

The Use of Spinal and Rib Based Distraction Systems in Early Onset Scoliosis Associated with Myelomeningocele

John T. Smith MD,
John A. Heflin MD
Paul Sponseller MD
Larry Karlin MD

Children's Spine Study Group
Growing Spine Study Group



Study Design

- Demographics
- Treatment methods
- Measurements
- Complications
- Standard statistical analysis



Study Design

- Retrospective review of two IRB approved Registries
- Diagnosis: Myelomeningocele
- Managed using distraction based growth-friendly instrumentation attached either to the ribs or spine



Results

- 34 Children w/ complete data
 - Growing rods: 12
 - VEPTR: 22
- Mean age initial implant: 6.6 years
- Average f/u: 4.4 years



Measurements

- Average Pre-op Cobb: 61°
- Average Post-OP Cobb: 37°
- Average most recent Cobb: 49°
- Initial T1-S1 Spine Height: 23cm
- Most recent T1-S1: 30cm



Comparison of Rib vs. Spine Anchor Measurements

	RIB-BASED (n=22)	SPINE BASED (n=12)
Age	6.3	7.2
Follow up	4.4	5.4
Pre-op Cobb	53.8	73.5
Final Cobb	42.1	47.0
Pre T1-S1 Height	22.7	23.9
Final T1-S1 Height	28.7	31.9
T1-S1 Gain	6.0	8.0



Complications

- 63 complications in 34 patients
 - Infection 24
 - Migration 15
 - Wound Dehiscence 8
 - Implant failure 10
 - Other 8
 - Death 1



Comparison of Rib vs. Spine Anchors Complications

	RIB-BASED	%	SPINE-BASED	%
Breakage	6	11.7%	4	26.7%
Infection	17	33.3%	7	46%
Migration	11	21.6%	0	0%

Numbers are too small for meaningful comparison between techniques



Complications Classified

- Grade 1: 17
- Grade 2A: 22
- Grade 2B: 23
- Grade 3: 1

Smith et. al.: ICEOS, 2012; Dublin, Ireland

Comparison of Rib vs. Spine Anchors Complications

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Conclusions

Spine and rib-based anchors are
an effective method to manage
scoliosis in the growing spine with
Spina Bifida



Disclosures

- Smith:
 - DepuySynthes: consultant; royalties
 - Spinguard: consultant
 - Ellipse Technologies: consultant (wife)
- Heflin:
 - Nothing to disclose
- Sponseller:
 - DepuySynthes;JBJS;Globus; Oakstone Medical Publishers
- Karlin:



EOS and Spina Bifida

- Develops early
- Progressive
- Seating problems
- Skin breakdown
- Hygiene issues
- Pulmonary function
- Comfort



Treatment Options

- Limited
- Poor response to bracing or seating modifications
- Thoracic insufficiency syndrome with early fusion
- High rate of complications with surgery



Purpose

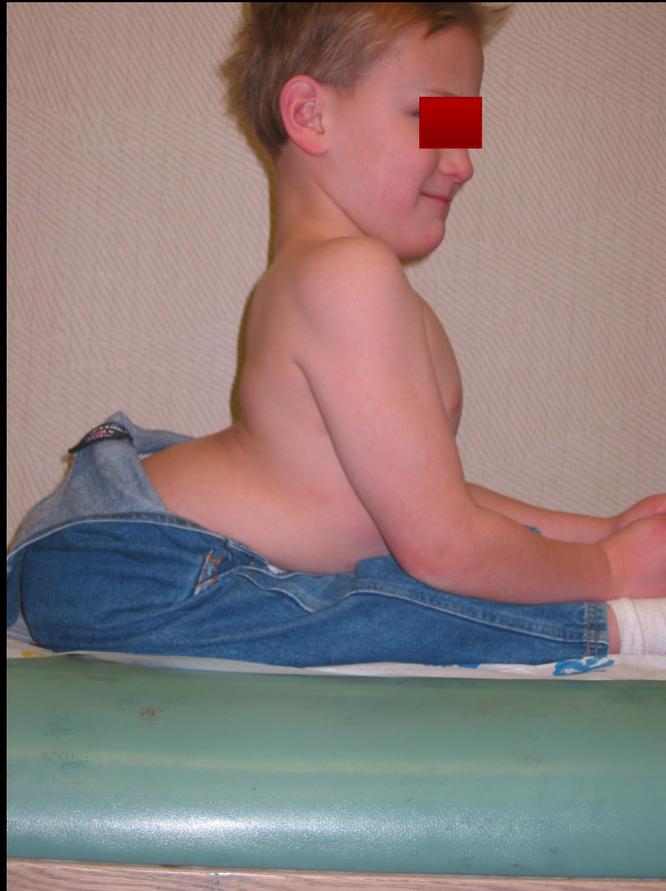
- Evaluate and compare rib and spine based distraction for the management of early onset scoliosis associated with spina bifida



