EDF Casting Preserves Pulmonary Function in Early Onset Scoliosis - A Preliminary Report

Authors & Disclosures

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- **Disclosures submitted**

Introduction

- While EDF Casting for Early Onset Scoliosis (EOS) has gained popularity and acceptance, little is known about the effects of the cast on pulmonary function
- Pulmonary function changes were studied during the application of EDF Casts for EOS
- We report on the preservation/improvement of pulmonary parameters in 6 children with two consecutive casting procedures

Methods

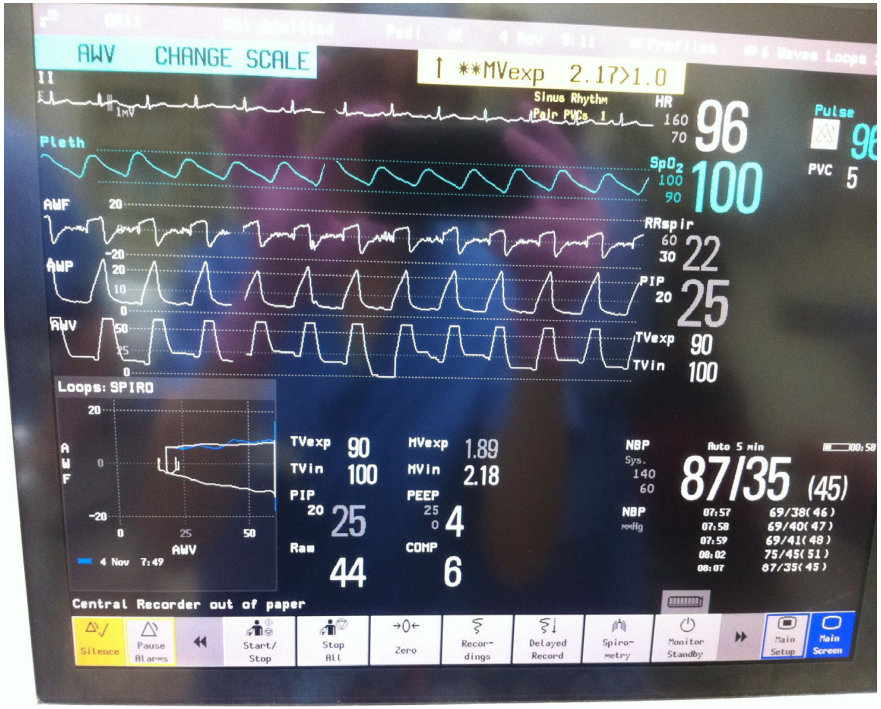
- 16 children (8 months to 9 years) with EOS were treated with EDF Casting under general endotracheal anesthesia using a standard protocol by one Pediatric Orthopaedic Surgeon.
- Measurements of compliance, tidal volume, airway resistance, and peak inspiratory pressure were made using a Philips M1014A Spirometry Module and Philips Healthcare Airway Flow Sensor

