

Does the Type of Distraction-Based Growing System for Early Onset Scoliosis Affect Post-Operative Sagittal Alignment?

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Disclosures

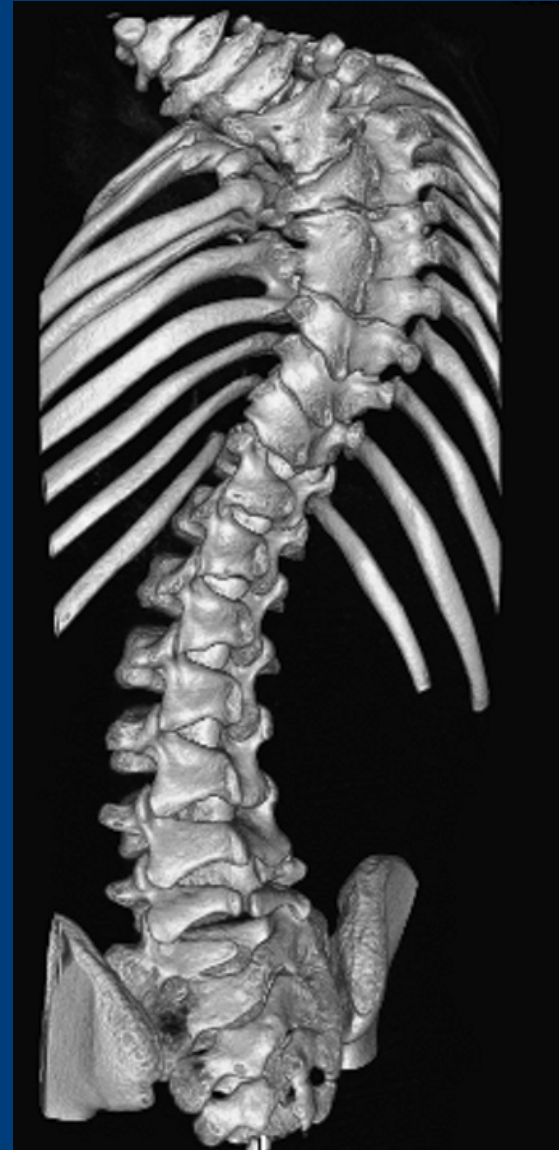
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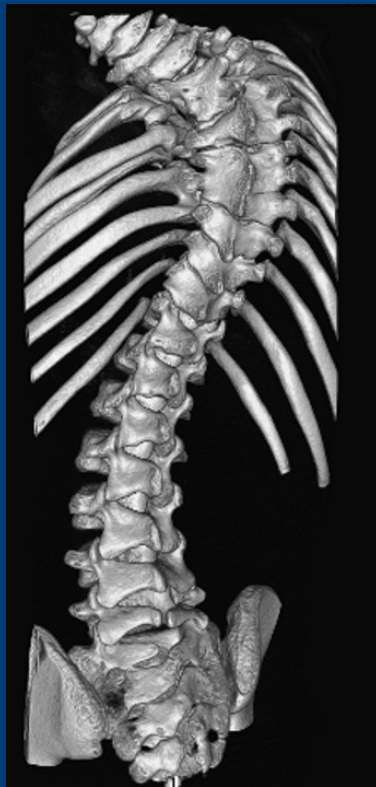
- a. Grants/Research Support**
- b. consultant**
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Early Onset Scoliosis



Early Onset Scoliosis

- **Goals**
 - Prevent progression of deformity
 - Maintain spine / chest wall growth
 - Avoid Thoracic Insufficiency

