Children's Hospital Colorado
Orthopedics Institute

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The role of serial casting in early onset scoliosis

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Disclosures

- Neither I nor any member of my family has a financial relationship or interest with any proprietary entity producing health care goods or services

Study Objectives

- To review our institution's experience with serial casting in the management of children with EOS.
- To determine if there are any differences in response to serial casting based on EOS curve etiology.
- To determine the effect of serial casting on thoracic height growth in the management of EOS.

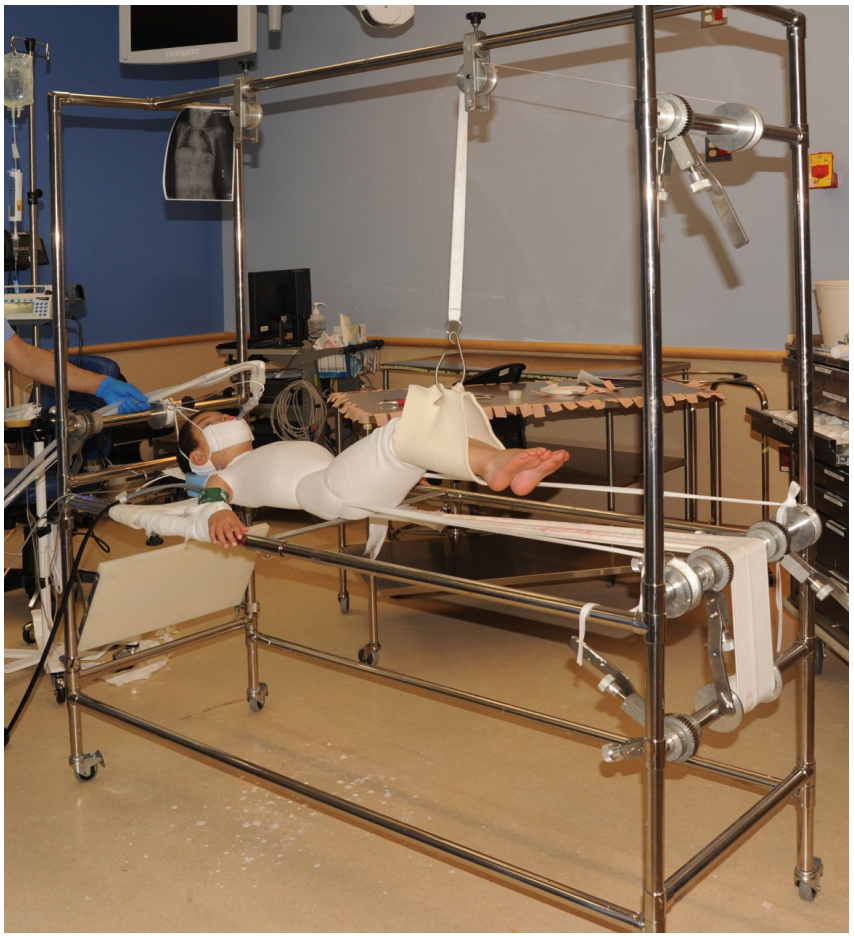
Methods

- Retrospective
- Serial casting database
- Single pediatric hospital
- Jan 2005 – Aug 2010
- Inclusion Criteria:
  - Diagnosis of EOS (<6yo)
  - Underwent at least 2 consecutive cast applications

