

# Serial Casting As A Delay Tactic In The Treatment Of Moderate To Severe Early Onset Scoliosis

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ICEOS 2010

Toronto

**Disclosures:**

<sup>1</sup> None

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# Background

- Early onset scoliosis (EOS) with moderate to severe curves impedes pulmonary development and increases mortality
- Use of growing spine and chest wall instrumentation has increased
  - Perceived lack of efficacy of casting?
- High complication rate and multiple interventions may lessen the appeal of surgical treatment

# Purpose

- To evaluate a single institution's experience with casting "Uncastable" curves
  - Older children with bigger curves
  - Syndromic or congenital scoliosis



# Methods

- Retrospective review of 58 patients treated with casting between 1993-2010
- Inclusion criteria
  - Idiopathic scoliosis
    - >2+6 years of age at initial casting
    - Curves greater than 50 degrees
  - ANY congenital, neuromuscular, syndromic curve
  - *Must have been transitioned from a cast to a brace*
- Exclusion criteria
  - Younger patients with smaller curves

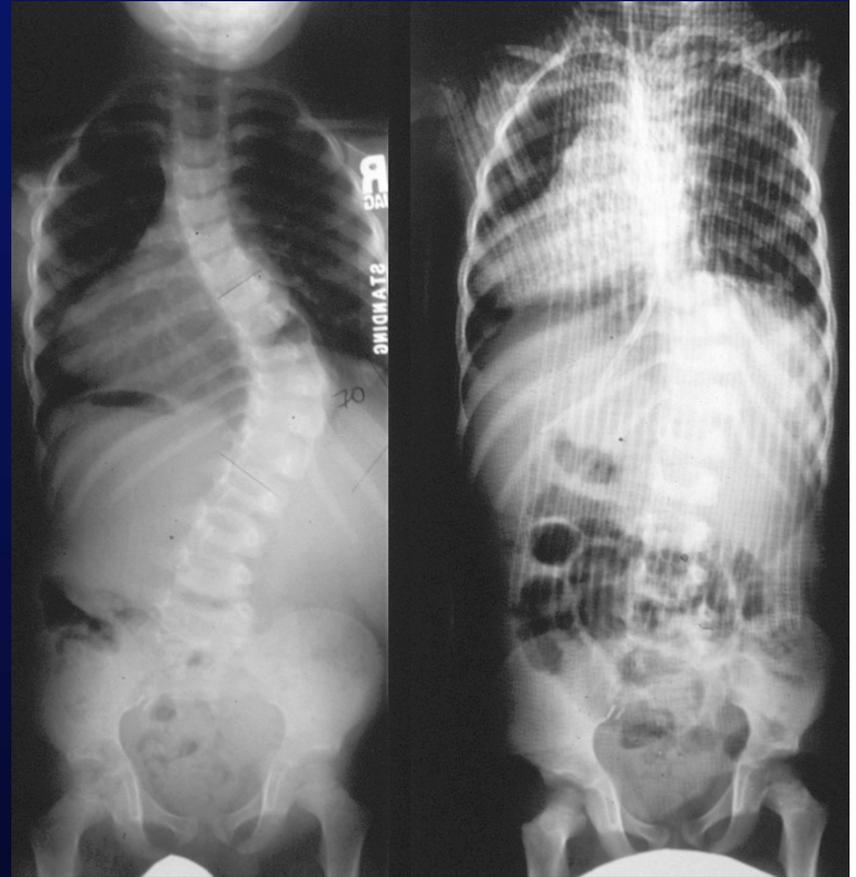
# Results

- 36 patients met all inclusion criteria
  - 16 Neuromuscular/syndromic
  - 13 idiopathic
  - 5 Skeletal dysplasia/CTD
  - 1 congenital
  - 1 s/p tumor resection
- Cast Type
  - 22 Risser/translational
  - 14 Mehta/Cotrel derotational
- 25% had MRI abnormalities of which 66% required neurosurgical intervention



