Does Initial Cast Correction Predict Treatment Success for Infantile Scoliosis?

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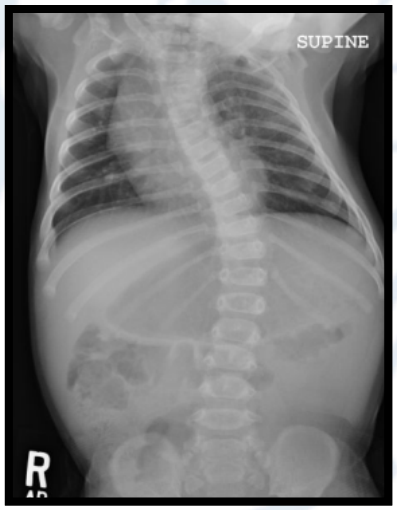
Disclosures

- **No disclosures relevant to this talk**

Background

- **Casting for EOS results in varying amounts of correction:**
  - Two patients
  - Both diagnosed with infantile idiopathic scoliosis (IIS)
  - Precast x-rays:

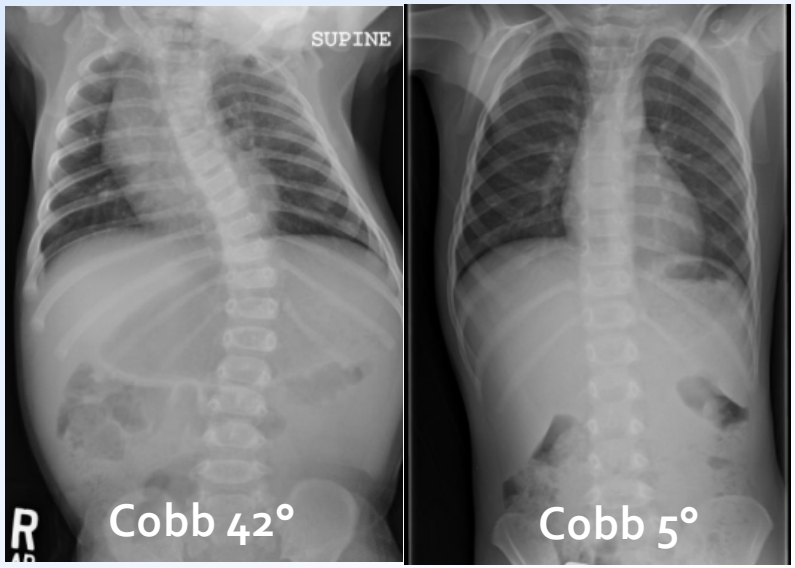
Patient 1



Patient 2

Background

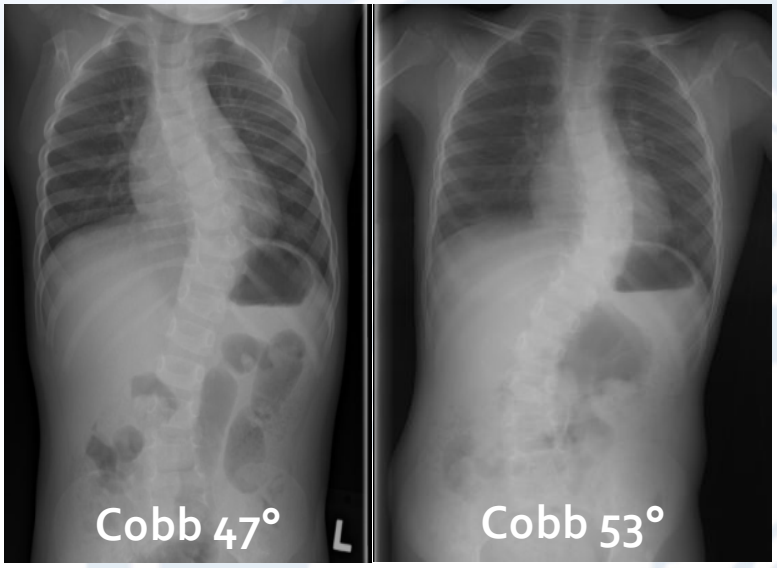
Patient 1



pre-cast x-ray

12 months after casting treatment

Patient 2



pre-cast x-ray

12 months after casting treatment

Background

Growth as a corrective force in the early treatment of progressive infantile scoliosis

J Bone Joint Surg [Br] 2005;87-B:1237-47.

