

6-Minute Truth:

Posterior Distraction Techniques are Kyphogenic

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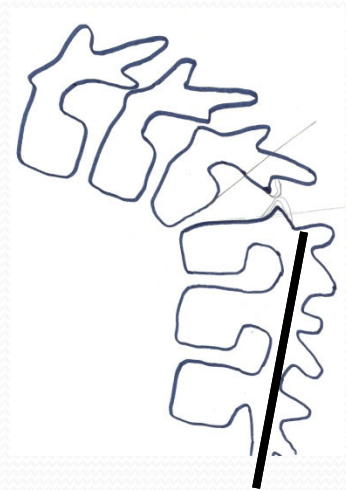


Kyphosis in Early-Onset Deformity

- Due to Weakness and/or laxity
- Posterior column is elongated in kyphosis
- Posterior distraction may exacerbate this
 - But cantilever may help

Postop Kyphosis

- Within instrumented segment
 - Can be made worse by distraction
 - Especially lumbar
- Outside of instrumented segment
 - PJK / DJK
 - Due to transition of rigidity
 - Due to surgical dissection





Kyphosis in early-onset deformity

- PJK / DJK
 - Due to transition of rigidity
 - Due to surgical dissection
 - Due to elasticity and growth

Growing Rods vs VEPTR

- “Kyphogenicity?”

- Differing anchor types
 - Cradles vs hooks, screws, wires
- Unilateral vs Bilateral
- Differing cantilever abilities
- Differing stress transitions
- Level selection is not established
 - Especially with kyphosis



