PRINCIPLES OF ADULT SPINE DEFORMITY

Indications and Goals of Surgery

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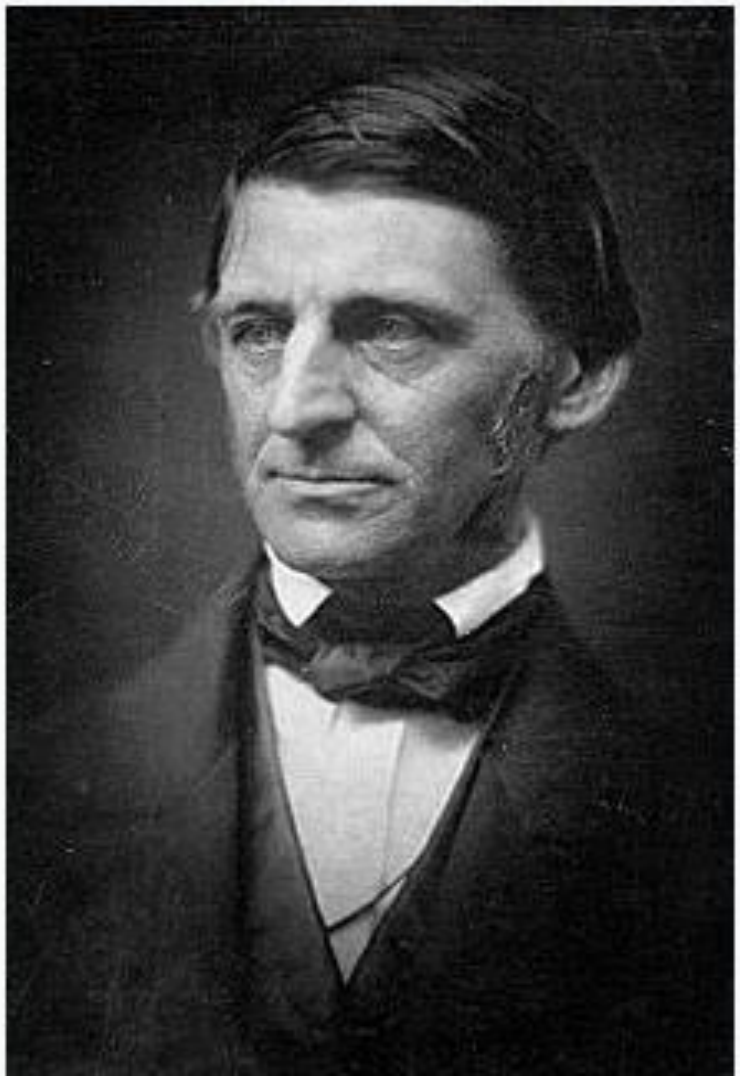
Principles vs Methods

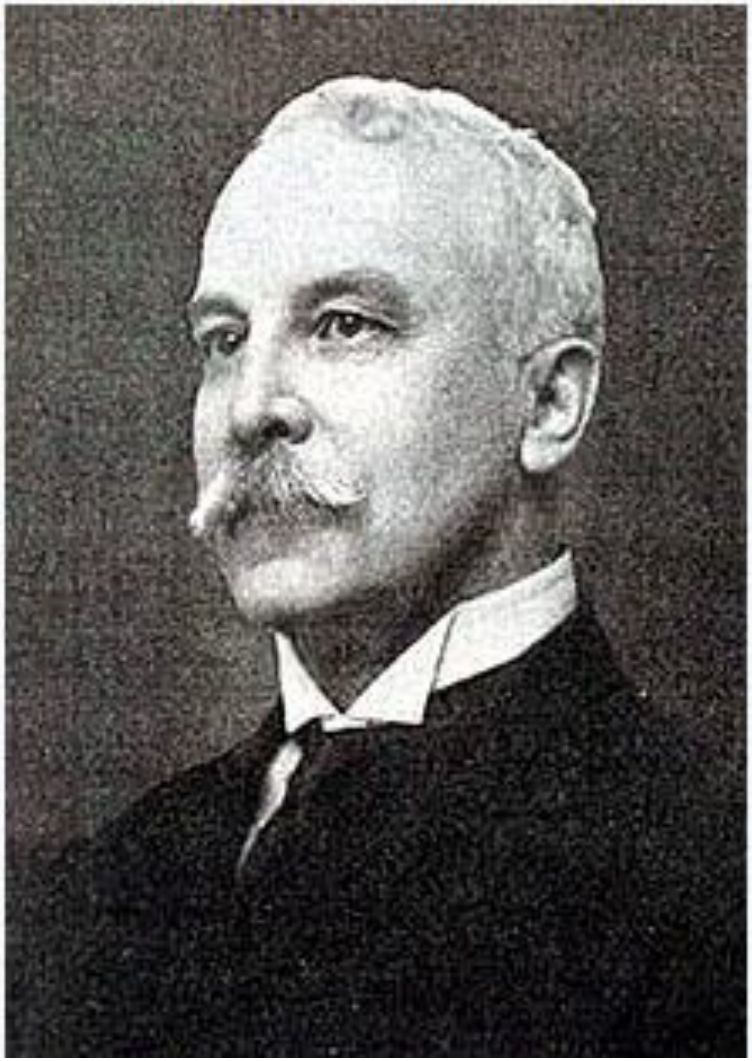
"The man who grasps principles can successfully select his own methods. The man who tries methods, ignoring principles, is sure to have trouble."