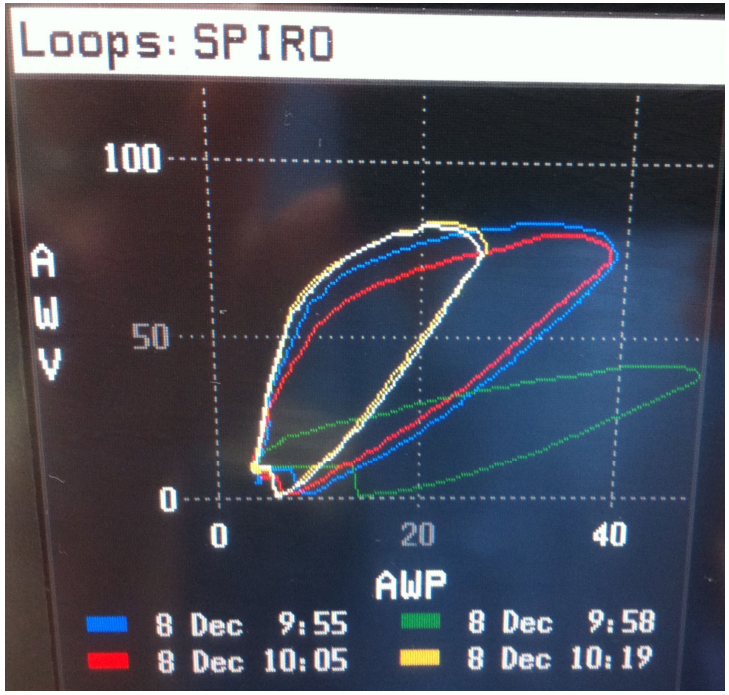
Methods

- Of these, **six** patients had a second cast as part of the treatment protocol, allowing comparison of their pulmonary mechanics before and after each of the casting
- Measurements were obtained
  - after intubation
  - before and after prior cast removal (baseline)
  - before and after spine traction
  - after cast application, and
  - out of traction after cast windows had been removed

Casting Setup

Philips M1014A Spirometry Module





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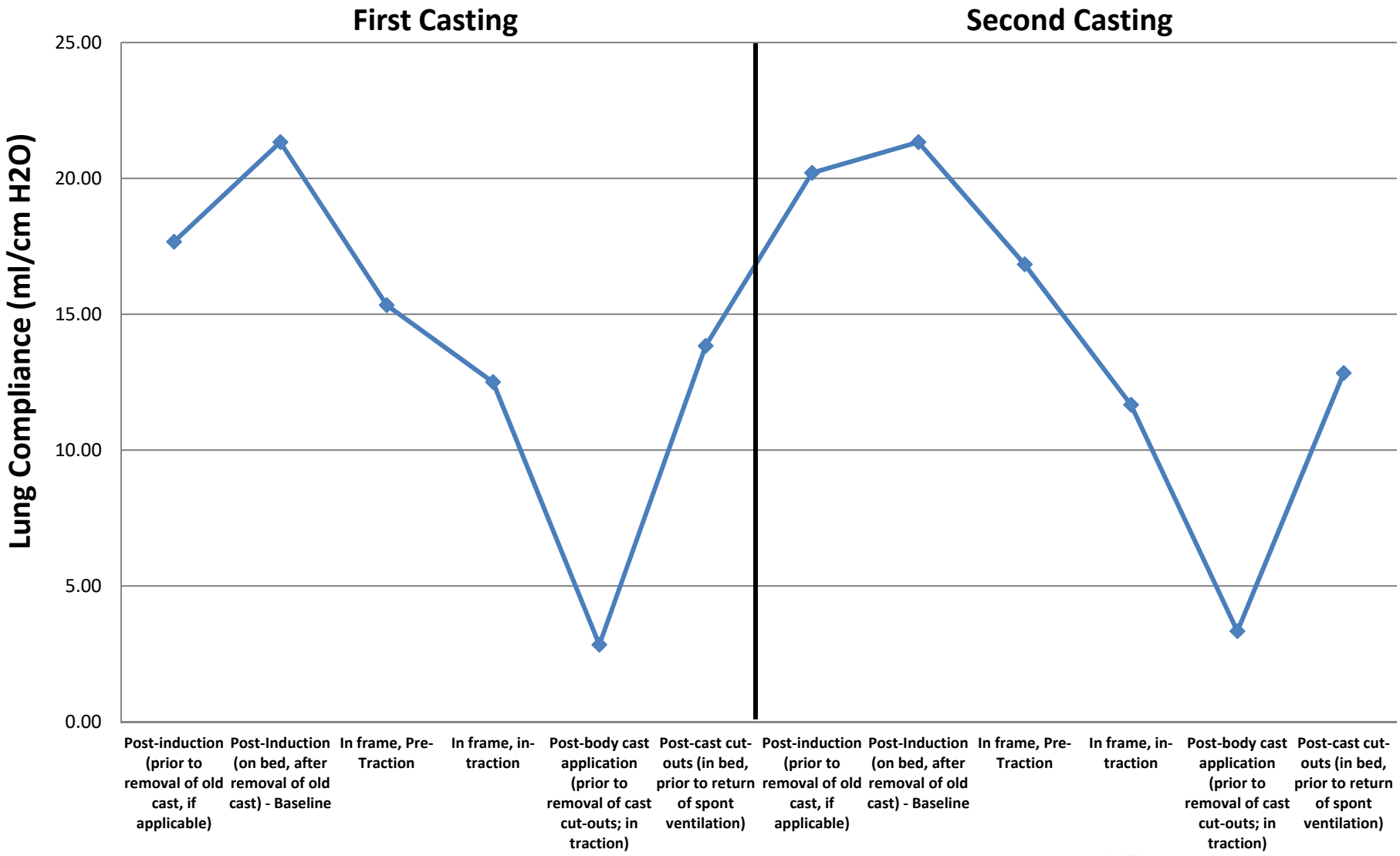
My casts……

