Correction and Complications in the Treatment of EOS: Is there a Difference between Spine vs. Ribbased Proximal Anchors ?

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## Disclosures

Presenter: Michael G. Vitale

(a) OREF, CWSDRF, SRS, POSNA, OMeGA(b) CWSDSG, Stryker, Biomet(e) Biomet, CWSDSG, FOXPSDSG

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No Relationships

(a) CWSDRF, SRS, POSNA

**No Relationships** 

(a) OREF, Medtronic
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## **Top 10 Areas of Equipoise in EOS**

1	In idiopathic children <9yo, with curves >60 degrees, what should the lengthening intervals be?
2	In idiopathic 1-3yo children with 30 degree curves, should we observe or cast?
3	In children >12yo who have finished lengthenings of distraction based treatments, should we observe, remove growing constructs or fuse?
4	In 3-6yo children with severe kyphosis, should we use rib or spine based distraction?
5	In idiopathic 2-3yo children with 90 degree curves, should we use spine or rib based distraction?
6	In high tone neuromuscular children with 90 degree curves who are ambulatory but have pelvic obliquity, should we use pelvic or non-pelvic fixation?
7	In idiopathic 9yo children with 30-40 degree curves who have progressed 30 degrees (last 6 months), should we treat conservatively, use growth modulation or other?
8	In an idiopathic 1-2yo child with a 60 degree curve, should we be bracing or casting?
9	In 9yo children with 90 degree curves, should we distract (rib or spine-based) or fuse?
10	In idiopathic 3-9yo children with 60 degree curves, should we be conservative or employ distraction based techniques?



### Purpose



To examine the outcomes of rib vs. spine based <u>proximal anchors</u> in growing instrumentation surgery





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## **Methods**

### **Retrospective review** of CWSDSG and GSSG data

### • Inclusion:

- Minimum 2 yrs f/u
- Age 2-10, Cobb>50
- Received growing instrumentation

### • Outcomes: Cobb angle change & Complications







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## Complications as Collected by GSSG & CWSDSG

### **GSSG Complications**

Neurologic Deficit Vessel Injury Cardiac Related Anesthesia Related Abandoned Procedure due to: respiratory distress, hemodynamic instability, excessive bleeding, inability to tolerate single lung ventilation Medical complication: pneumonia, UTI, atelectasis requiring intervention, pleural effusion requiring intervention, SMA syndrome Implant Related: anchor, connector, longitudinal component failure) Neuro-monitoring findings requiring intervention Wound: superficial or deep infection, dehiscence, suture abscess, erosion due to implant, metal allergy **Unexpected Pain** 

### **CWSDSG Complications**

Infection Spine/Hardware (Intervention, Device Related, Resolution) Hardware Failure (Intervention, Device Related, Resolution) Wound Dehiscence Pneumonia

Neurologic Injury Pain - Neurogenic Device Migration Requiring Revision Death

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### **Minimal Baseline Demographic Differences**

	Rib	Spine
Ν	260	245
Mean f/u	4.7 yrs	5.2 yrs

Etiology	Rib	Spine		
Idiopathic	16.7%	20.8%		
Congenital/Structural	37.1%	30.3%		
Syndromic	15.8%	25.4%		
Neuromuscular	30.3%	23.6%		

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# Spine-based proximal anchors achieve greater Cobb Angle correction



![](_page_10_Picture_3.jpeg)

## Spine-based proximal anchors exhibit higher <u>complication rates</u>

### **Complications per Patient**

![](_page_11_Figure_2.jpeg)

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![](_page_11_Picture_5.jpeg)

### **Conclusions** ?

1. Spine-based proximal anchors superior at Cobb angle correction

2. Spine-based proximal anchors at increased risk of complications

![](_page_12_Picture_3.jpeg)

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![](_page_12_Picture_5.jpeg)

### **Study Limitations**

- 1. Retrospective study design
- 2. Analyzed only frequencies due to data-sharing obstacles
- 3. Complications defined differently between CWSDSG and GSSG

Flawed retrospective study for a high priority topic of equipoise

Impetus for prospective trial of Rib vs. Spine-based proximal anchors

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![](_page_13_Picture_8.jpeg)

## Next: Prospective Clinical Trial of Rib vs Spine-based Proximal Anchors

### • Methods:

- Prospective study of rib vs. spine-based proximal anchors
- 2 years of follow up; approximately q6 months
- Stratify Patients by C-EOS

Funded by SRS

**Examine "Construct" Density** 

### • Endpoints:

- Radiographic
- Early Onset Questionnaire 24 (EOSQ-24) scores
- Standardize definition of Complications

NewYork-Presbyterian Morgan Stanley Children's Hospital Columbia Classification of Complications in Growing Spine Surgery JT Smith, D Skaggs, C Johnston, MG Vitale

## **Study Timeline**

	2012		2013		2014		2015	
	September	October-December	June	December	June	December	June	December
Planning and Enrollment	Status update on Registry merger Submit IRB Protocol at CUMC	Send IRB Approval to outside sites for approval Data collection may begin upon approval	~ Time to reach 70 patient enrollment quota	6 mo follow up	12 mo follow up	18 mo follow up	~ End of data collection Begin data analysis	Manuscript preparation and submission
<u>Database</u> Development	GSSG and CWSDSG coordinators to begin streamlining clinical, radiographic, and surgical input Both groups will update data collection forms to reflect parallel input. GSSG database programmers to design a parallel registry which will be used for all data in both registries Late 2012: Study registry available for entering prospective trial subjects							

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![](_page_15_Picture_4.jpeg)

## More to Come....

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