Emerson

Ralph Waldo Emerson



Harrington Emerson



SPINAL DEFORMITY IN THE ADULT

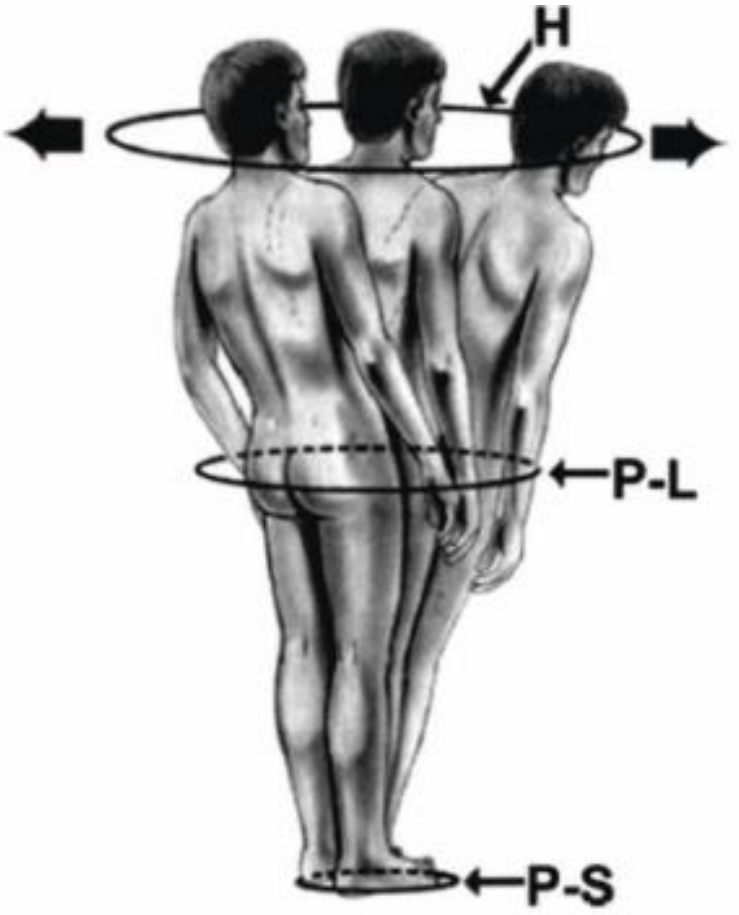
- Increasingly common disorder
- Significant and measurable impact on HRQL
- Surgical treatment still complex with significant risk of complications

ASD – DEFINITION

- Malalignment of the spine
  - Segmental
  - Regional
  - Global

SPINAL ALIGNMENT

- Critical for maintenance of upright posture
- Stability of the axial skeleton
- Minimal muscular energy expenditure



ASD

- Scoliosis
- Sagittal malalignment
- Kyphosis
- Spondylolisthesis
- Axial plane deformity

SCOLIOSIS

- Sequelae of childhood deformity
- De novo (degenerative)

ASD– OTHER CAUSES

- Trauma
- Tumor
- Infection
- Inflammatory conditions
- Post-surgical (Iatrogenic)

POST-SURGICAL (IATROGENIC) ASD

- Destabilization
- Malalignment

ASD – PREVALENCE

- As high as 32% in general population
- Up to 68% in people over age 65
- With U.S. population growth--the number of older adults with ASD is estimated to be more than 60 million by 2050

ASD--Economics

- Aging population
- More co-morbidities
- Increasing number of people with ASD

- Growing strain on health care resources
- Important to develop evidence-based approaches
- If we don't, policy makers and 3rd party payors will

ASD—Indications for surgery

- Should we treat ASD surgically?

Impact of ASD

- Measurable effect on physical and mental health
- Back pain, neurologic symptoms, difficulty standing upright, and functional limitations
- Marked disability when compared to the general U.S. population
- Impact worsens with age

Operative treatment of ASD

- Improved function and health status and reduced pain

Furthermore….

- Elderly gain a disproportionately greater improvement in disability and pain despite a higher complication rate

Indications for Surgery in ASD

- Not as clear cut as for AIS
- Typically related to curve magnitude and/or progression in AIS
- Adults more often seek care for for pain and disability due to degenerative disease and malalignment
- Curve magnitude may not be the major issue in ASD

ASD vs AIS

- Co-morbidities
- Bone quality
- Stiffness
- Sagittal malalignment
- Need for neurologic decompression
- Frequently require fusion to sacrum

Surgical Treatment of ASD

- Wide variability in the indications, surgical techniques and post-op care

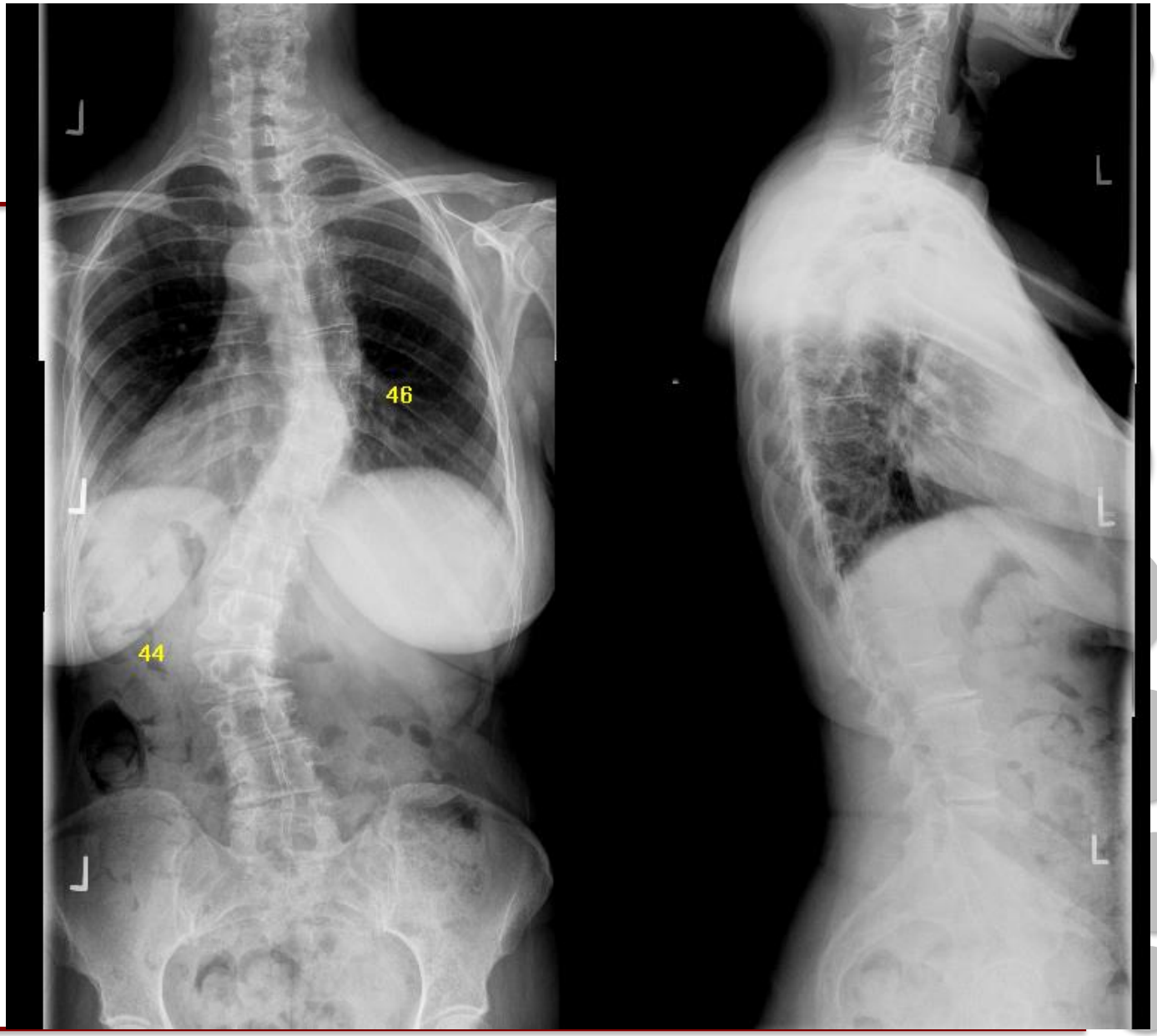
- Difficult to develop Appropriate Use Criteria and still be responsive to these variables (Berven)