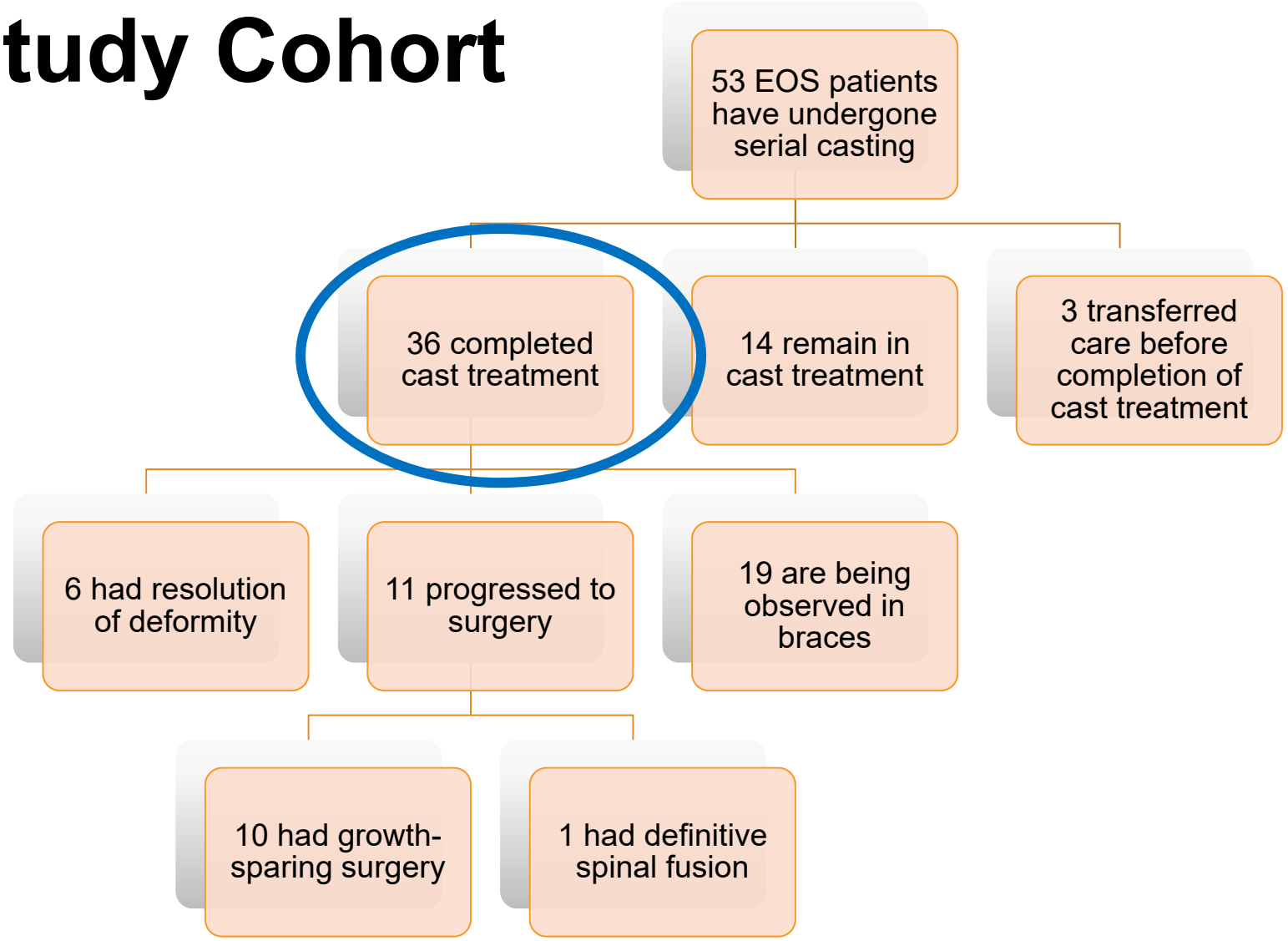
Methods

- AMIL spine casting table
- Over-the-shoulder casts with anterior and posterior windows
- Casts changed every 8-12 weeks

- Classified into 2 groups
  - Idiopathic
  - Non-idiopathic



Study Cohort



Results

- No differences between idiopathic and nonidiopathic groups
  - Length of time in cast (range 3 – 47 months, average 13 months)
  - Follow-up (range 5 – 54 months, average 31 months)
  - # of casts (range 2-20, average 6)
  - Age at start of casting (range 0.2-6 yrs, average 2.6 yrs)

Complications

- Complication Rate: 19% (7/36)
  - Pulmonary (5)
    - 3 pneumonia
    - 1 bronchiolitis
    - 1 aspiration
  - Skin (2)
    - Superficial skin breakdown