# Patient characteristics

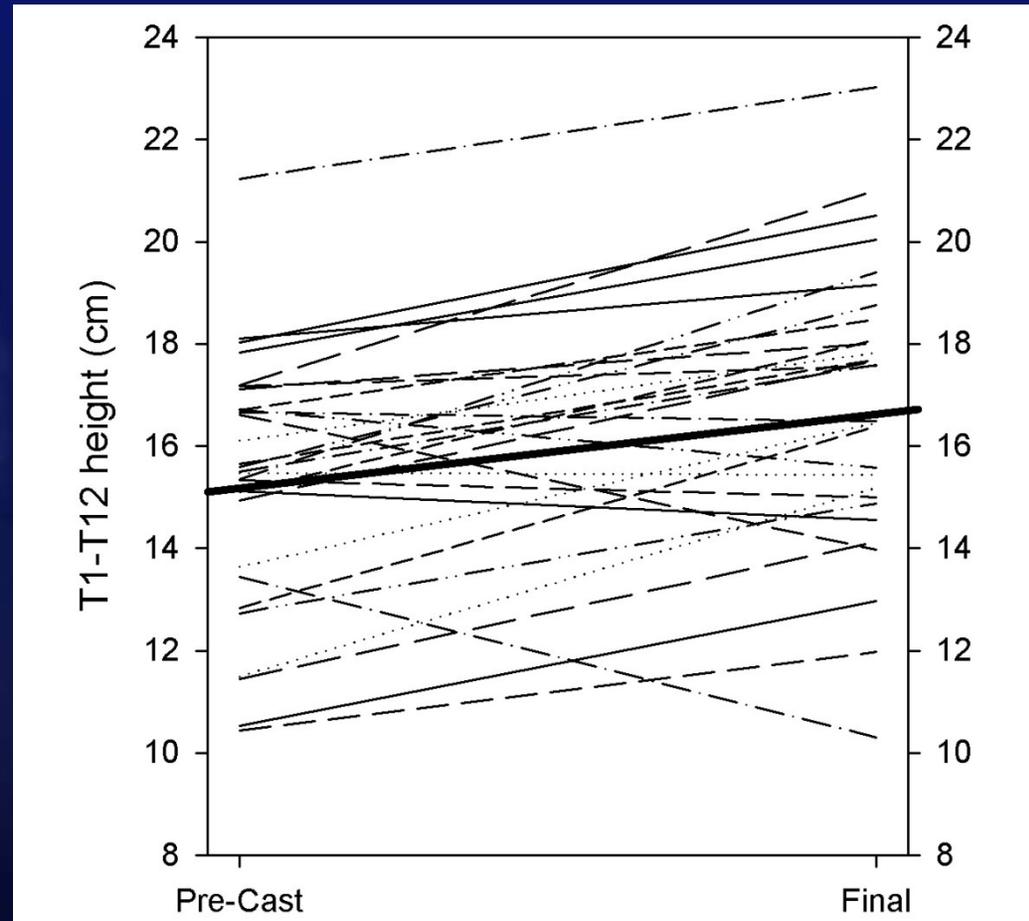
- Age at first cast 4.8 years
- Follow up 3.9 yrs (0.8 – 9.1)
- Primary curve  $65.6^{\circ}$  corrected to  $37.9^{\circ}$  in cast
- 3.9 cast changes over 1.1 years
- Curves after removal  $59.4^{\circ}$ 
  - Increased to  $75.4^{\circ}$  at final follow up.



# Idiopathic vs Non-idiopathic

	Idiopathic (n=13)	NMS/Cong/Syn (n=23)	P value
Pre cast Cobb	62.2	67.5	0.15
% Correction with cast	45.9%	43.1%	0.68
Preop RVAD	39.5±17	NA	
<b>Bracing period</b>	<b>39.9 months</b>	<b>18.3 months</b>	<b>0.05</b>
Loss of correction in brace	44.9	35.5	0.19
Need for surgery at follow up	46%	36%	0.73