A.H. 56 yo F physician

AIS as a child

Progressive painful scoliosis

Healthy, exercises regularly, nonsmoker, No narcotics

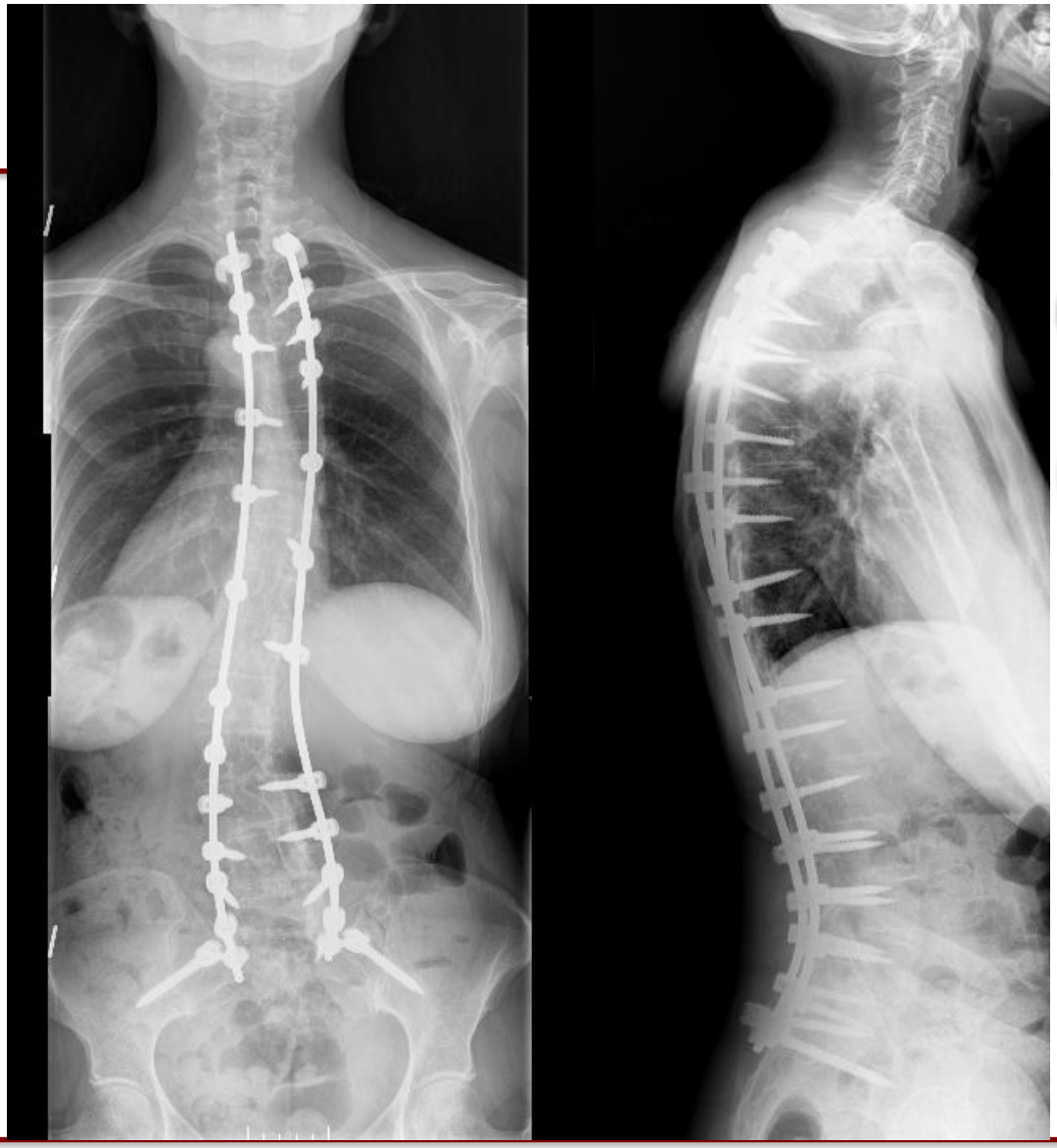


A.H.

4 yr post-op

No surgical complications

Minimal pain



J.P. 70 yo F

Severe back and LE pain

Progressive curve

Lumbar stenosis

Osteopenia,HTN,

Deconditioned

Narcotic use

J.P.

- Different risk profile than A.H.
- Goal is to optimize patient

- Currently on a 1 year course of Forteo, daily walking, and weaning from narcotics

Principle

Surgical indications and goals may not be the same for all patients with ASD

Surgical Indications

- Vary depending on:
  - Risk stratification
  - Patient expectations and desires
  - Shared decision making

V.B. 63 yo F

Back and LE pain

No relief with PT and injections

V.B.

