

The Effect of Growth Friendly Surgery on Coronal and Sagittal Plane Spine Growth in Idiopathic Scoliosis

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Disclosure

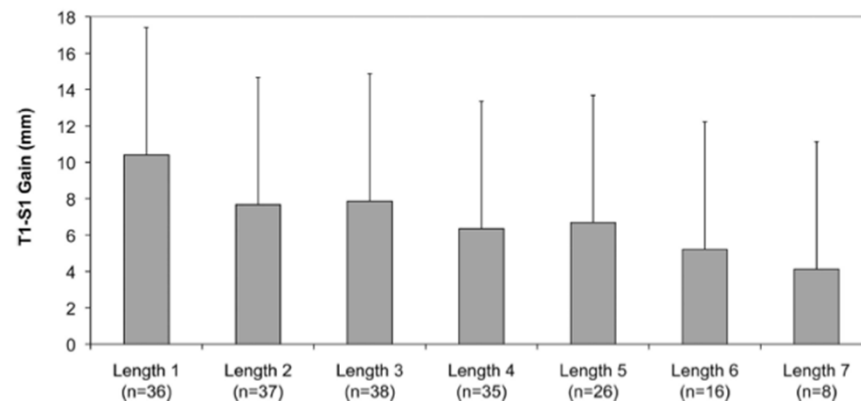
- ▶ Ron El-Hawary
 - Consultant – Depuy Synthes, Medtronic, HBI
 - Research – Depuy Synthes, Medtronic
- ▶ Charlie Johnston
 - Consultant – Depuy Synthes
 - Royalties – Medtronic, Elsevier



Background

Lengthening of Dual Growing Rods and the Law of Diminishing Returns

Wudbhav N. Sankar, MD, David L. Skaggs, MD, Muharrem Yazici, MD, Charles E. Johnston II, MD, Suken A. Shah, MD, Pooya Javidan, MD, Rishi V. Kadakia, BS, Thomas F. Day, MD, and Behrooz A. Akbarnia, MD



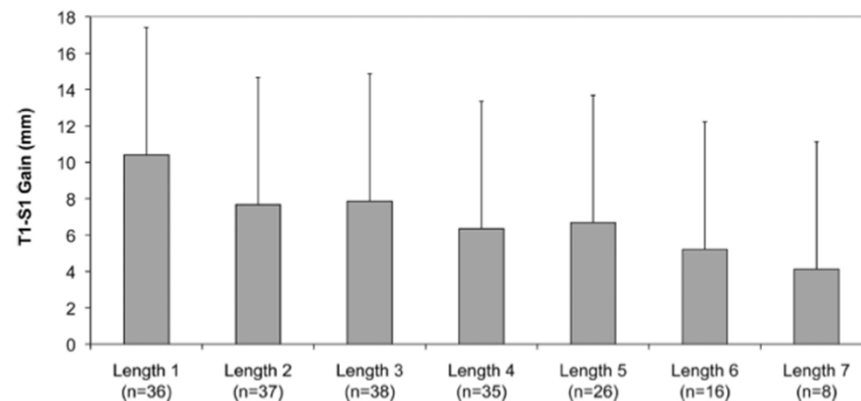
SPINE Volume 36, Number 10, pp 806–809
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- ▶ Auto fusion?
- ▶ Supports delay tactic with casting

Background

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- ▶ Limitations of the paper include:
 - Heterogeneity of patients
 - Sagittal plane not addressed

Purpose

- ▶ Purpose:
 - To evaluate the effect of lengthening procedures on coronal, sagittal, and true spine length in children with idiopathic scoliosis
- ▶ Hypothesis:
 - Spine length continues to increase with each lengthening procedure; however, these gains occur in the **sagittal** plane