	Resolved 94 patients	Unresolved 42 patients
Mean Age at Referral	19 months	30 months
Delay between Detection and Referral	12 months	18 months
Mean Cobb	32 degrees	52 degrees
Mean RVAD	28 degrees	39 degrees
Phase 1:2	57:37	9:33

Hypothesis

- **Previous research has shown in brace correction predicts treatment success in AIS**
- **Can initial in cast correction predict treatment success in IIS ?**
  - **Percent change in Cobb?**
  - **Percent change in RVAD?**

Purpose

- To examine casting outcomes and identify which factors correlate with curve control
- To identify predictors of curve resolution

Methods

Inclusion

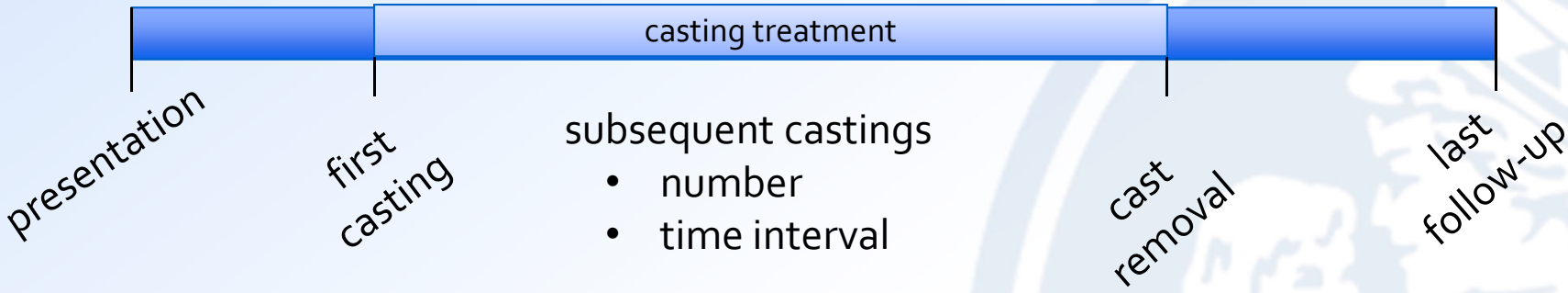
- Infantile
- Idiopathic
- Initial treatment in cast
- Preop, initial in-cast and recent out-of-cast radiographs available

Exclusion

- Congenital
- Neuromuscular
- Other treatment

Methods

Data collection time points

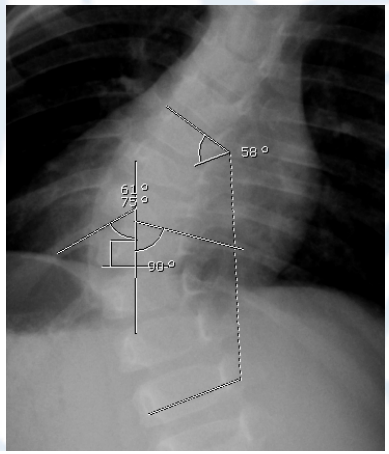


Radiographic measurements

- Cobb angle
- RVAD (rib vertebra angle difference)

Statistical methods

- Pearson's correlation analysis
- Uni- and multivariable regression



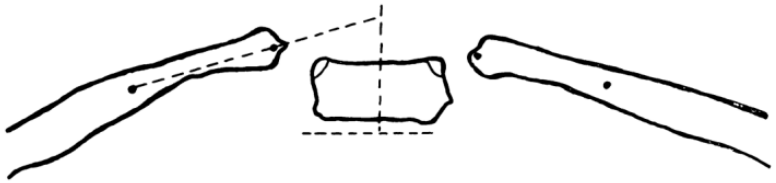


FIG. 4
The construction of the rib-vertebra angle.