2 years PO T4-S1 fusion,
Lam/TLIF L4-5 and L5-S1,
Bilateral iliac screws

C/O of some upper thoracic pain

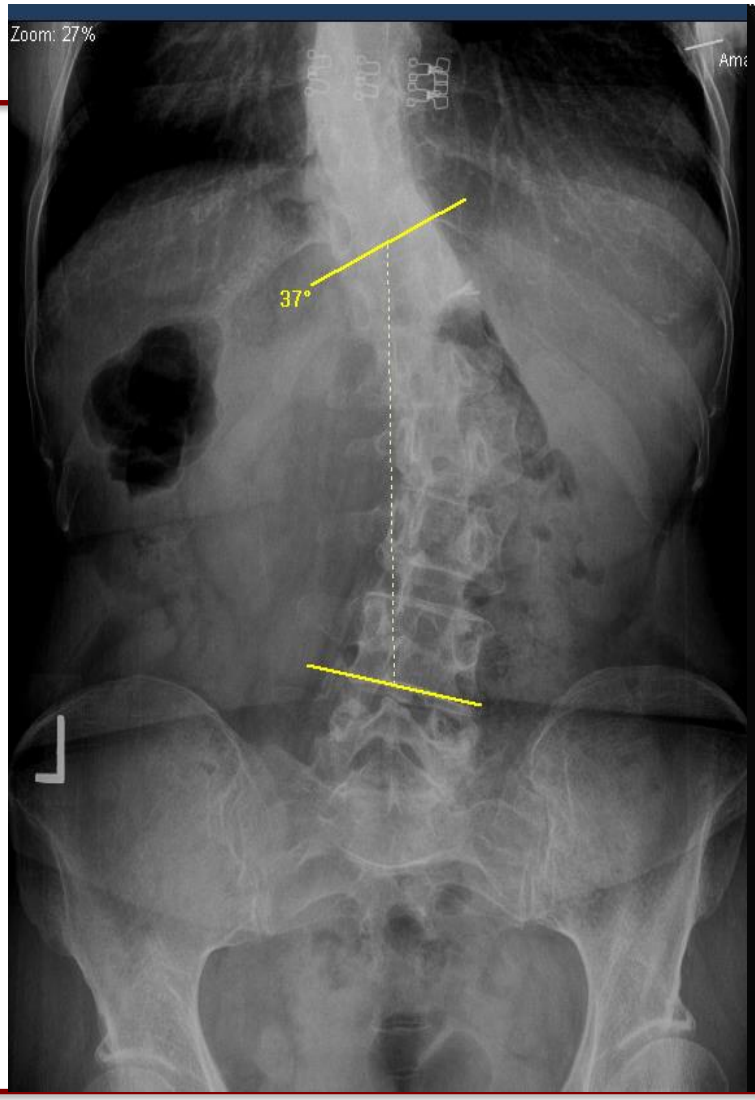
No LE sxs

Very happy
Working as a teacher

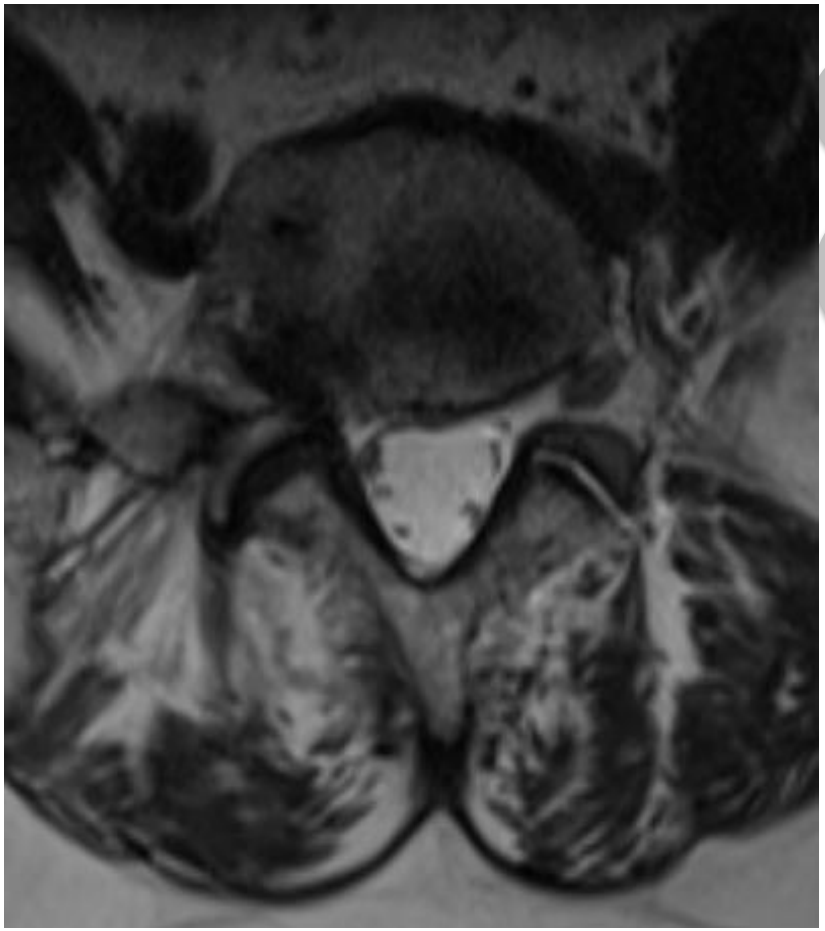
S.B. 65 yo F

RLE pain

Mild LBP



S.B.