- None required invasive interventions

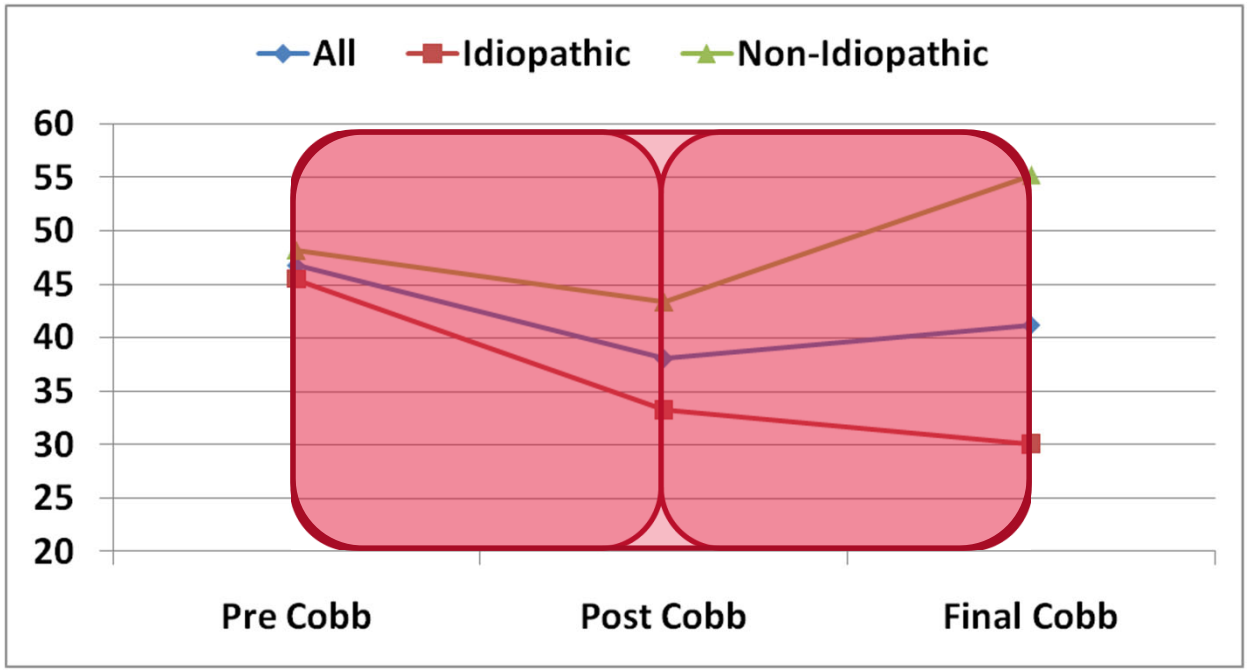
Results

- Surgery: 30.6% (11/36)
  - Avg age: 5.6 yo (2.7-8.0 yo)
  - Avg time delay from initial casting: **2.1 yrs** (0.4-4.2 yrs)

- Deformity Resolution: 16.7% (6/36)

	Resolution		
	n	**Percentage**	**P-Value**
Idiopathic	5	26.32%	p=0.1821*
Non-Idiopathic	1	5.88%	

*Fisher's Exact Test



	Pre-Post Cobb	Pre-Final Cobb	Post-Final Cobb
All*	**8.7 (p=0.0014)**	5.7 (p=0.1248)	-3.1 (p=0.1792)
Idiopathic†	**12.2 (p=0.0032)**	**15.4 (p=0.0052)**	3.2 (p=0.2532)
Non-Idiopathic†	4.8 (p=0.1018)	-6.5 (p=0.1392)	**-11.0 (p=0.0071)**

*Student's t-test
†Wilcoxon Sign Ranked

Thoracic Height Velocity

	T-Height Velocity: Subject Mean (cm/year)	T-Height Velocity: Population Mean	P-value*
All	1.56	1.4 cm/year	p=0.6501
Idiopathic	1.59	1.4 cm/year	p=0.5619
Non-Idiopathic	1.52	1.4 cm/year	p=0.8926

*Wilcoxon Sign Ranked

Discussion

- Study Limitations:
  - Retrospective study design
  - No control observed or braced group
  - Small sample size
  - Follow-up is not to skeletal maturity
  - Limited objective parameters to assess treatment success
  - No functional or quality of life measures

Discussion

- First study evaluate efficacy of serial casting in EOS using thoracic height velocity

- Correction, surgical delay and complications comparable to recent studies of casting
  - Tsuji SRS 2008
  - Fletcher ICEOS 2010

Conclusions

- Serial casting leads to improved curve correction in idiopathic compared to non-idiopathic EOS

- Serial casting in EOS delayed surgery an average of 2.1 years in our cohort

Conclusions

- Thoracic height growth continues at normal velocity during serial casting for EOS.
  - Benefit of casting vs. natural history?

- Further studies on serial casting in the management of EOS are warranted to explore :
  - Outcomes using other objective measures of treatment success (e.g. quality of life, pulmonary function)
  - Results at skeletal maturity

Thank You!