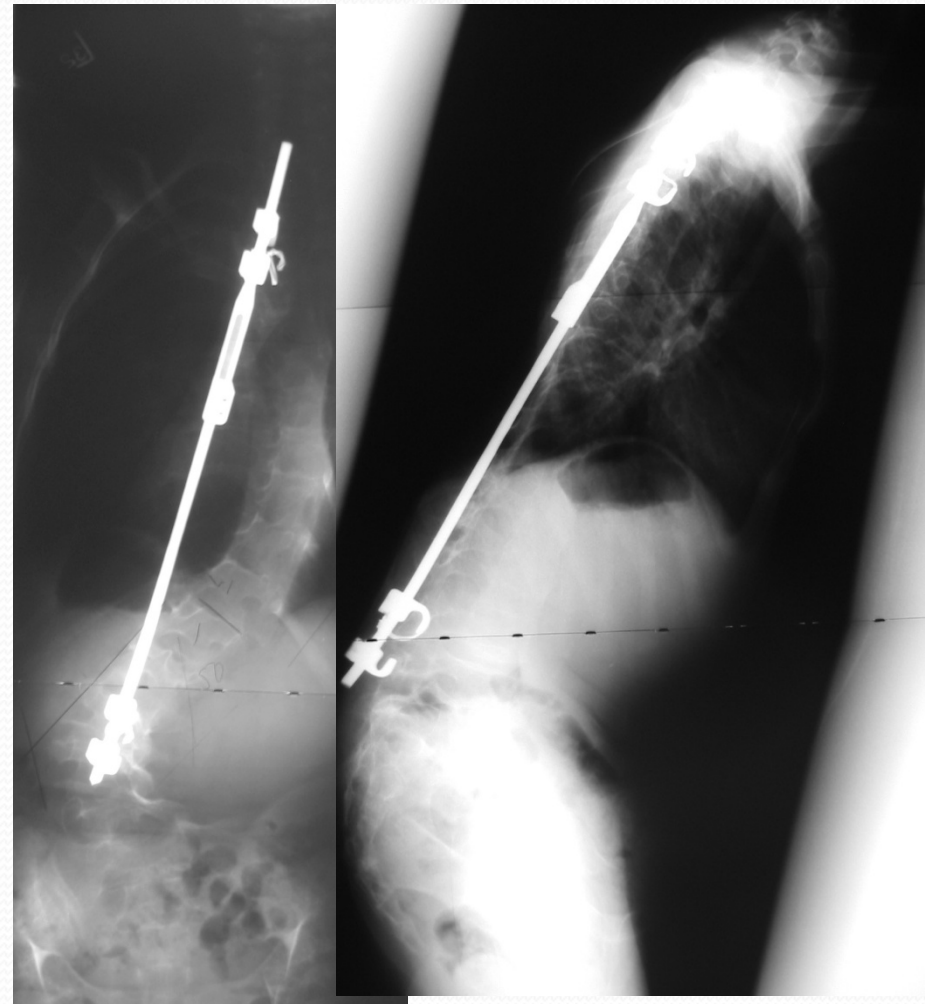
GR vs VEPTR

- Kyphosis reduction 42% vs 46% (ns)
 - Final 46° vs 44°
 - Sankar, Skaggs 2010

Schprintzen-Goldberg

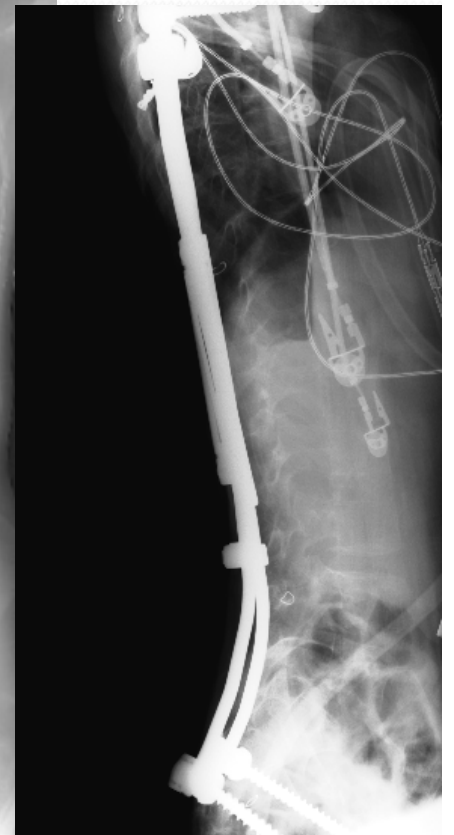
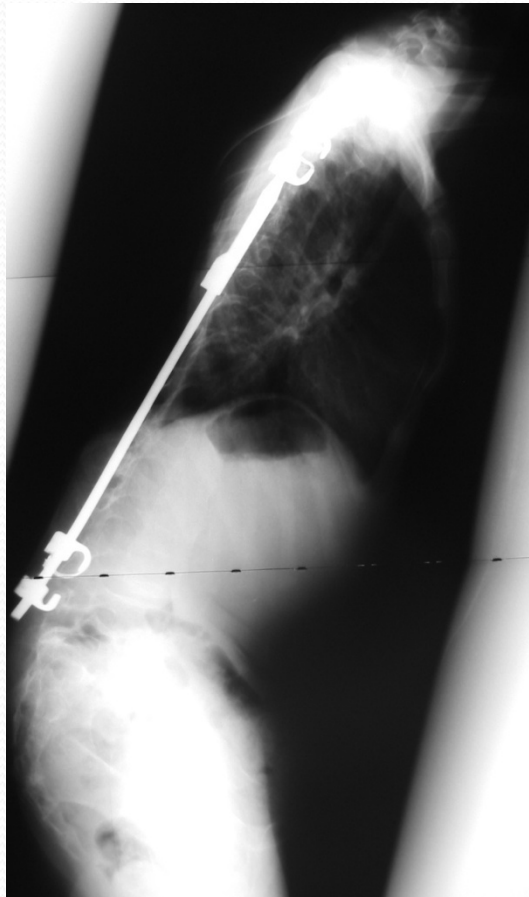
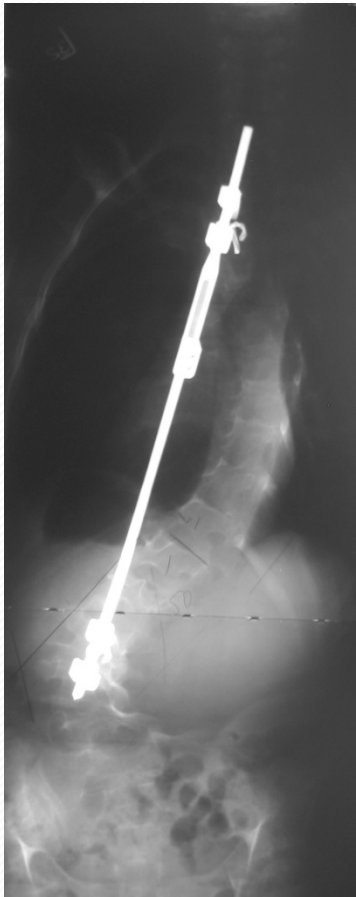
(FBN1 mutation)

