

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

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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)
ge	6.3	7.2
ollow up	4.4	5.4
re-op Cobb	53.8	73.5
inal Cobb	42.1	47.0
re T1-S1 Height	22.7	23.9
inal T1-S1 Height	28.7	31.9
1-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	%
Leakage	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



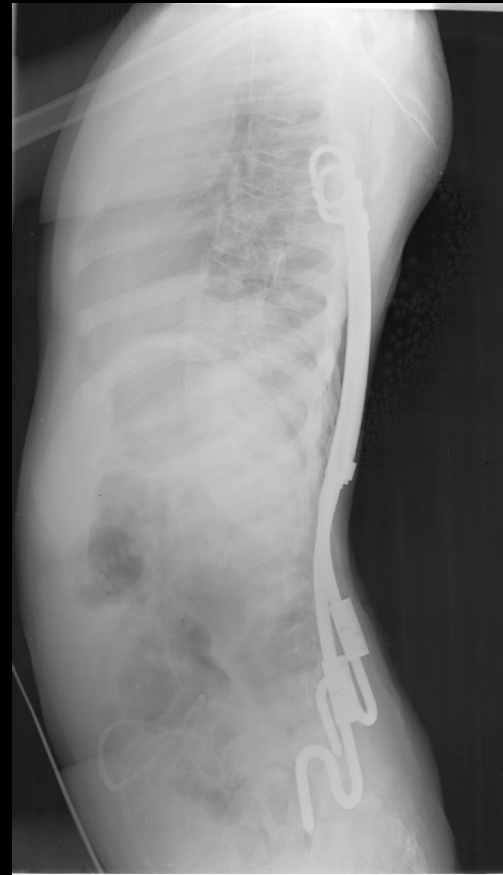
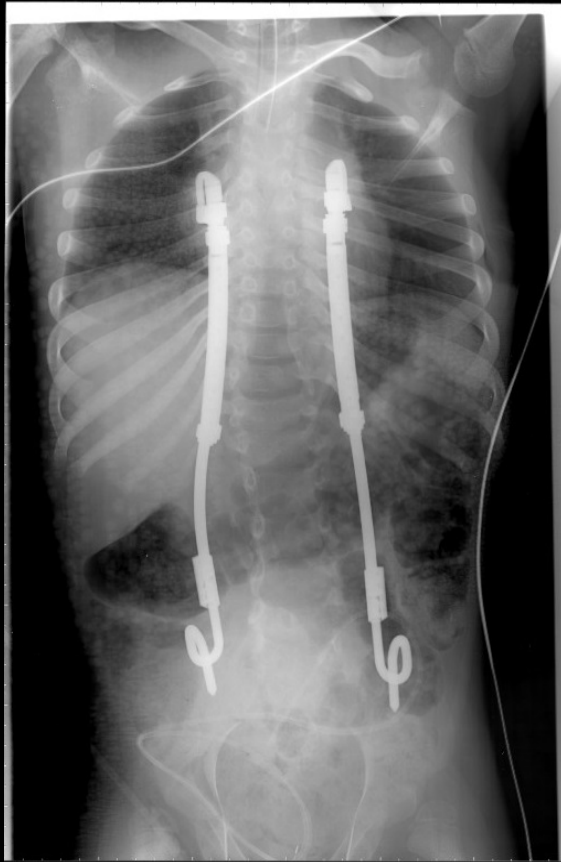
TM: 8 y/o male with Spina Bifida and severe lordosis measuring 75°