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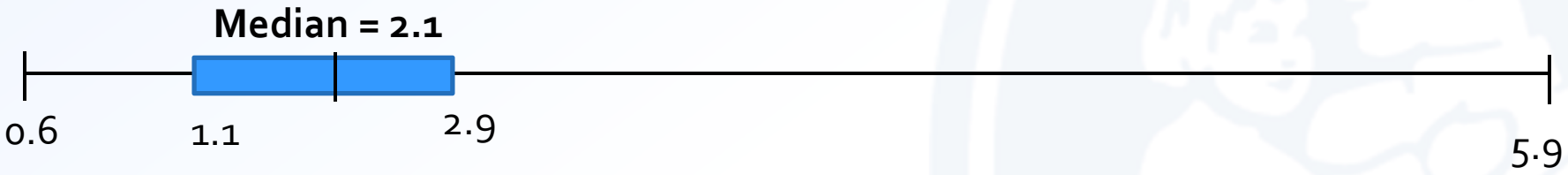
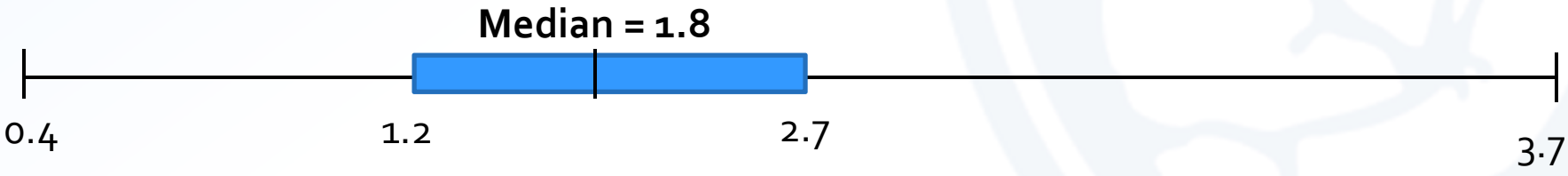
Results: Patient Characteristics

Sample (n = 29)

Age at initial casting (mean = 2.2 years)

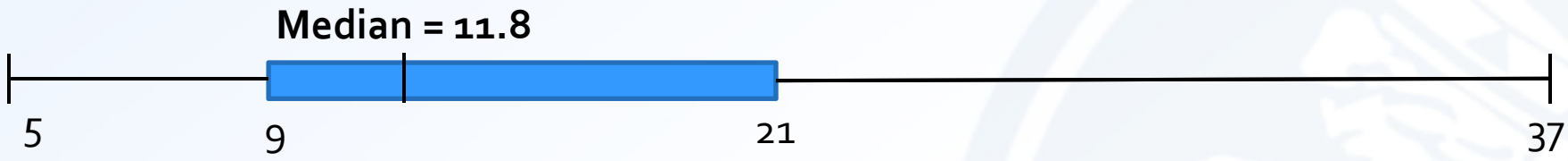


Follow Up (mean = 2.0 years)

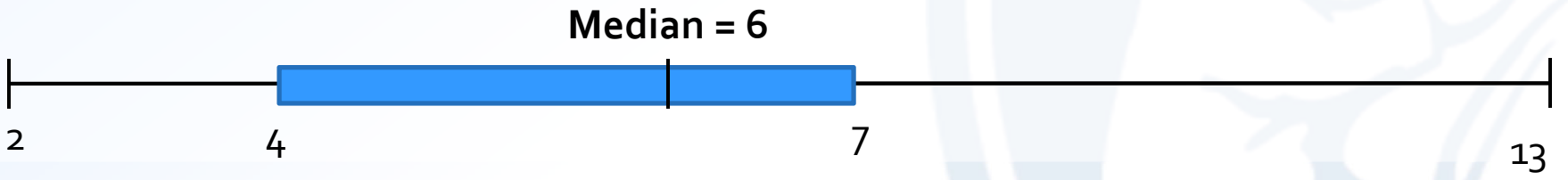


Results: Treatment Characteristics

Treatment Duration (mean = 15 months)

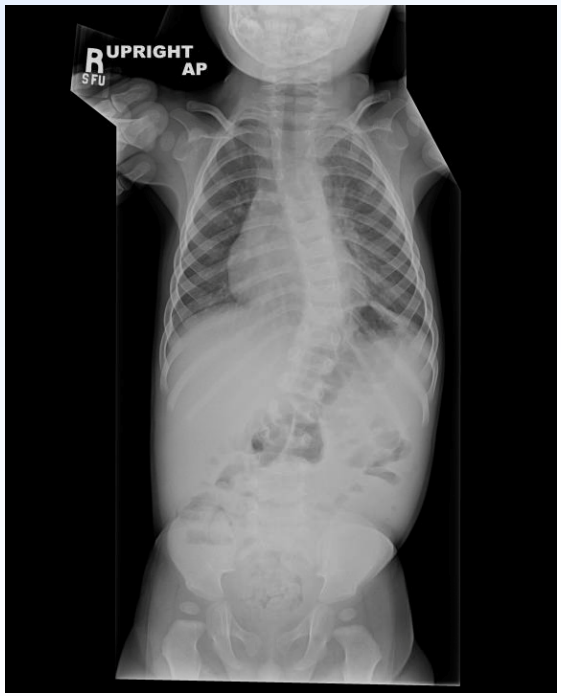


Cast Treatment (mean = 6 casts)