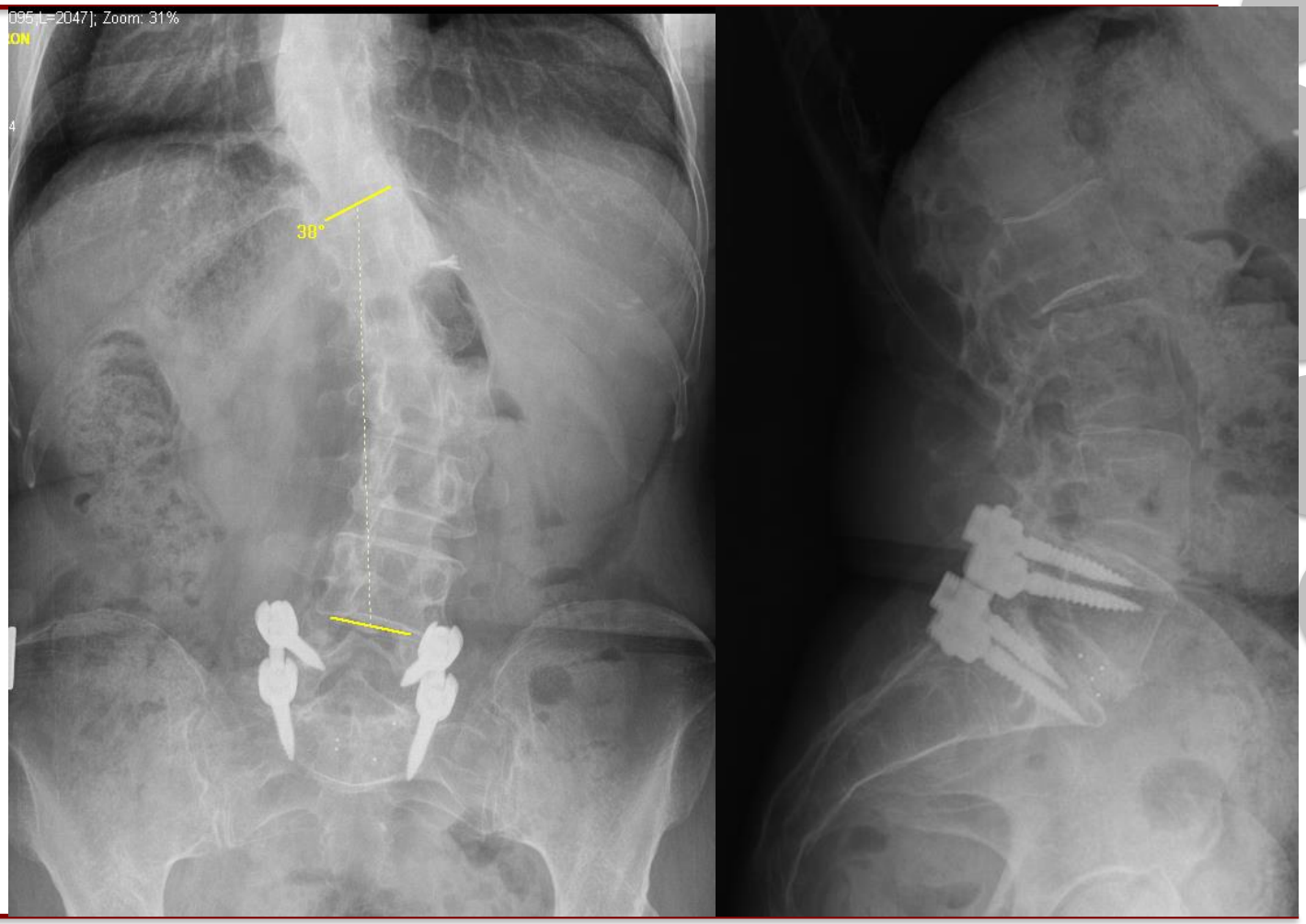


S.B.

6 mo PO TLIF/PSF

No LE pain

No back pain



Non-surgical Treatment of ASD

- Physical Therapy
- Chiropractic
- Accupuncture
- Medication
- Injections
- Bracing

Non-surgical Treatment of ASD

- No evidence for improvement in HRQL
- Accounts for the largest component of increased costs over past decade

- We all still do it
- Need evidence-based pathways

Indications for Surgery in ASD Thoracic Curves

- Few adults seek surgical treatment for isolated thoracic scoliosis
  - Young adults with significant curves
  - Concern for self-image

Thoracic Scoliosis

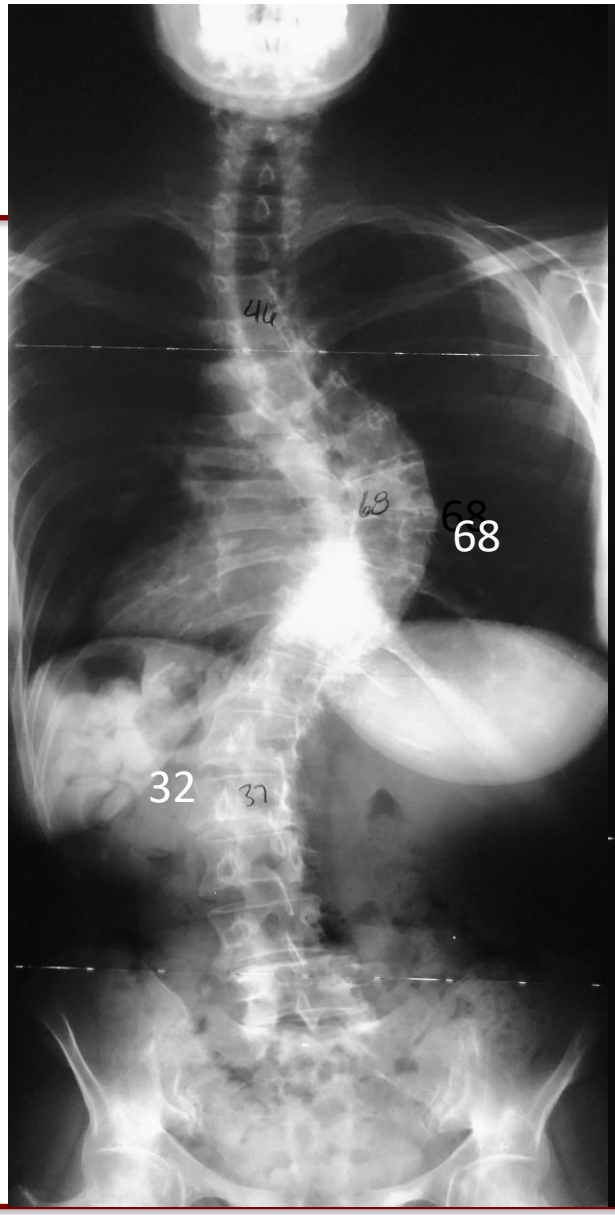
- Thoracic curves > 50 degrees tend to progress
  - Can consider surgery depending on symptoms and concern for deformity
  - If symptoms are manageable, observe for progression
- Selective thoracic fusion can be considered
  - Younger patients
  - No signicant lumbar pathology