Case Example

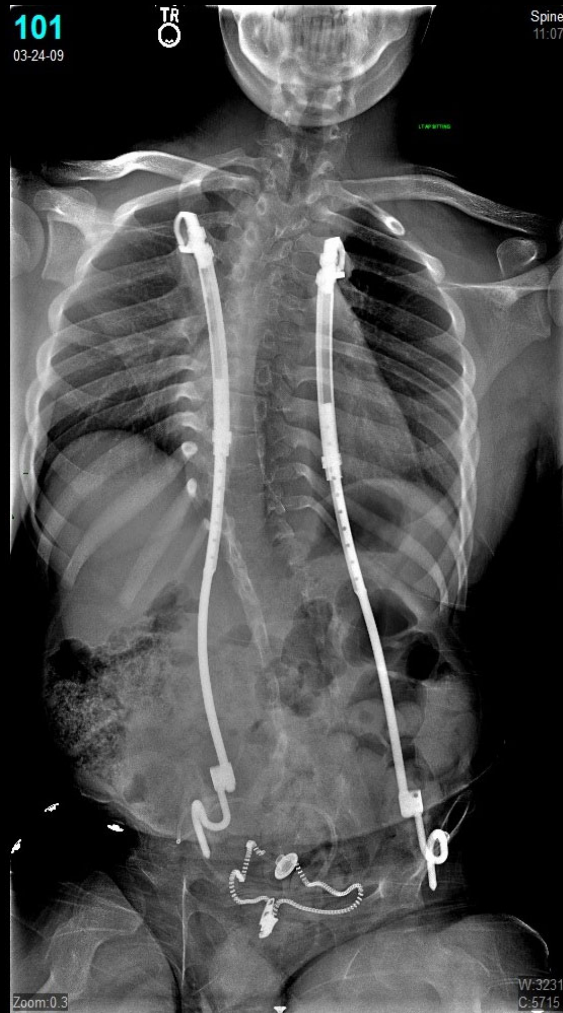


Initial Post Op film s/p bilateral rib to pelvis VEPTR

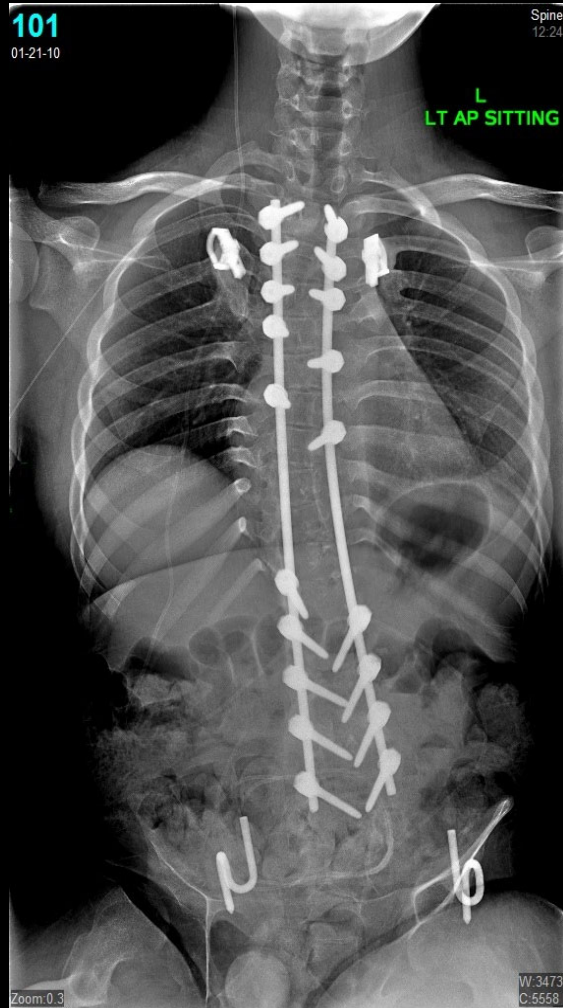




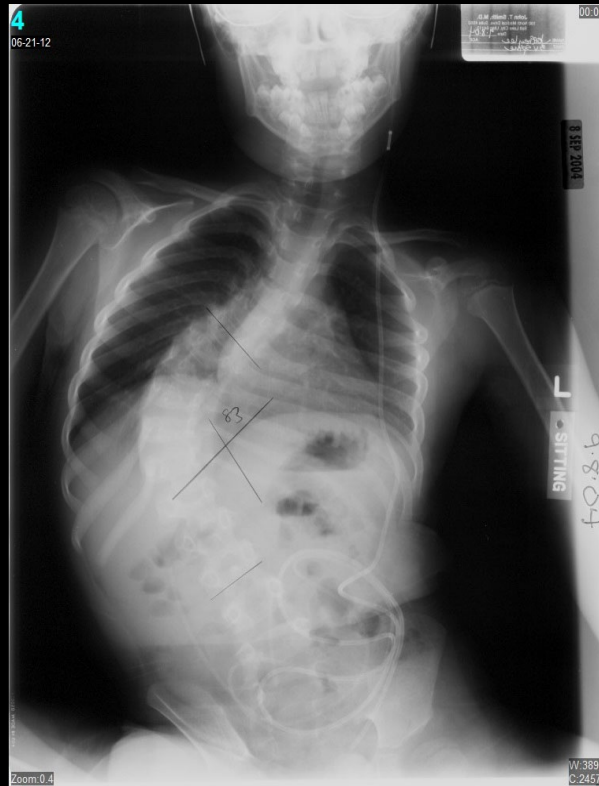
6 yrs s/p VEPTR expansions



Fusion, age 14



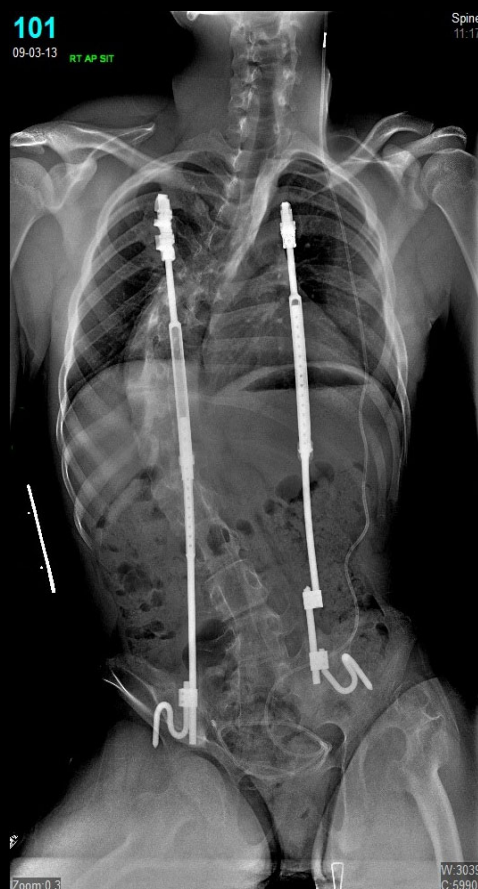