Results

- Results were studied as percent deviations from the baseline (defined as 100%)
- Preservation/improvement in compliance, tidal volume, airway resistance, and peak inspiratory pressure at the time of the second cast application
- Despite significant deteriorations in each parameter when the patients were in the casts before windows were cut
- The maximum decreases in tidal volume and compliance and increases in airway resistance and peak inspiratory pressure were not as severe during the second cast application when compared to the first casting

Lung Compliance



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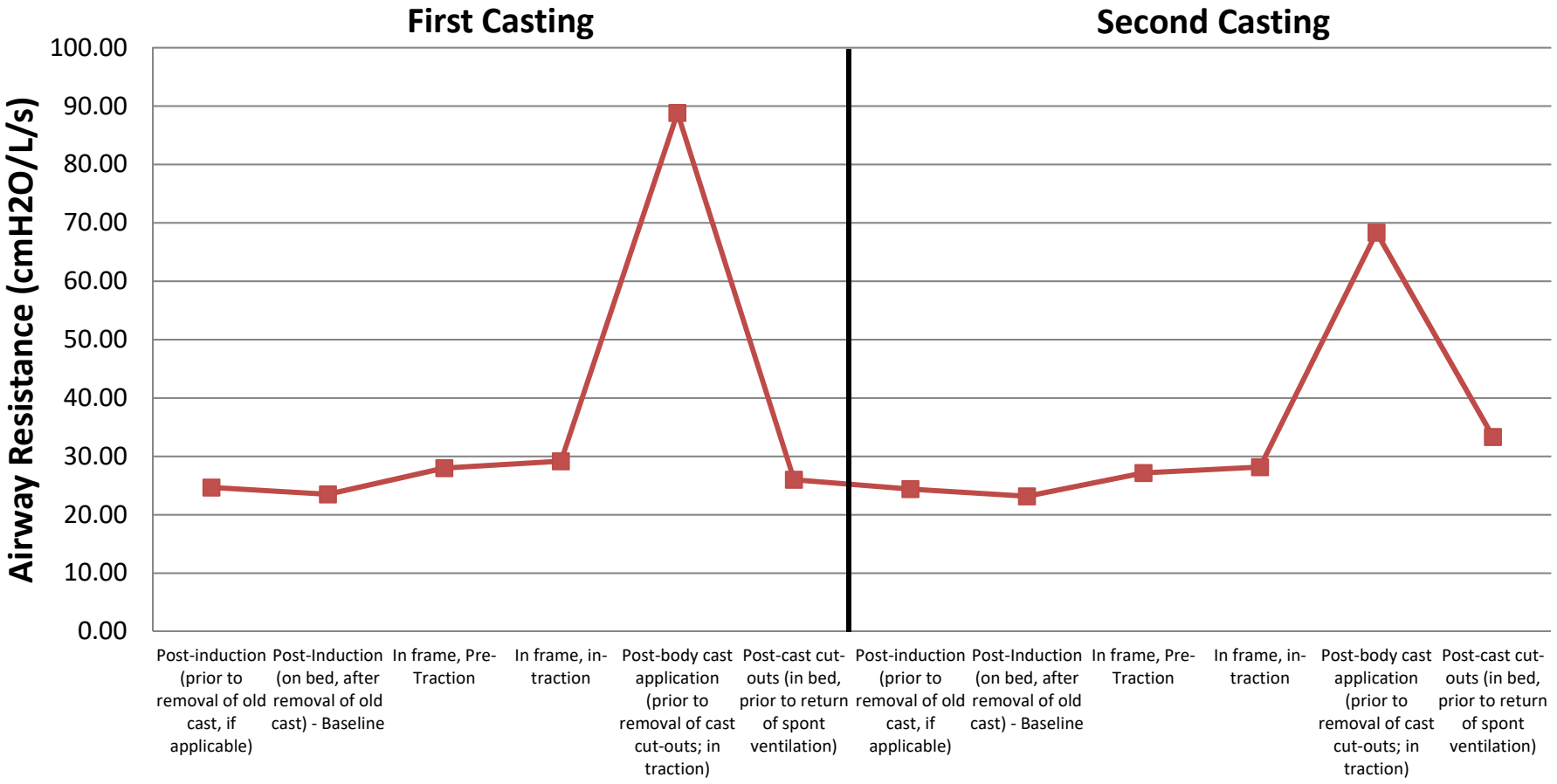
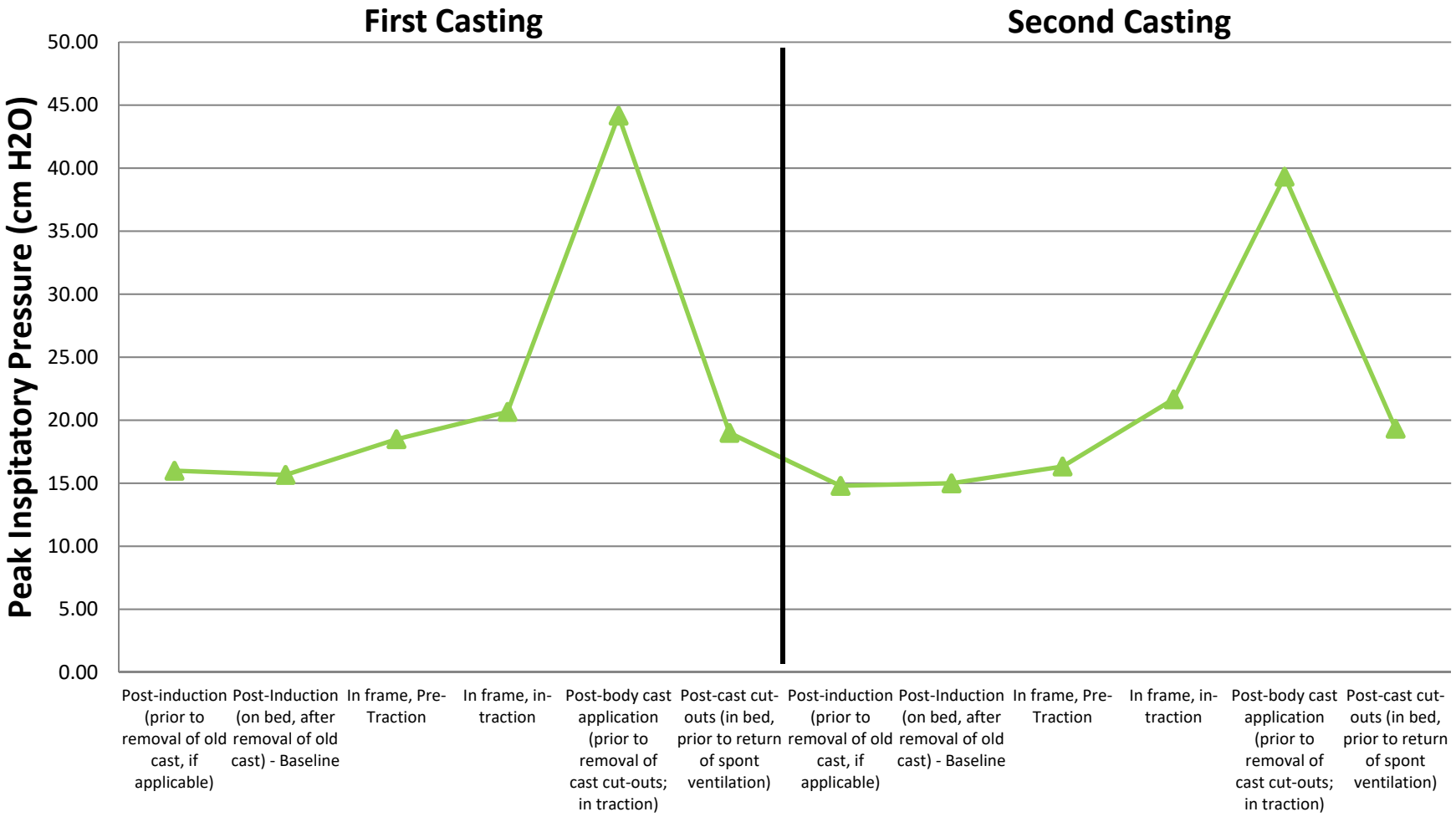
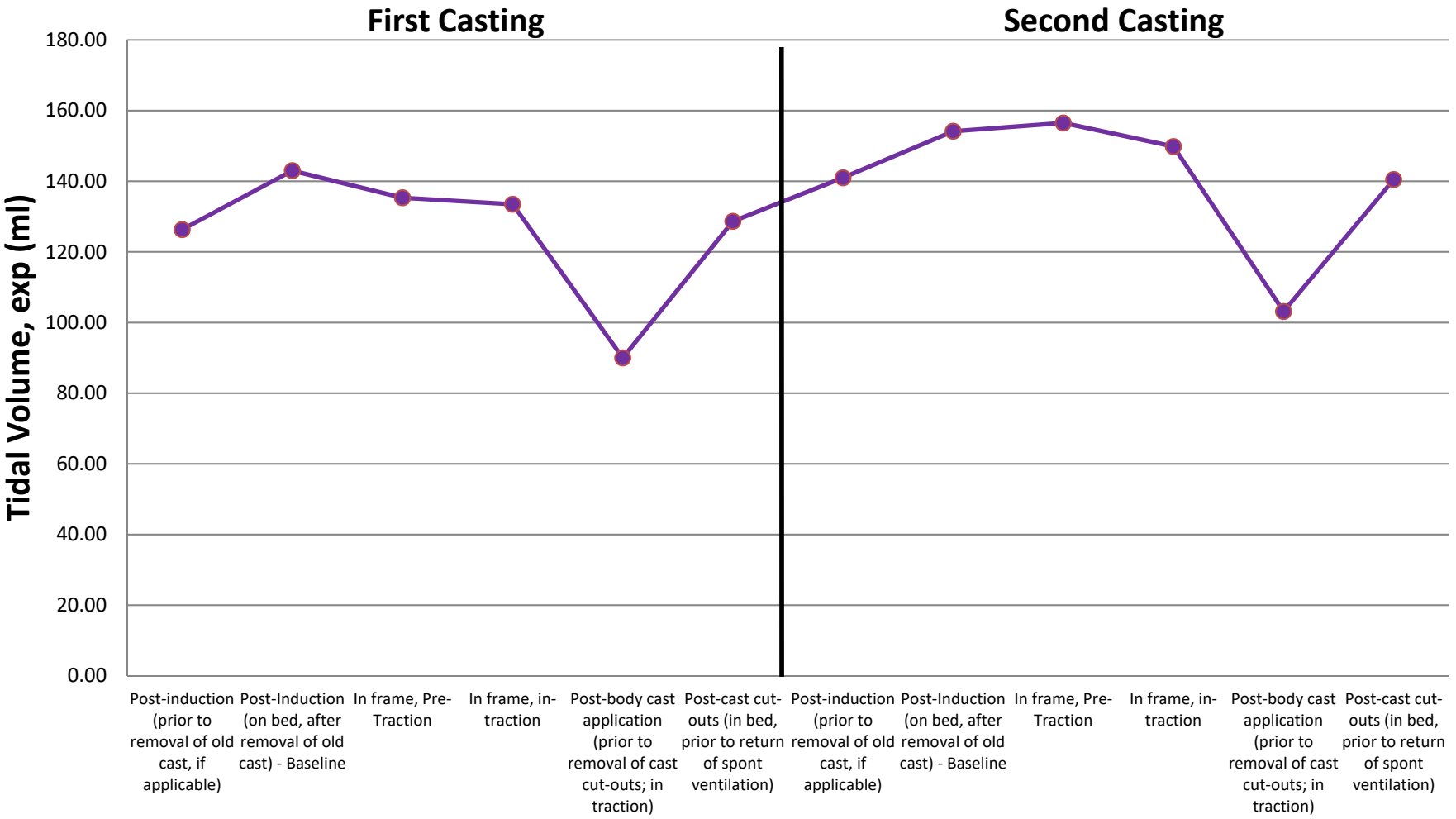
Airway Resistance



