

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

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ICEOS 2010

Toronto

Disclosures:

¹ None

² Medtronic (1,2,3c,5); Saunders/Mosby-Elsevier (7); Orthopedics (8)

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

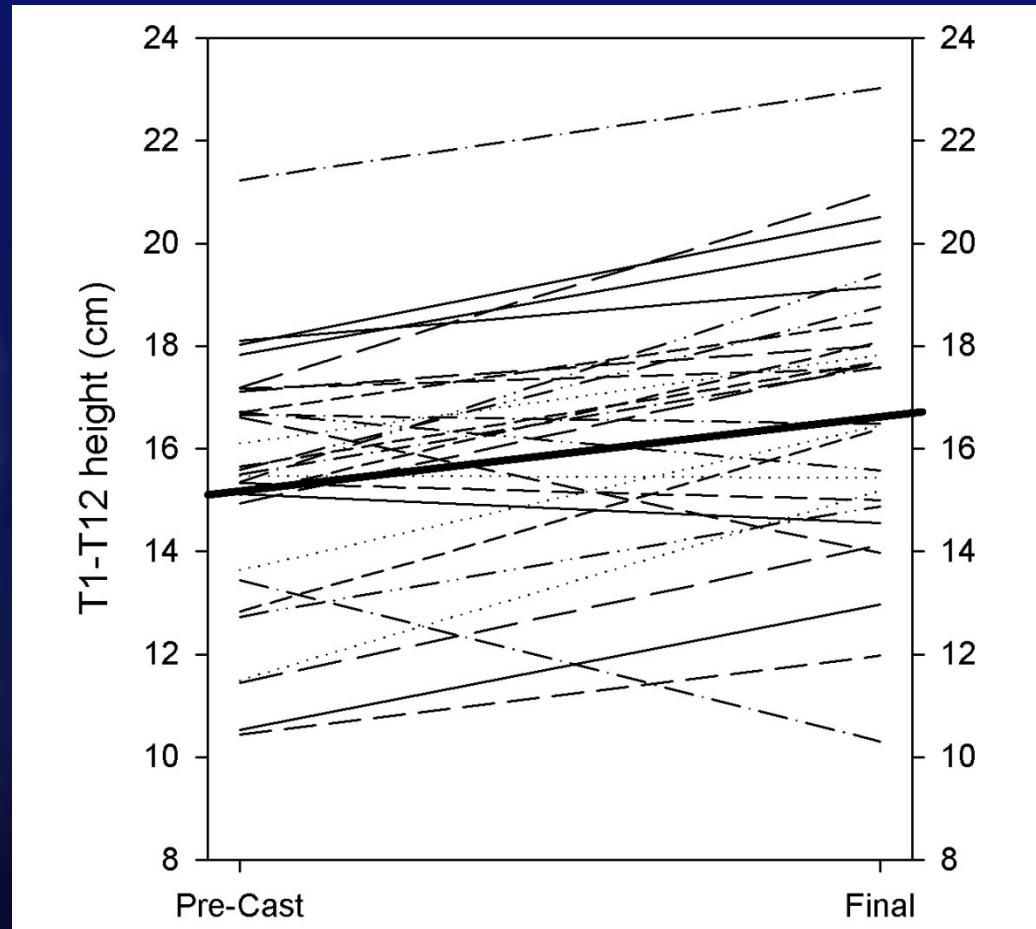
- Age at first cast 4.8 years
- Follow up 3.9 yrs (0.8 – 9.1)
- Primary curve 65.6° corrected to 37.9° in cast
- 3.9 cast changes over 1.1 years
- Curves after removal 59.4°
 - Increased to 75.4° at final follow up.