S.L. 50 yo F

Progressive thoracic curve

Thoracic back pain

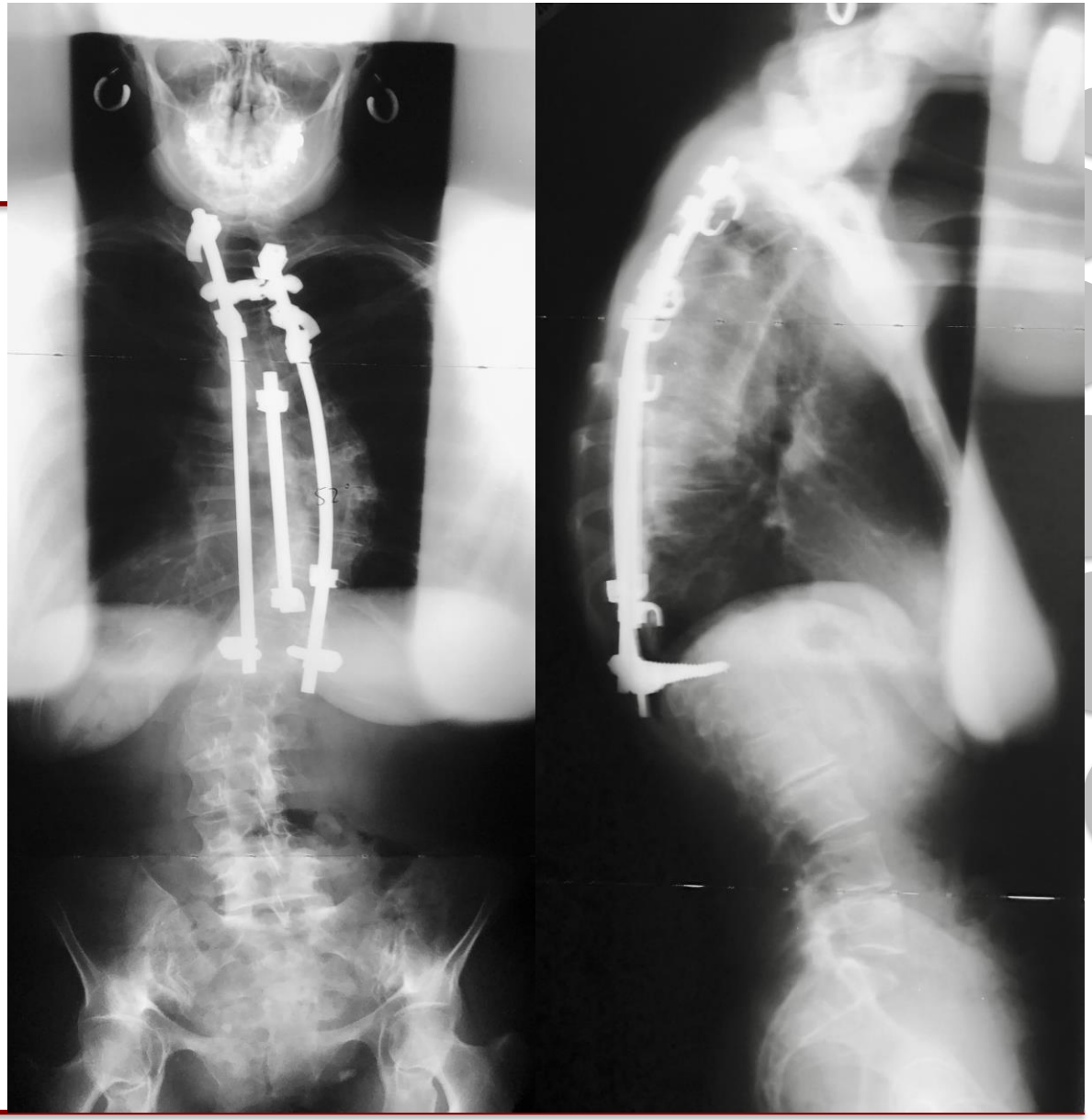
No LBP



S.L.

PSF T2-T12

Distal implant failure
4 months PO



S.L.

Revised to L-1

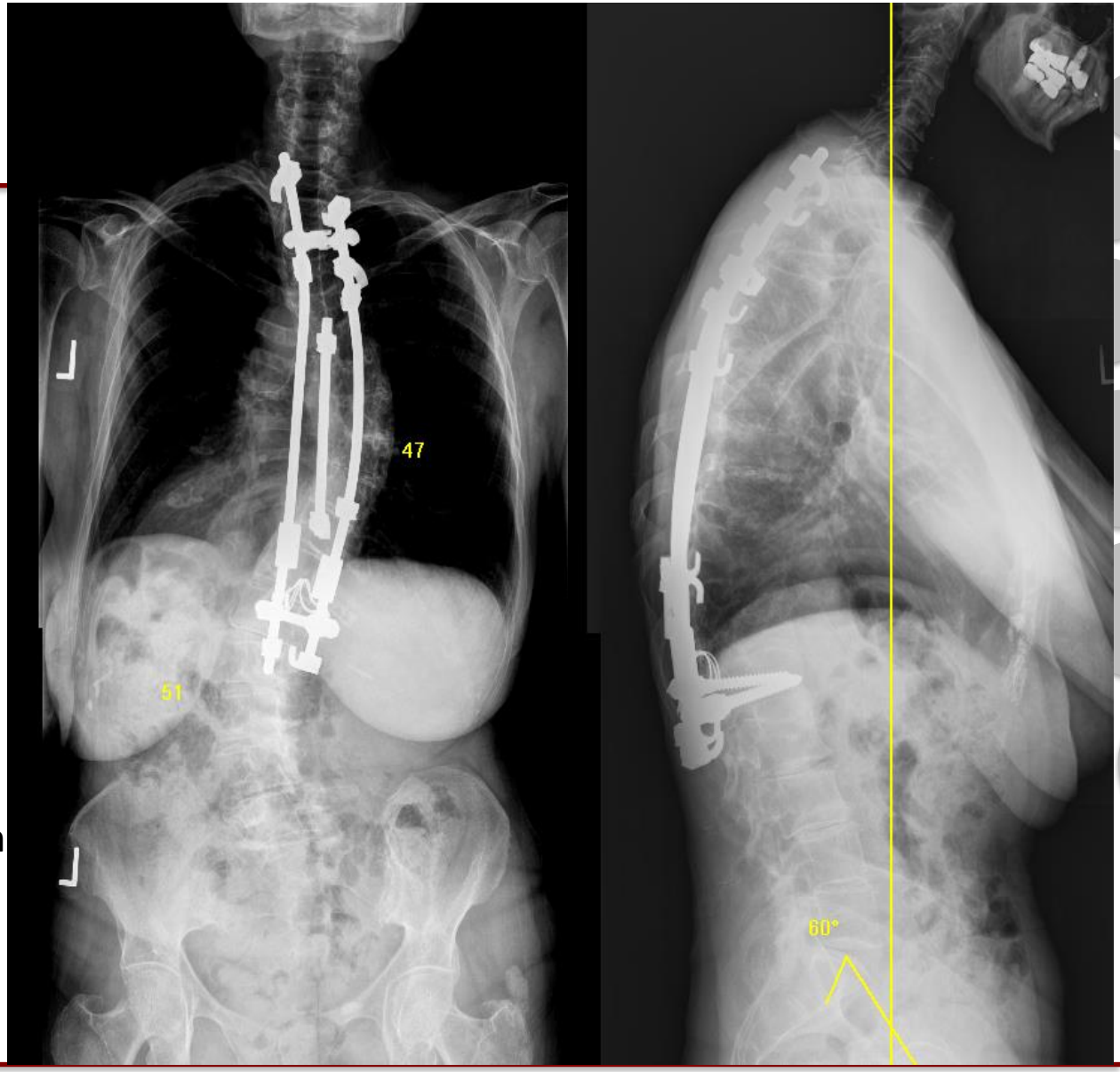
S.L.