Peak Inspiratory Pressure



Tidal Volume



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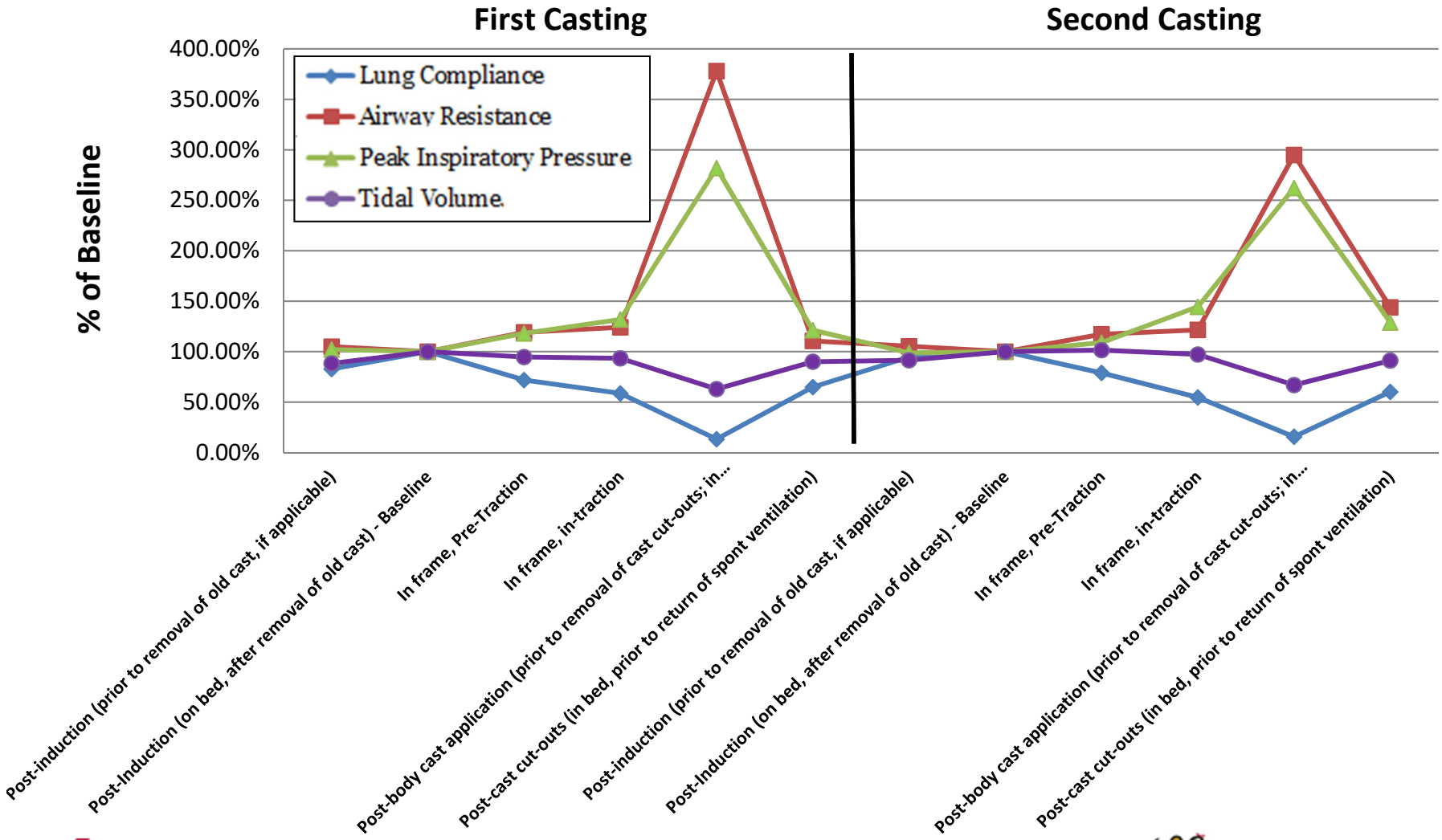
Results