Results of Initial Casting

	Presentation	Initial Casting	Percent Correction
Mean Cobb Angle	45	17	**62 %**
Mean RVAD	26	13	**48 %**



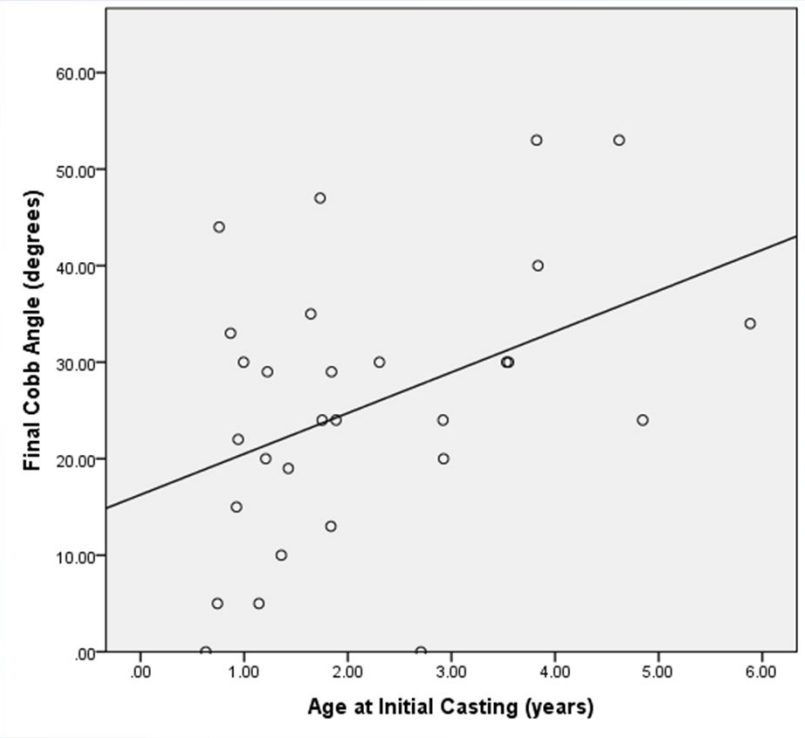
Results

Multivariable regression:

- **Significant predictors of most recent Cobb:**
  - Age
  - Change in Cobb angle at initial casting

p=0.004; R^2 = 29.9%

Results



- **Patients casted at younger age yielded smaller Cobb angles at follow up**
- Multivariable analysis showed that for each additional year of age at casting, the most recent Cobb angle increased 4 degrees *(p=0.01)*

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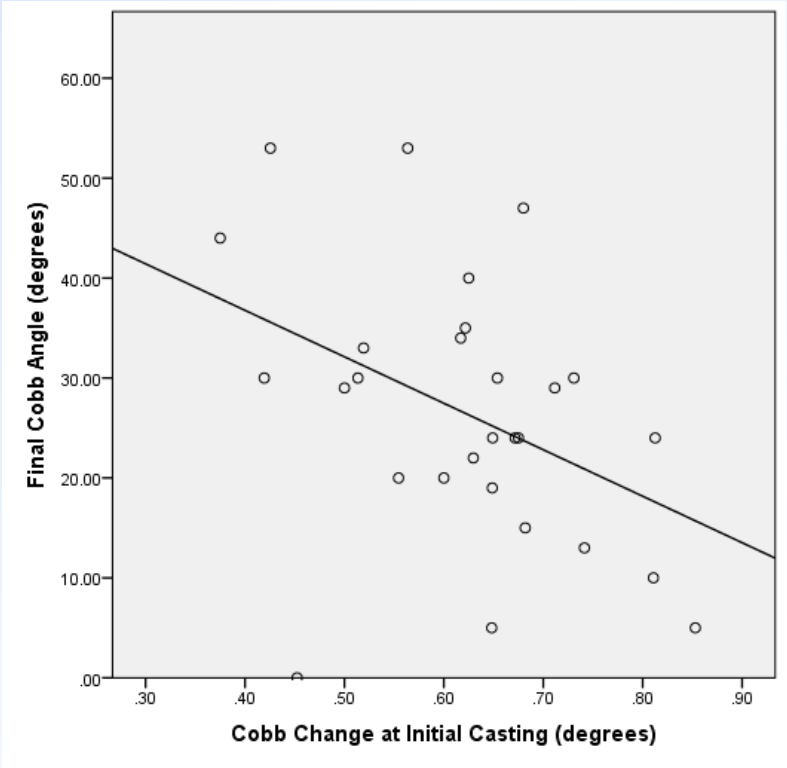
Results