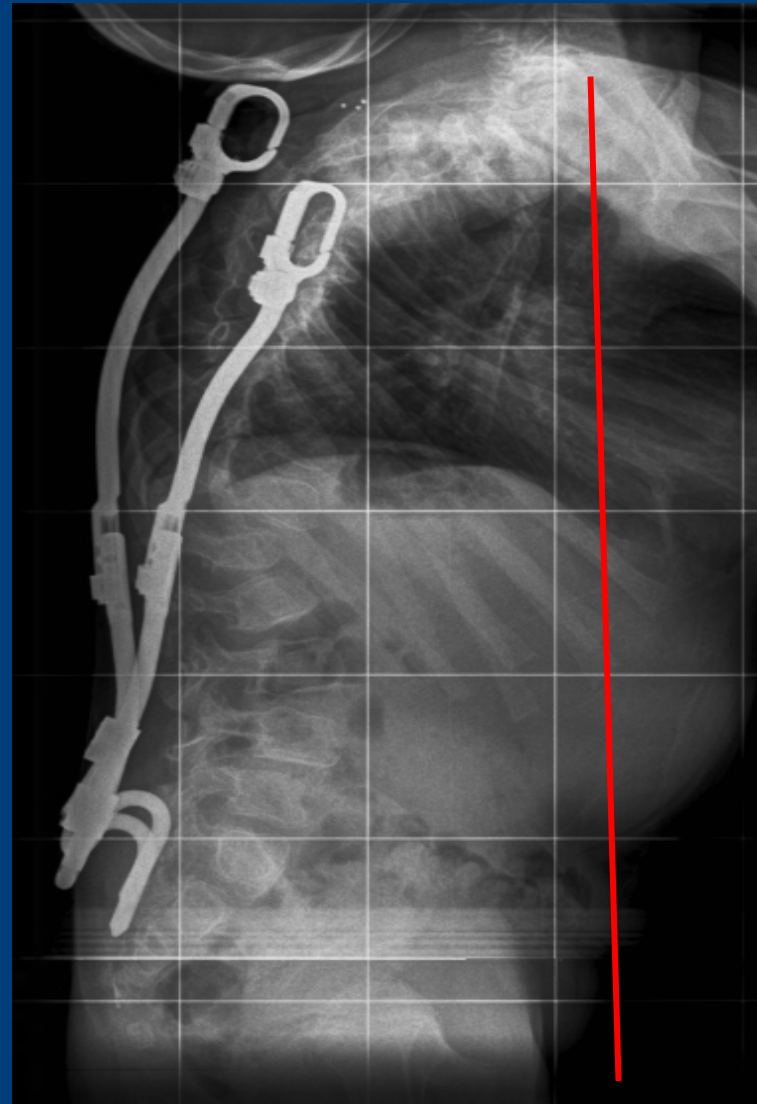
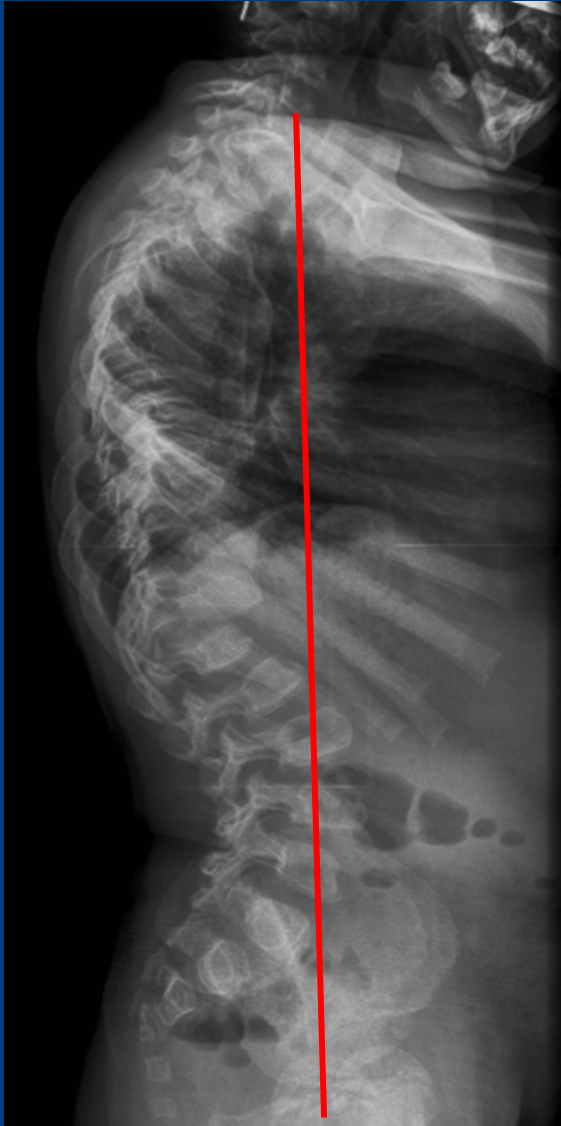