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	
Bracing period	39.9 months	18.3 months	0.05
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 ± 1.8 cm

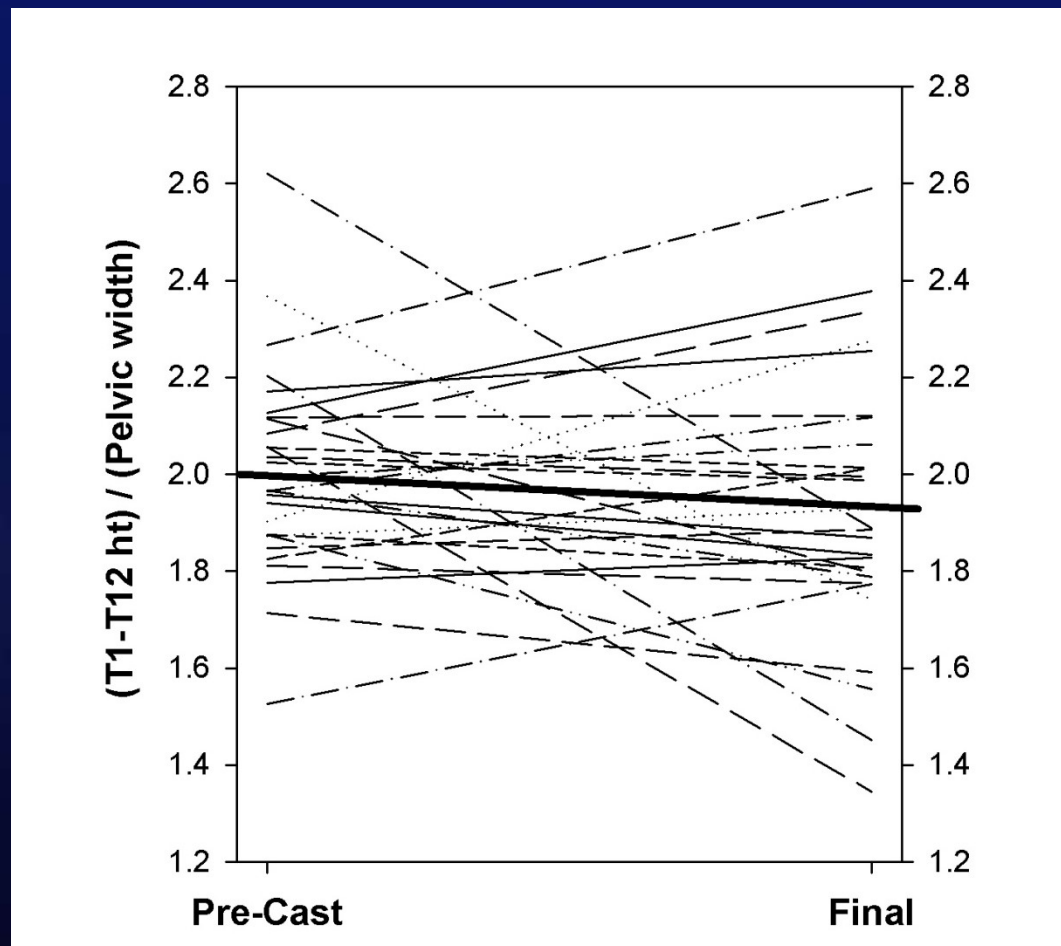
Annual growth 0.7 ± 1.2 cm/yr



EMORY
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FOR CHILDREN

Thoracic Height/Pelvic Width



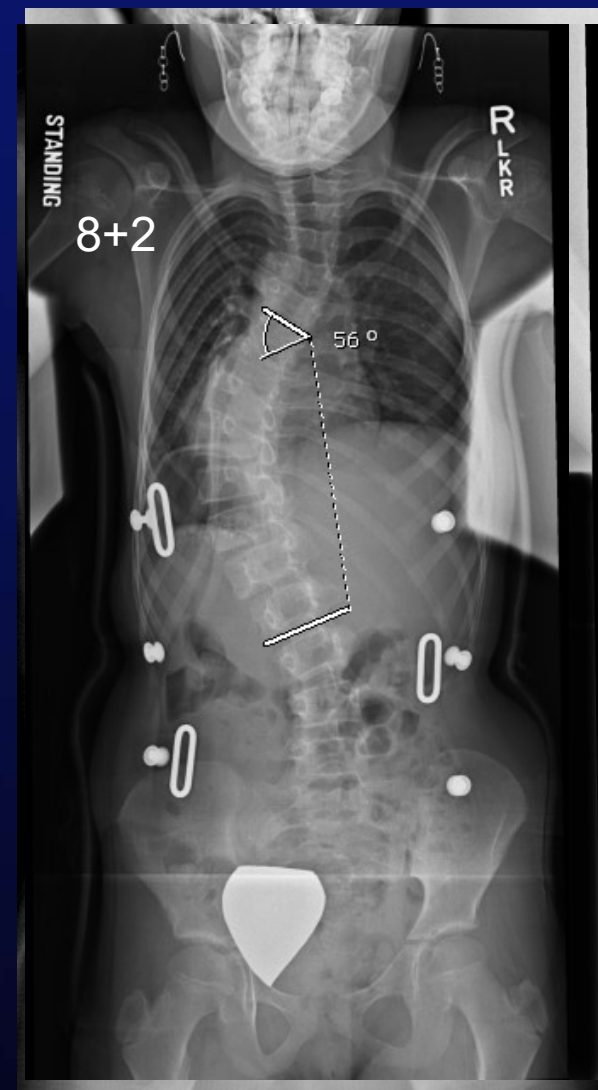
Complications – 16.6%