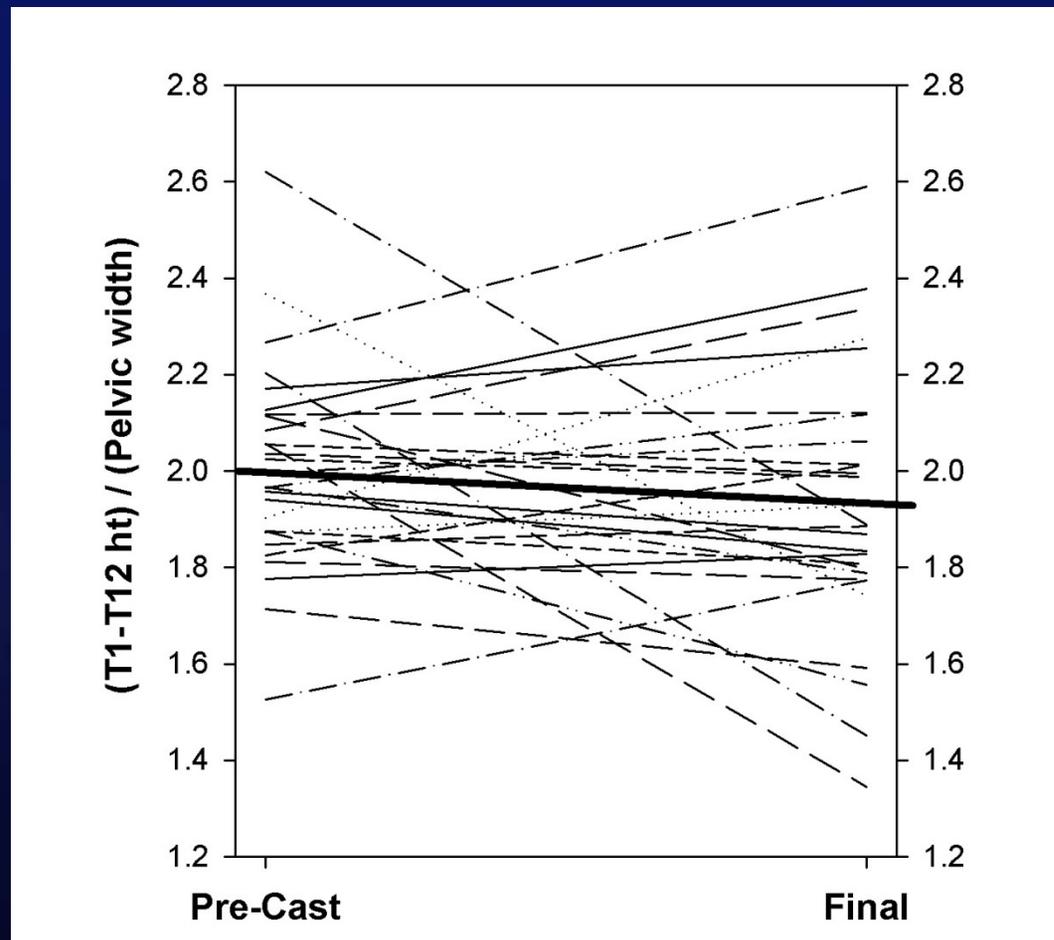
# T1-T12 Height



T1/12 growth  $1.5 \pm 1.8$  cm

Annual growth  $0.7 \pm 1.2$  cm/yr

# Thoracic Height/Pelvic Width



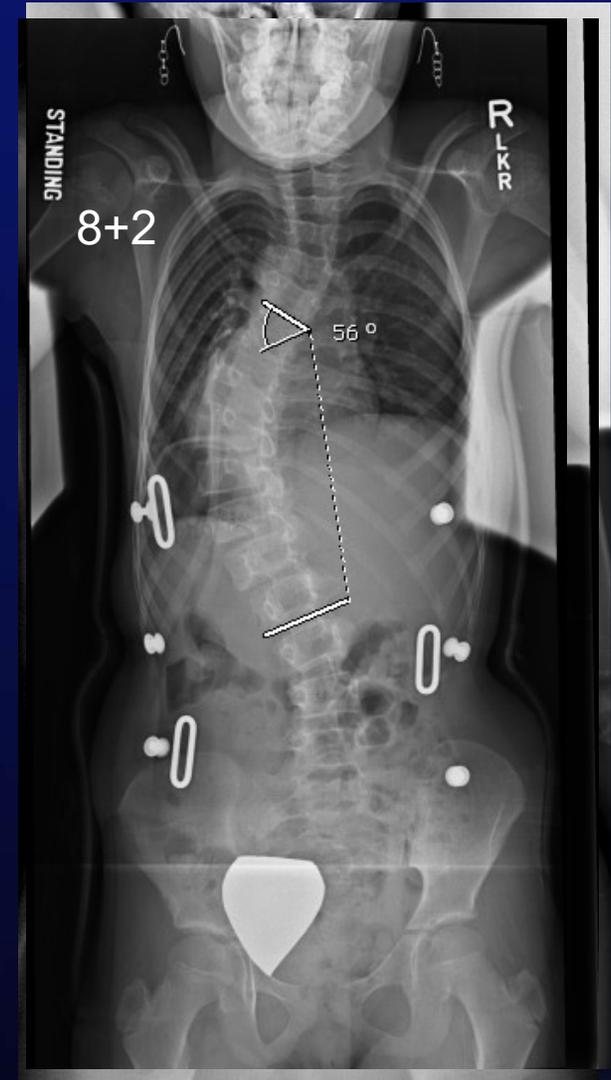
# Complications – 16.6%

- 1 bilateral femur fx during seizure
- 3 skin irritation or rash requiring no treatment
- 1 skin lesion in patient with lipomeningocele requiring removal of cast
- 1 recurrent emesis – cast removed in PACU