14 years PO

3 year hx LBP wl Radiculopathy

Hemi lams Lt L4-5, L5-S1
Elsewhere
No relief

Now considering extension to sacrum



Lumbar/Thoracolumbar Curves

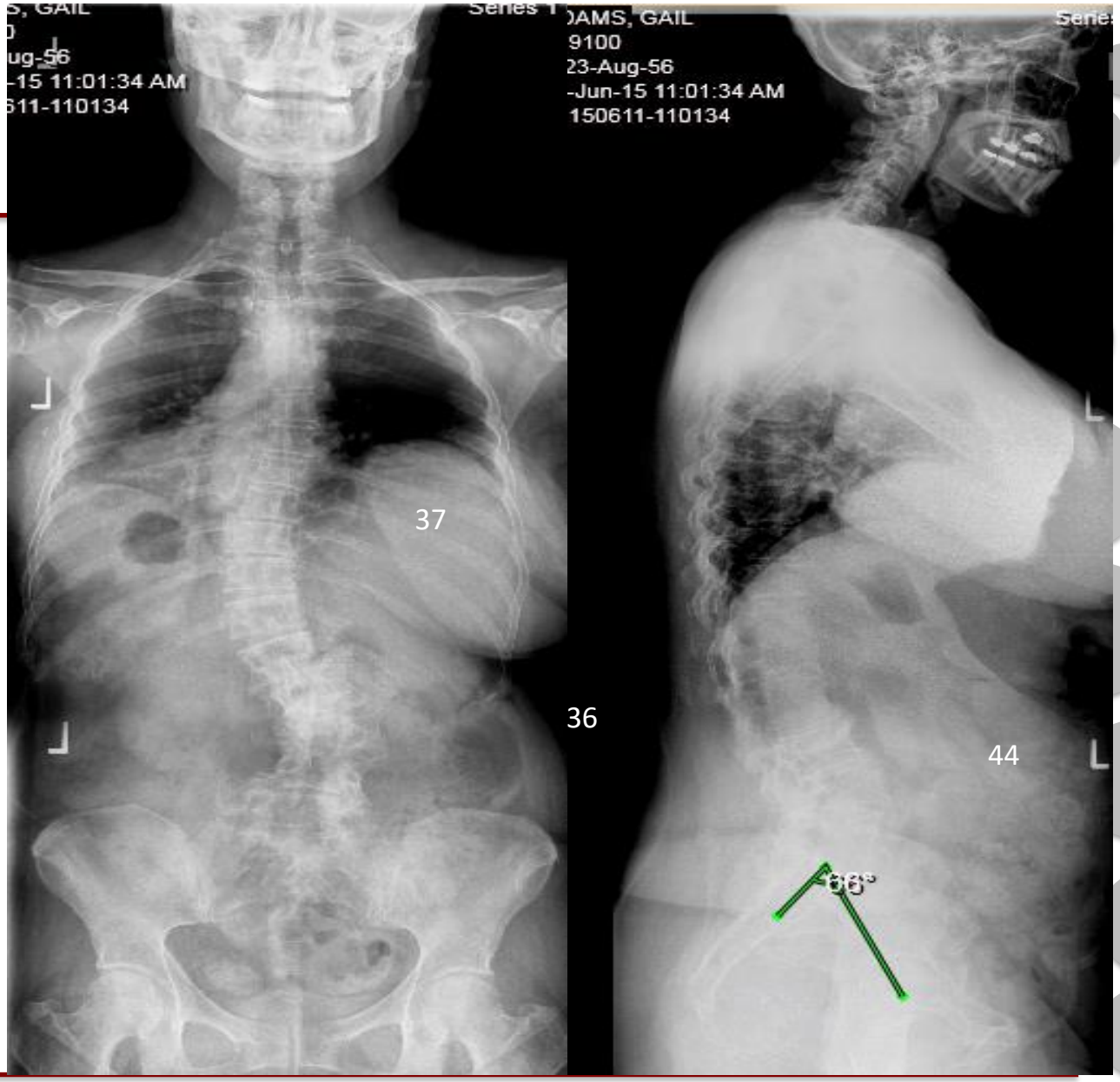
- Majority of ASD patients seeking care
- Degree of curvature not as important
- Surgery indicated for:
  - Progressive curves
  - Severe back and/or LE symptoms unresponsive to non-operative care
  - Neurologic involvement
  - Symptomatic sagittal malalignment