Early Onset Scoliosis

- **Complications**
 - **Numerous**
 - **Soft Tissues**
 - **Proximal Junctional Kyphosis**
 - **Implant Migration**
- **Related to Sagittal-Plane?**

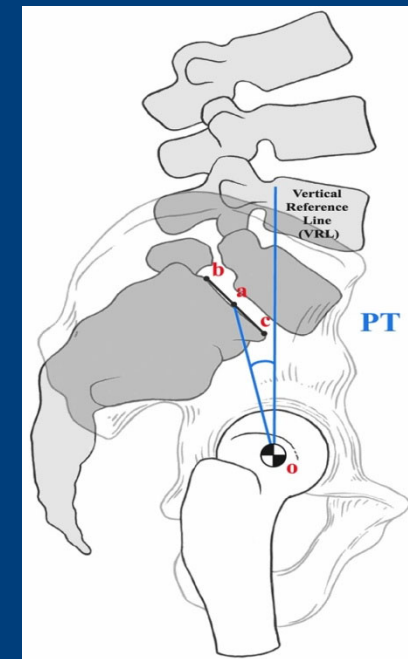
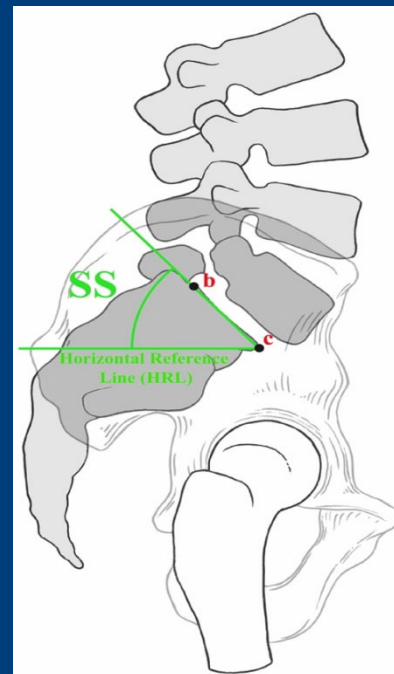
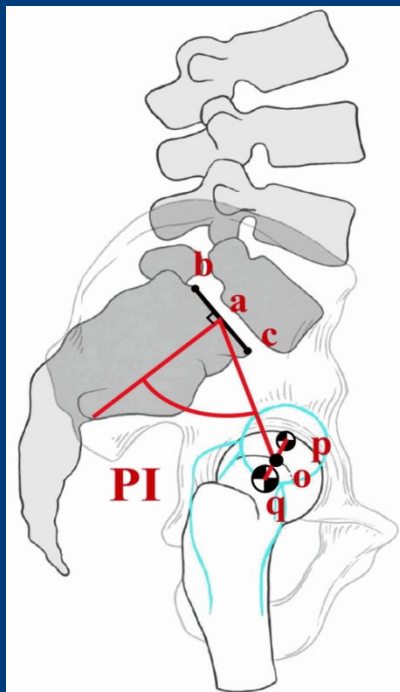


Sagittal-Plane



Sagittal-Plane

- **Spinopelvic parameters** - recently defined in children with EOS
 - Pelvic Incidence
 - Sacral Slope
 - Pelvic Tilt



Purpose

- To determine if the type of growing system (rib vs spine based) affects post-operative sagittal-plane alignment.