- Moe technique
 - Single Harrington rod
 - Lumbar Distraction
 - Balance/ Connective tissue?



Schprintzen-Goldberg

- Revision to pelvis

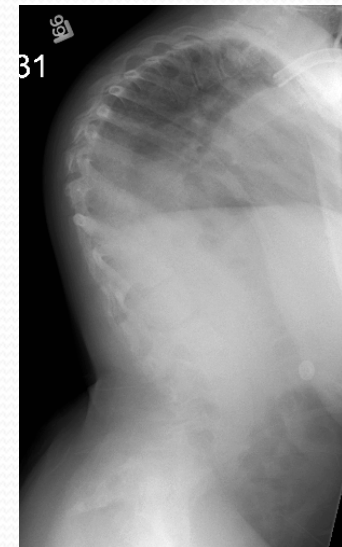


Example: 6 yo with CP

- 90° scoliosis- corrects to 70 in tx
- 105° kyphosis-corrects to 95 in tx

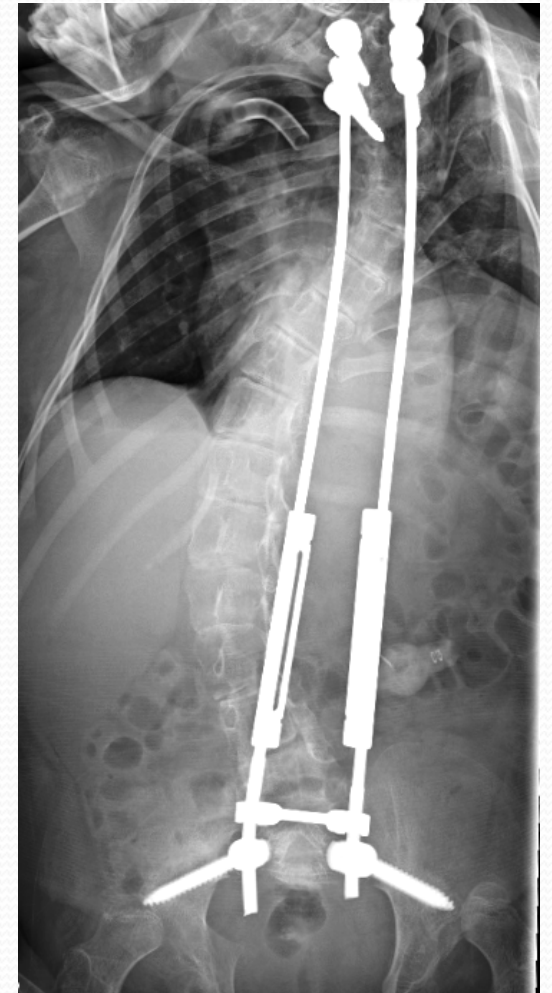
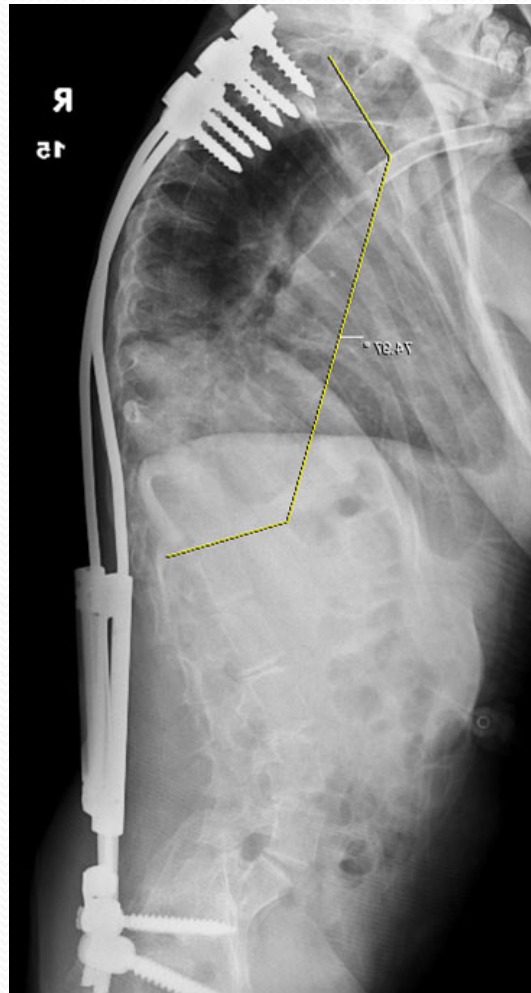