JL: 6 y/o male with scoliosis and spina bifida



JL: Initial rib to pelvis VEPTR



8 year f/u with VEPTR



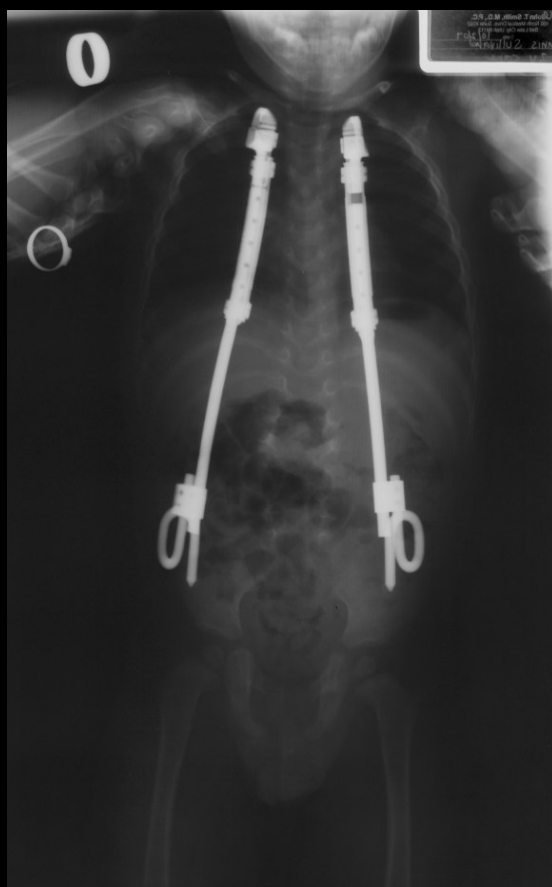
DS: 18 m/o with Spina Bifida and a gibbus deformity. Patient is ambulatory



W.3533
C.2014



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