Methods

- **Inclusion**

- 6 months – 10 years of age (open triradiates)
- Scoliosis (ambulatory)
- >50 degrees
- Treated with rib-based or spine-based distraction

- **Exclusion**

- Previous spine surgery
- Non-Ambulatory

Methods

- **Standing lateral radiographs evaluated pre-operative and minimum 2 year post-operative**
- **N= 79 children with EOS:**
 - **56 subjects - Rib-based**
 - **23 subjects - Spine-based**

Results: Pre-operative

Diagnosis	Rib Based	Spine Based
Congenital	37	1
Idiopathic	6	6
Neuromuscular	5	1
Syndromic	8	12
Thoracogenic	0	3
Total	56	23

Results: Pre-operative

Pre-op	Rib Based	Spine Based	P Value
Age (Years)	4.4	6.3	P<0.05
Thoracic Cobb	70.4	74.8	P>0.05
Lumbar Cobb	34.6	40.1	P>0.05
Thoracic Kyphosis	36.6	40	P>0.05
Lumbar Lordosis	45.7	54.9	P>0.05
Sacral Slope	34.9	39.7	P<0.05

- Pelvic Incidence, Pelvic Tilt (p>0.05)

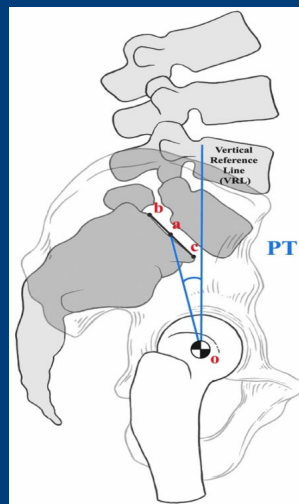
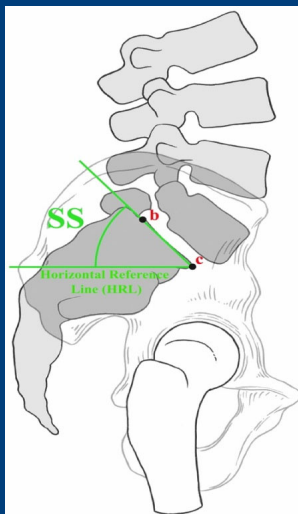
Results: Post-operative

Post Op	Rib Based	Spine Based	p value
Follow Up (Years)	3.5	2.1	P<0.05
Thoracic Curve Correction	20.90%	47.50%	P<0.05
Lumbar Curve Correction	19.30%	48.90%	P<0.05
Cervical Lordosis	36.4	21.4	P<0.05
Thoracic Kyphosis	46.2	26	P<0.05
Lumbar Lordosis	46.4	53.5	P>0.05
Sacral Slope	34.8	40	P<0.05
Pelvic Tilt	18	11.1	P<0.05
Pelvic Radius	49.8	66.4	P<0.05

- Pelvic Incidence, PJA, Sagittal Balance (p>0.05)

Discussion

- Rib-based (Post-op)
 - Greater cervical lordosis
 - Greater thoracic kyphosis
 - Less lumbar lordosis
 - Less sacral slope
 - Greater pelvic tilt



Discussion

- **Potential Confounders**
 - **Diagnosis**
 - Rib-based more congenital
 - **Age**
 - Rib-based younger age at primary surgery
 - **Follow-up**
 - Rib-based longer f/u

Conclusions

- **At minimum 2 year follow-up, children treated with rib-based distraction systems were found to have alterations in their sagittal spinopelvic profile as compared to children treated with spine-based distraction systems.**
- **Thoracic Kyphosis**
 - **RB 46° vs SB 26°**

Thank You