In tx



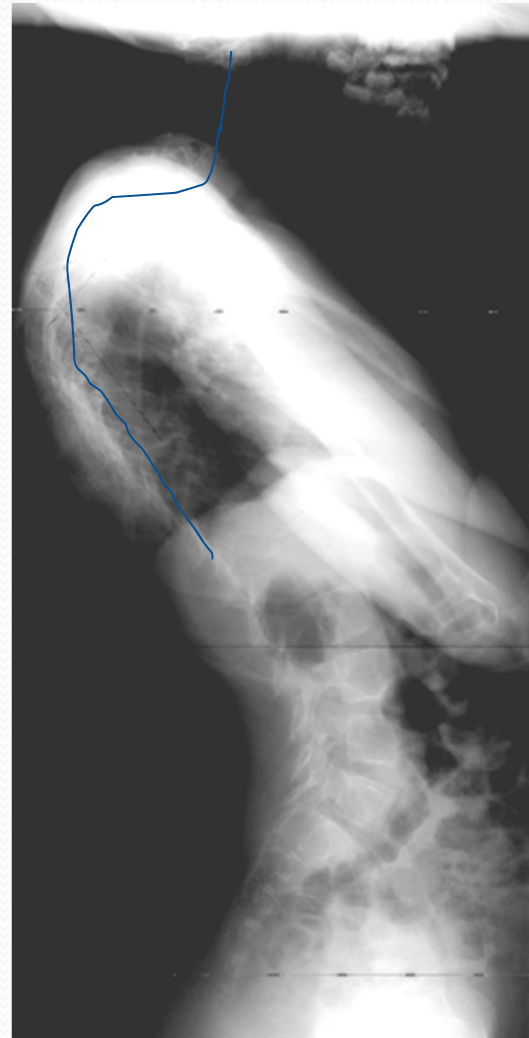
Follow-up: CP

- 6 yrs later
 - After 5 distractions



Example: 8 yo congenital myopathy

- 95° kyphosis C5-T5
- 87° scoliosis T1-T10



In Tx



Follow up: Myopathy





Does Kyphosis increase rod fx risk?

- 249 patients studied
- No association
 - Yang et al 2009



Principles to minimize Kyphosis

- “Reasonable” correction at initial surgery
 - With position or traction
 - To minimize acute cut-out
- Maximal rod strength
 - Diameter
 - Metallurgy
 - Change diameter as patient grows
 - Under-contour



Principles to Minimize Kyphosis

- Adequate anchor strength
 - 3 instead of 2-level foundation when needed
- Proper anchor levels
 - Span the junction
 - “saving levels” may not add mobility



Principles

- Span the kyphotic region
 - EIV beyond kyphosis
- Add Cantilever to existing rod when necessary
 - May need to repeat at lengthening surgeries
- Minimize dissection at EIVs



Partial Truth

- Posterior techniques can be kyphogenic
 - Within and beyond curve
- This effect can be minimized
- It can more often control and correct kyphosis!