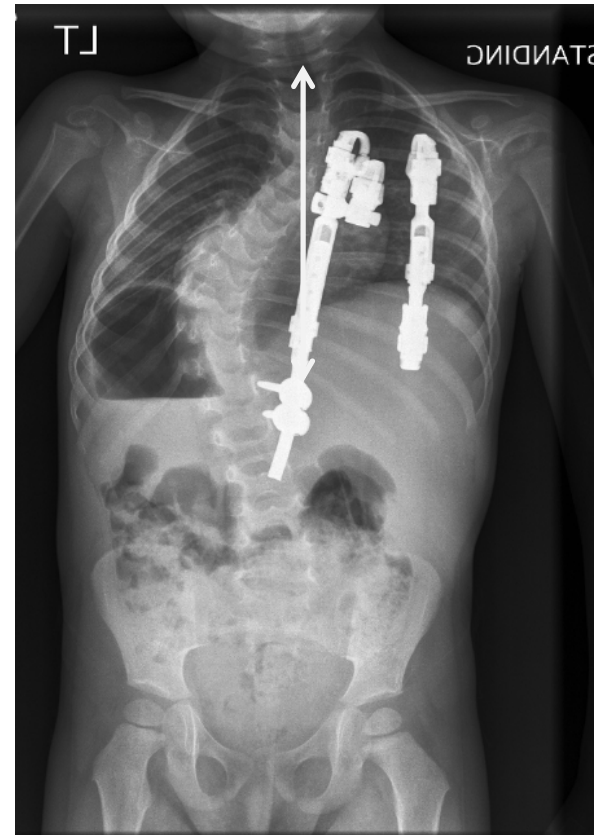
Inclusion Criteria

- ▶ Idiopathic Scoliosis (<10 yrs)
 - Children's Spine and Growing Spine Study Groups
- ▶ Treated with posterior distraction surgery
 - Rib-based
 - Spine-based.
- ▶ Minimum 5 year follow up.
- ▶ Minimum 5 lengthening procedures.



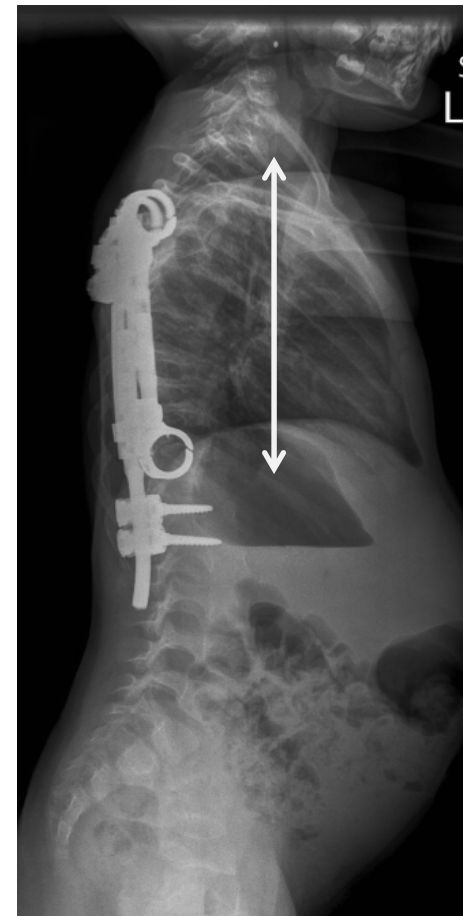
Methods

- ▶ Primary outcome was change in T1–T12 length per lengthening procedure
 - PA Radiograph
 - Traditional
 - Linear



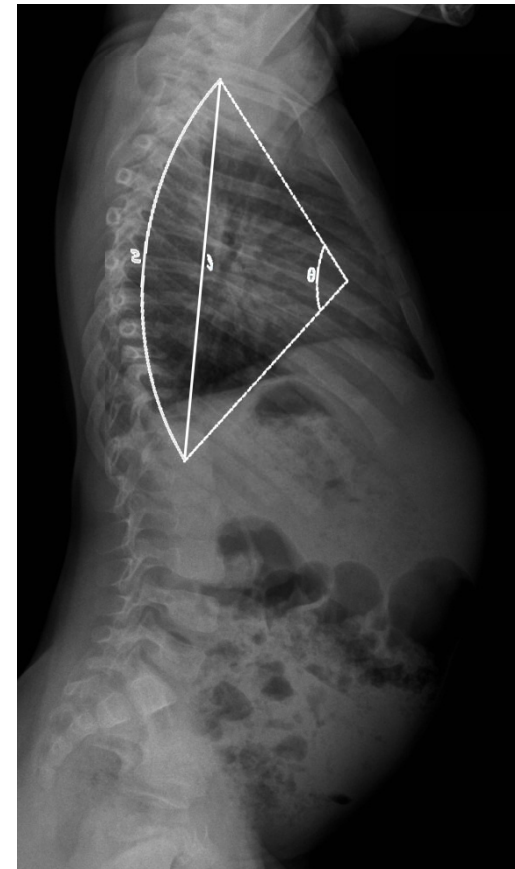
Methods

- ▶ Primary outcome was change in T1–T12 length per lengthening procedure
 - Lateral Radiograph
 - Linear



Methods

- ▶ Primary outcome was change in T1–T12 length per lengthening procedure
 - Lateral Radiograph
 - Arc of Curvature
 - True Spine Length