- **Greater change in Cobb angle at initial casting yielded smaller Cobb angle at follow-up**
- Multivariable analysis showed that for each 10% change in Cobb angle at initial casting, the final Cobb angle decreased by 4 degrees *(p=0.005)*

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Conclusions

#1. CAST EARLY

- Curve control is more likely attained the younger a child is casted

#2. CORRECTION AT INITIAL CASTING

- Greater change in Cobb angle at first casting increases likelihood of casting treatment success at 2-year follow-up
  - Flexibility?
  - Cast Quality?

Future Directions

Limitations

- Small sample size (n=29)

Solution:

Patients Cured vs Not-Cured: Multivariable

Based on significant univariate factors with p<=10:

Multivariable analysis determined that age, RVAD at casting, and the number of casts were the only significant, indendent predictors of casting success.

Predictor	OR	95 % CI	p
Age	0.76	(0.63-0.93)	0.007
RVAD at first casting	0.79	(0.64-0.96)	0.02
Number of casts	0.43	(0.22-0.86)	0.02

- For each one month increase in age, the odds of success decreased by 24%.
- For each one-unit increase in RVAD at first casting, the odds of success decreased by 21%

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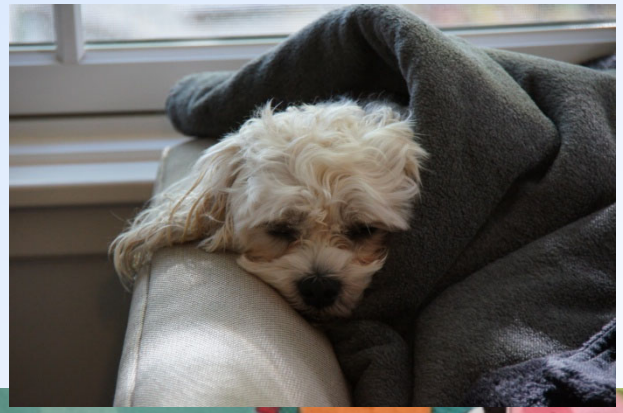

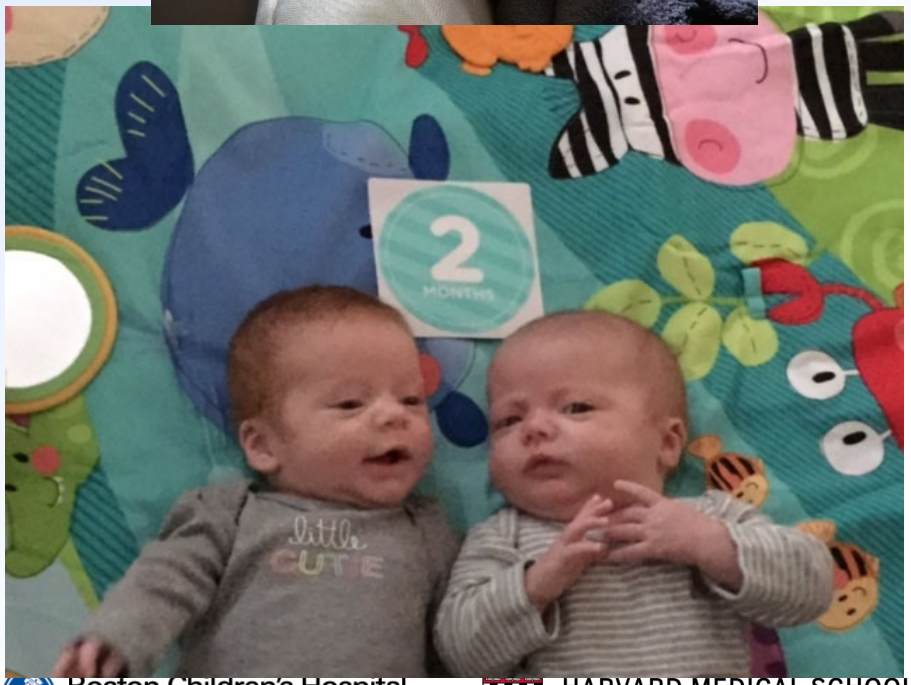

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