ALIF
  - Started with Lower SRS scores but had greater improvement (?worse sag plane imbalance)
  - More lordosis

No Differences:	Neurologic complications (TLIF 4/42 vs ALIF 3/42) Pseudarthrosis (0/42 TLIF, 1/42 ALIF)
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# Best Evidence

## Transforaminal Lumbar Interbody Fusion With rhBMP-2 in Spinal Deformity, Spondylolisthesis, and Degenerative Disease-Part 1

*Crandall DG, Revella J, Patterson J, et al Spine 2013*

- 123 Consecutive Deformity Pts (of 509)
- Avg 5 year f/u
- Plain radiographic assessments
- ODI, VAS

### Results:

- 4% pseudo (5/123) at TLIF levels
- 2.4% pseudo (3/123) at non-TLIF levels
- Idiopathics: Less pain and higher function pre-op vs degen scoli
- AIS: VAS 5.2 -> 1.9; ODI 37.5 -> 20
- DS: VAS 5.67 -> 3.2; ODI 48.4 -> 28.4

# Best Evidence

Transforaminal Lumbar Interbody Fusion With rhBMP-2 in Spinal Deformity, Spondylolisthesis, and Degenerative Disease-Part 2

*BMP Dosage-Related Complications and Long-term Outcomes*

*Crandall DG, Revella J, Patterson J, et al Spine 2013*

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<u>At Avg 5 yr f/u:</u>	<u>Prevalence</u>
• Pseudo:	8/872 discs (.92%)
• Seroma/radiculopathy	2/509 (.4%)
• Ectopic bone	3/509 (.59%)

\*\* Rec: 4mg/disc because no BMP-related comps



# Best Evidence

Transforaminal Lumbar Interbody Fusion *Versus* Anterior Lumbar Interbody Fusion as an Adjunct to Posterior Instrumented Correction of Degenerative Lumbar Scoliosis

*Crandall DG and Revella J. Spine 2009*

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- 40 consecutive
- Avg 7 levels
- 20 TLIF, 20 ALIF
- Avg 3 years
- ODI, VAS
- CT at 1 yr
- Non-randomized, non-matched
  - ALIF had worse deformity
  - ALIF had anterior osteophytes
  - Less lordosis

# Best Evidence

Transforaminal Lumbar Interbody Fusion *Versus* Anterior Lumbar Interbody Fusion as an Adjunct to Posterior Instrumented Correction of Degenerative Lumbar Scoliosis  
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## TLIF Group

- 2/20 pseudo
- 5/20 adj problems
- 2/20 revision

## ALIF Group

- 4/20 pseudo
- 10/20 adj problems
- 8/20 revision

No Differences:

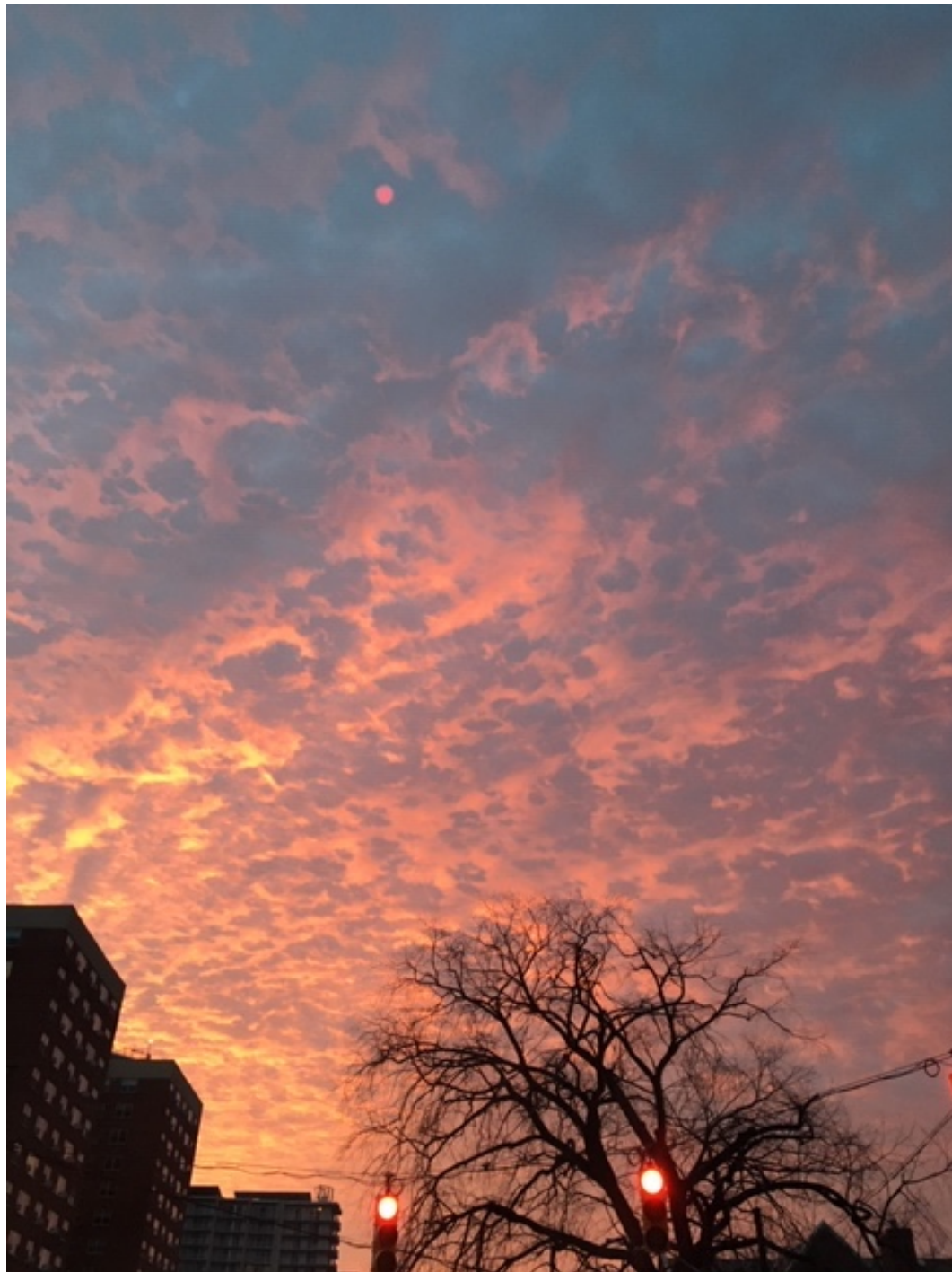
Clinical Outcome  
Deformity Correction

# TLIF Pearls

- Use monitoring
- Distract contralateral disc space
- Perform complete facetectomy:  
Pedicle to pedicle
- Gradual distraction
- Kerosin to increase window size
- Protect exiting and traversing nerve roots



THANK



YOU

# Lateral Interbody for Deformity

- Image from Study