- 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

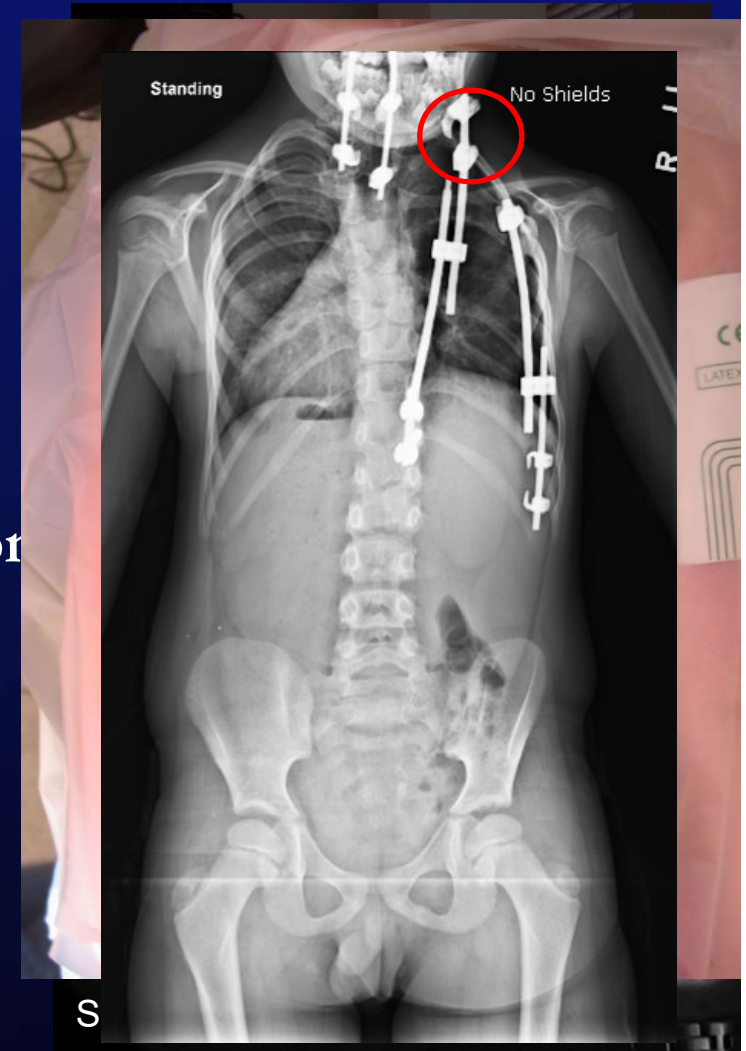
- **Greater curve magnitude**
 - 71.8° vs 61.7°, $p=0.018$
- **More time in a cast**
 - 1.43 yrs vs 0.75 yrs, $p=0.037$
- **Greater loss of correction out of cast**
 - 23° vs 9°, $p = 0.017$
- **Risser casting**
 - Switch to Mehta casting in 2007 may confound
- **Age at presentation and underlying diagnosis 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?