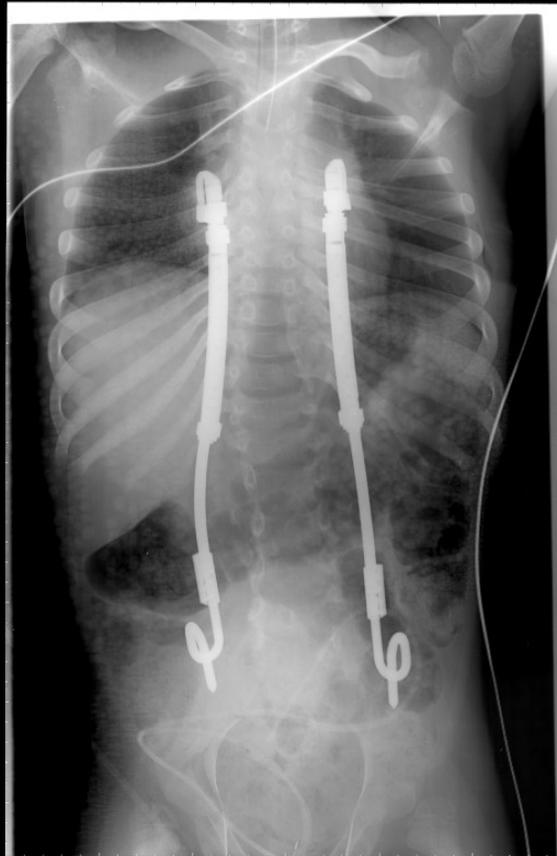
TM: 8 y/o male with Spina Bifida and severe lordosis measuring 75°