G.A. 58 yo F LBP, Bil LE sxs

3 prior lumbar surgeries,L5-S1 fusion

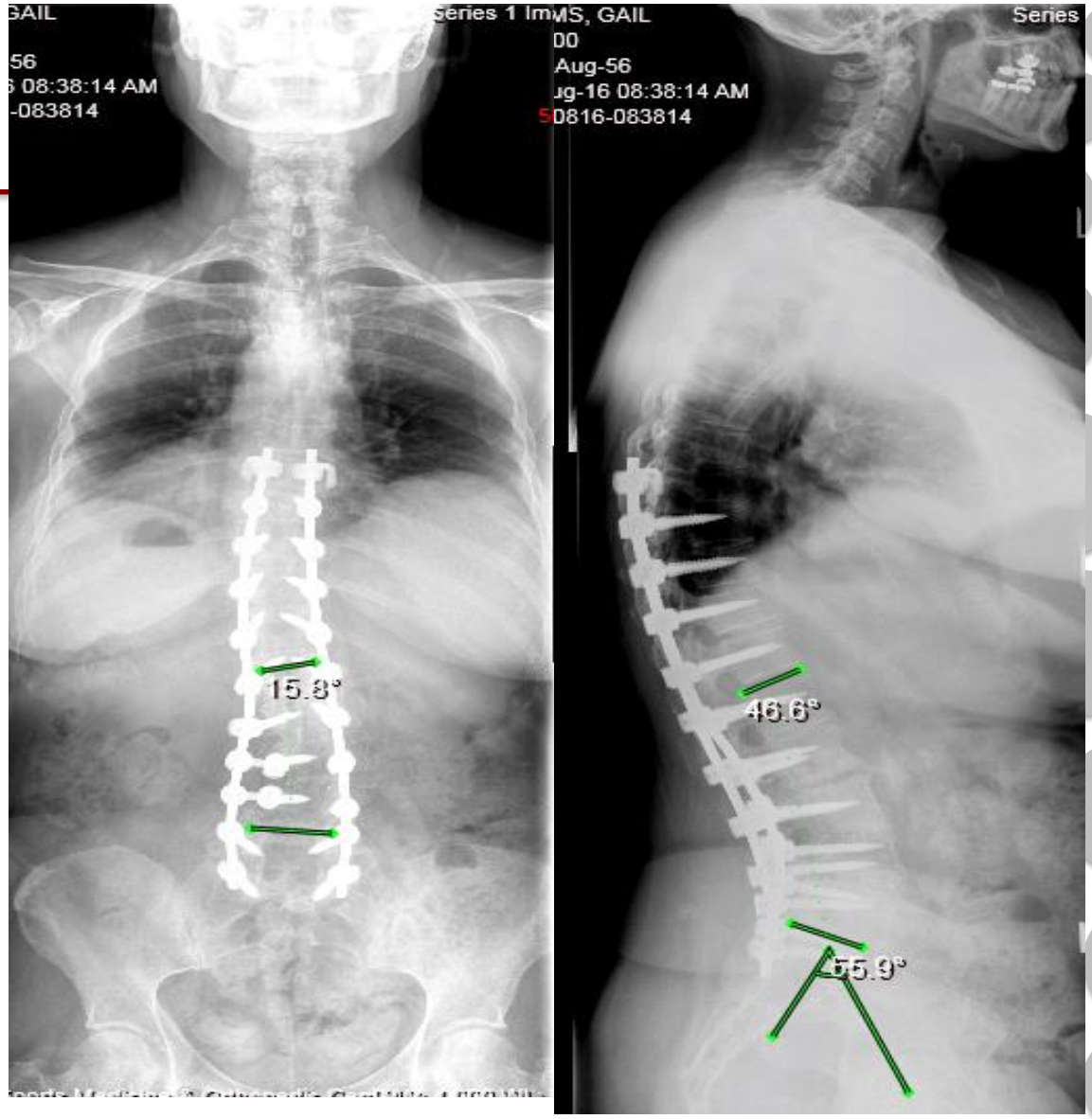
MRI: severe stenosis L4-5

Tx: PT, ESIs, meds



G.A.
1 Year post-op:
Lam/TLIF L3-4,
L4-5
PSF/Instr T8-S1
(Prior fusion L5-
S1)

No LE Sxs
Mild-Mod LBP
Off Narcotics



Fusion to the Sacrum

- Most adults with symptomatic Lumbar and T/L curves have L/S pathology
- May be avoided in selected younger patients with “healthy” L4-5 and L5-S1 segments
- High risk of distal junctional pathology if fused to L-5

Goals of Surgical Treatment in ASD

- Reduction of Pain and Disability
- Safety
- Cost effectiveness

Reduction of Pain and Disability

- Restore alignment
- Decompress neural elements as needed
- Maintain alignment
  - Stable fixation
  - Solid fusion
  - Avoid junctional pathology

Patient Safety

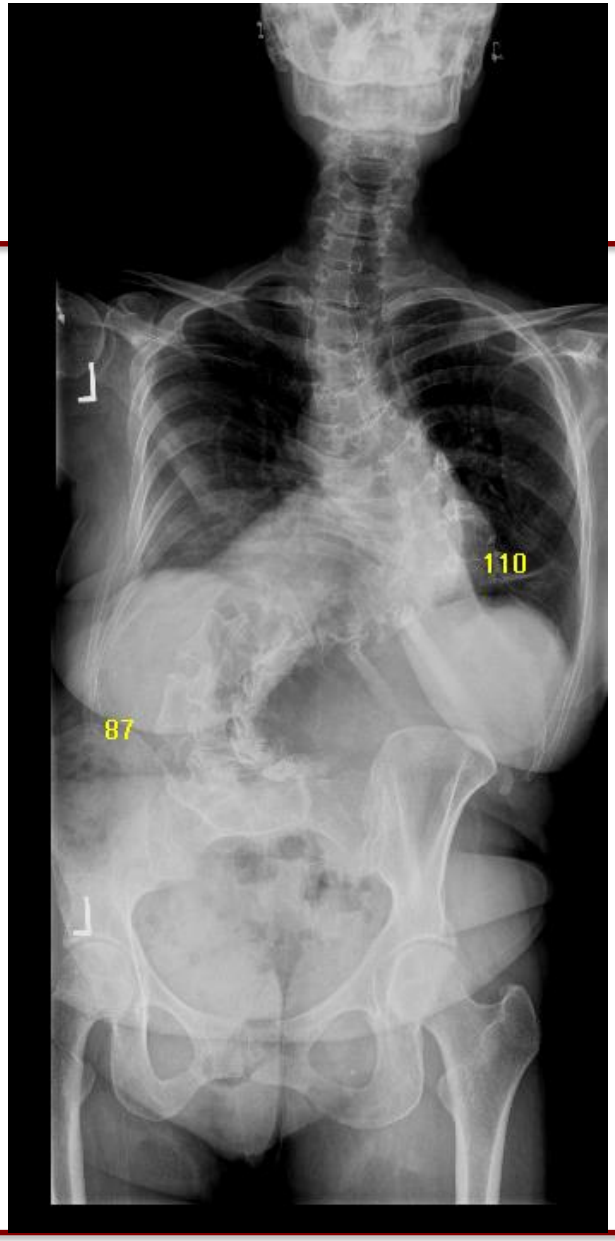
- Intertwined with every aspect of ASD surgery
  - Patient selection
  - Preoperative optimization
  - Surgical planning
  - Surgical technique and skills
  - Post-operative care
  - Management of complications

G.L. 50 yo Female

Scoliosis since childhood

No prior treatment

LBP, Rt lower rib pain
Occasional SOB



G.L.

PSF T2-S1
No osteotomies

Trunk lengthened 6.5 cm

Conclusion

- ASD has a significant impact on HRQL
- Prevalence of ASD will continue to increase
- Surgical treatment of ASD improves HRQL
- Wide variability in surgical indications
- Direct correlation between radiographic parameters and self-reported pain and disability (sagittal alignment most important)
- Current economics are not sustainable

THANK YOU!