# Surgical intervention

- 15/36 (39%) required surgery
    - 7 definitive anterior/posterior
    - 8 growing spine constructs
  - Surgery delayed 3.06 years
  - Curve correction
    - 89.9° preop to 44.6° post op (50.3% correction)
      - GR – 90.3° → 51.1° (43.1% correction)
      - APSF – 89.5° → 38.9° (56.5% correction)
- p=0.13



# Risk for Surgery

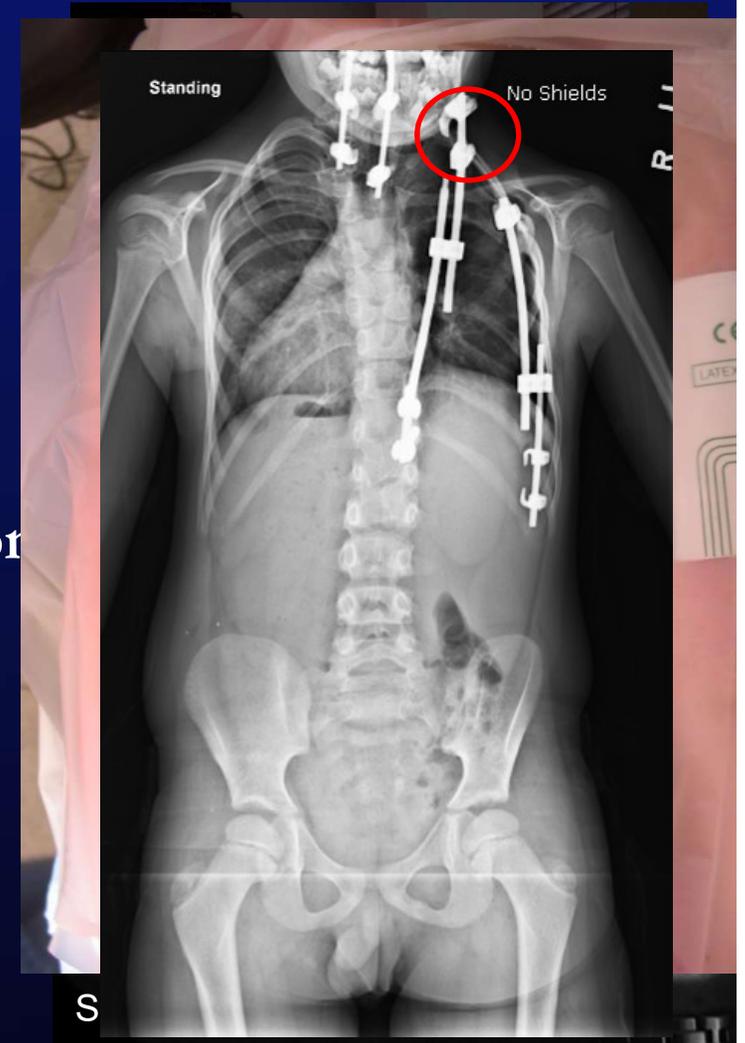
- **Greater curve magnitude**
  - 71.8° vs 61.7°,  $p=0.018$
- **More time in a cast**
  - 1.43 yrs vs 0.75 yrs,  $p=0.037$
- **Greater loss of correction out of cast**
  - 23° vs 9°,  $p =0.017$
- **Risser casting**
  - Switch to Mehta casting in 2007 may confound
- **Age at presentation and underlying diagnosis not associated with surgery**

# Discussion

- Mehta 2005 – casting of idiopathic curves in infantile scoliosis (<1+7 years) successful in curing curve
  - Failure to correct deformity in older children (>2+6 years or curve >52 degrees)
  - 35% underwent surgery by 10+4
- Is this a failure?
  - Surgery delayed 3 years in our study
  - Good correction (~50%) achieved with surgery

# Complications

- **Growing Spine Instrumentation**
  - Bess JBJS 2010 – 58% complication
    - 6.4 procedures per pt
    - 20% complication risk per procedure
- **Chest Wall Expansion**
  - Emans Spine 2005 – 55% complication
- **Combined GSI/VEPTR**
  - Sankar Spine 2010 – 72% unplanned surgery
- **Casting – 16% complications**
  - 2 required cast removal
  - No additional procedures



# Future questions

- Does casting restrict pulmonary growth?
- Derotational casting vs Translational casting?
- Do extended periods of casting help maintain curve compared to transition to bracing?
- What is endpoint for casting in severe scoliosis?