		Lung Compliance (ml/cm H2O)		Airway Resistance (cmH2O/L/s)		Peak Inspiratory Pressure (cmH2O)		Tidal Volume, exp (ml)	
First Casting	Post-induction (prior to removal of old cast, if applicable)	17.67	82.81%	24.67	104.96%	16.00	102.13%	126.33	88.34%
	Post-Induction (on bed, after removal of old cast) - **Baseline**	21.33	100.00%	23.50	100.00%	15.67	100.00%	143.00	100.00%
	In frame, Pre-Traction	15.33	71.88%	28.00	119.15%	18.50	118.09%	135.33	94.64%
	In frame, in-traction	12.50	58.59%	29.17	124.11%	20.67	131.91%	133.50	93.36%
	Post-body cast application (prior to removal of cast cut-outs; in traction)	2.83	13.28%	88.83	378.01%	44.17	281.91%	90.00	62.94%
	Post-cast cut-outs (in bed, prior to return of spont ventilation)	13.83	64.84%	26.00	110.64%	19.00	121.28%	128.67	89.98%
Second Casting	Post-induction (prior to removal of old cast, if applicable)	20.20	94.69%	24.40	105.32%	14.80	98.67%	141.00	91.46%
	Post-Induction (on bed, after removal of old cast) - **Baseline**	21.33	100.00%	23.17	100.00%	15.00	100.00%	154.17	100.00%
	In frame, Pre-Traction	16.83	78.91%	27.17	117.27%	16.33	108.89%	156.50	101.51%
	In frame, in-traction	11.67	54.69%	28.17	121.58%	21.67	144.44%	149.83	97.19%
	Post-body cast application (prior to removal of cast cut-outs; in traction)	3.33	15.63%	68.33	294.96%	39.33	262.22%	103.17	66.92%
	Post-cast cut-outs (in bed, prior to return of spont ventilation)	12.83	60.16%	33.33	143.88%	19.33	128.89%	140.50	91.14%

Pulmonary Function Parameters



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Conclusions

- While pulmonary parameters did not return to baseline at the end of the first casting, they had “normalized” at the time of the second cast application
- Some chest wall and pulmonary/airway adaptation occurs while the children are in the casts, perhaps with growth?
- Further study with longitudinal follow-up of these patients is under way

Thank you!