Case Example

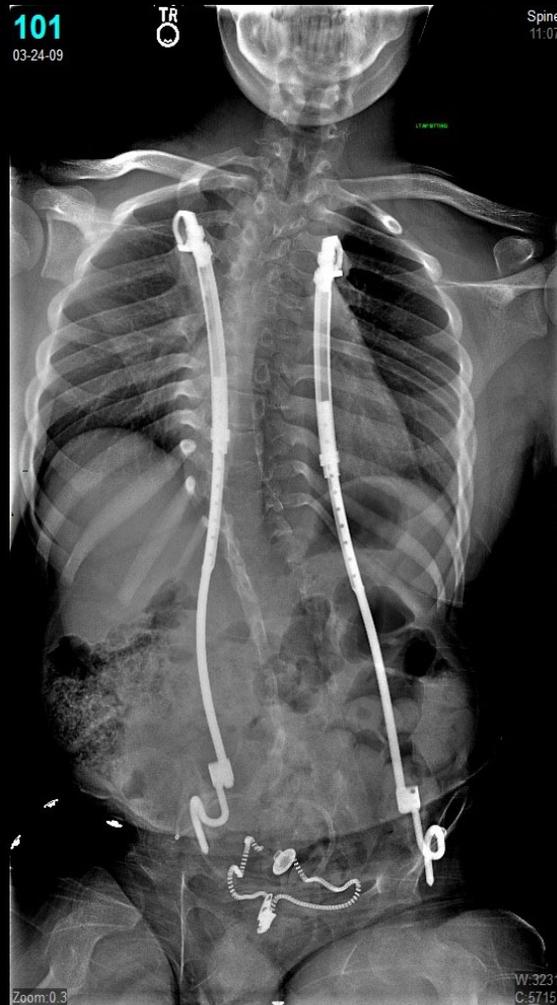


Initial Post Op film s/p bilateral rib to pelvis VEPTR





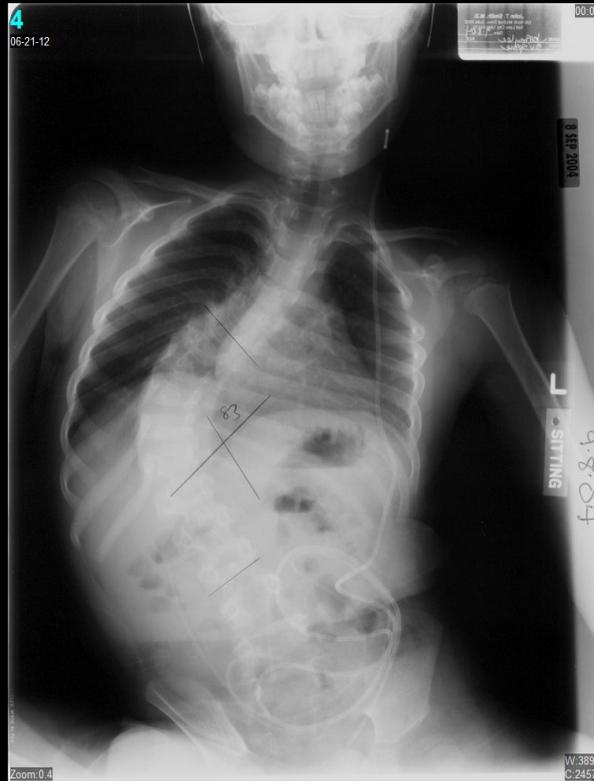
6 yrs s/p VEPTR expansions



Fusion, age 14



JL: 6 y/o male with scoliosis and spina bifida



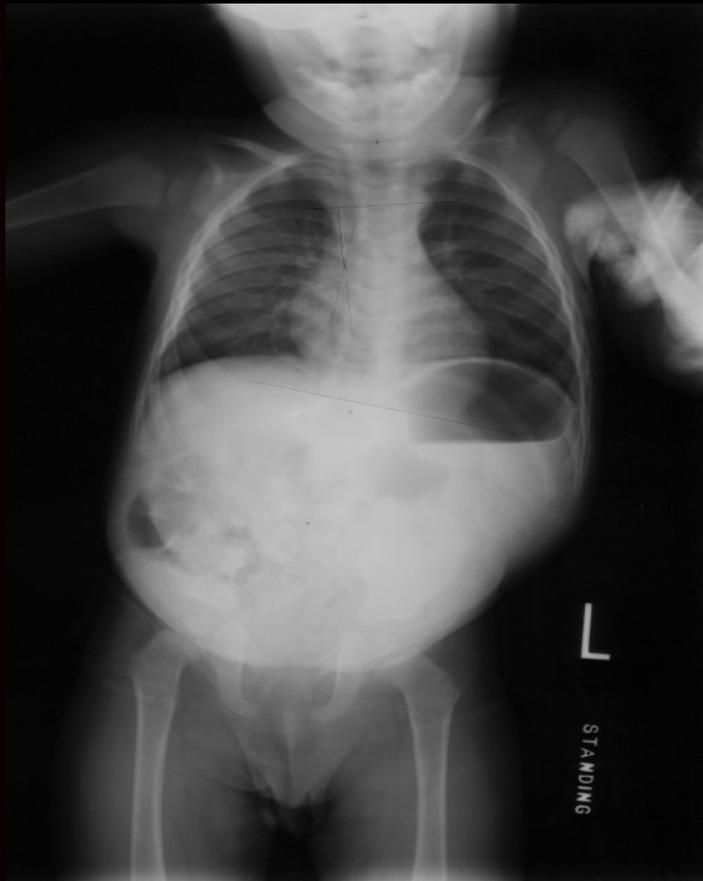
JL: Initial rib to pelvis VEPTR



8 year f/u with VEPTR



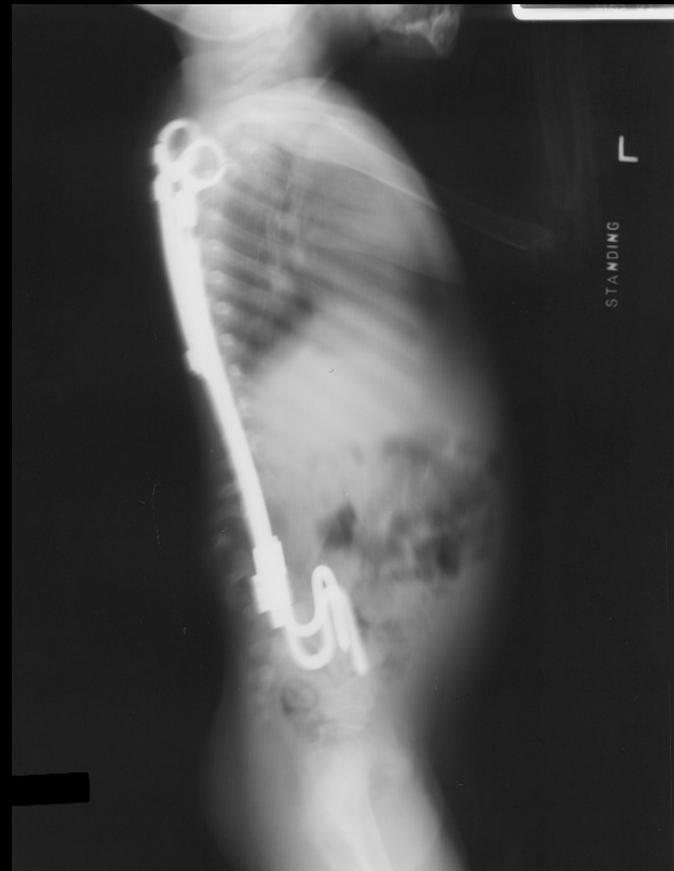
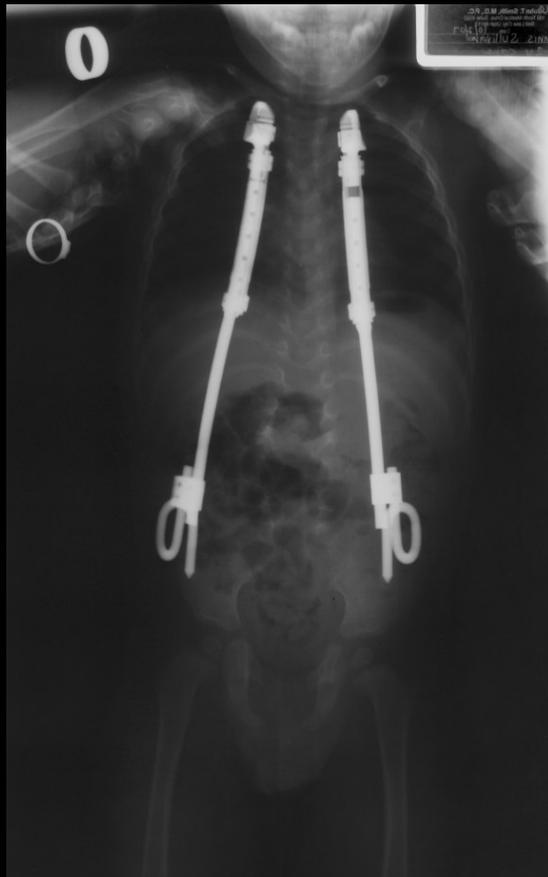
DS: 18 m/o with Spina Bifida and a gibbus deformity. Patient is ambulatory



W.3533
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DS: Initial rib to pelvis VEPTR



DS: 6 years after VEPTR



Discussion

- Rib and Spine-based distraction techniques effectively stabilize curve progression in Spina Bifida
- Most complications (49%) were infection or wound issues related to poor skin
- Complications were mostly manageable



Limitations

- Retrospective review
- Limited numbers for comparison of spine vs. rib-based anchor techniques

Conclusions

Spine and rib-based anchors are an effective method to manage scoliosis in the growing spine with Spina Bifida