Results

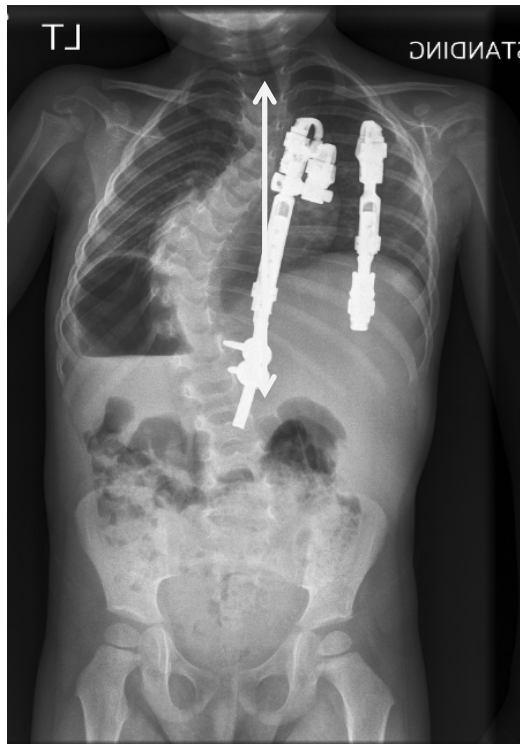
- ▶ 18 patients
 - 9 Growing Rod and 9 VEPTR
- ▶ Mean age of 4.1 years
- ▶ Three groups were compared:
 - Post Implantation (L1)
 - 2nd through 5th lengthenings (L2–L5)
 - 6th through 10th lengthenings (L6–L10)



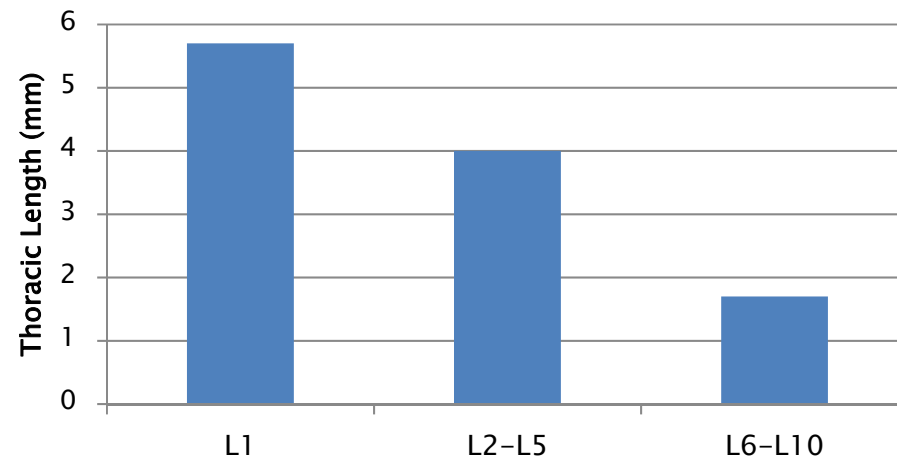
Results

	Pre-Implant	L1	L2 – 5	L6 – 10
Cobb angle	52.6°	45.0°	44.7°	48.6°
Kyphosis	40.9°	32.1°	45.3°	47.5°
Coronal T1–T12	16.4cm	16.0cm	17.6cm	17.8cm
Sagittal T1–T12	16.8cm	16.4cm	17.4cm	18.3cm
True T1–T12	18.6cm	18.4cm	19.5cm	20.8cm
Change coronal T1–T12 per lengthening	Not applicable	5.7mm	4.0mm	1.7mm
Change in sagittal T1–T12 per lengthening	Not applicable	4.0mm	3.3mm	3.1mm
Change in true T1–T12 per lengthening	Not applicable	2.8mm	4.4mm	4.4mm

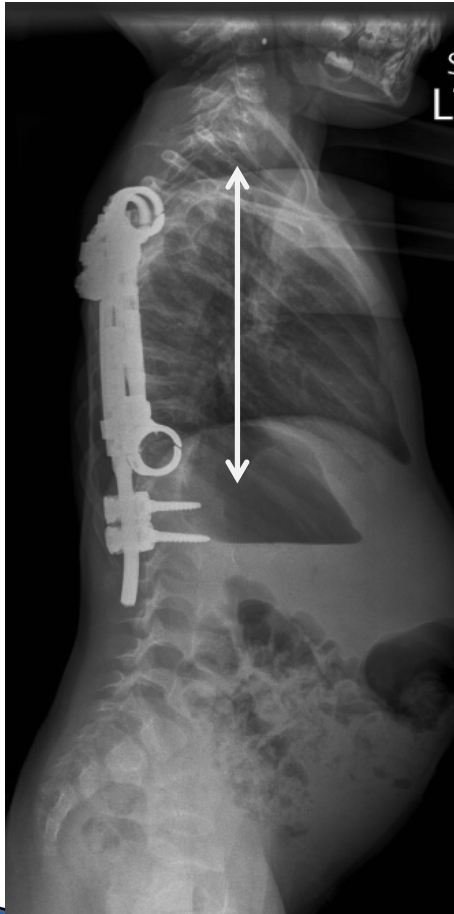
Coronal T1-T12



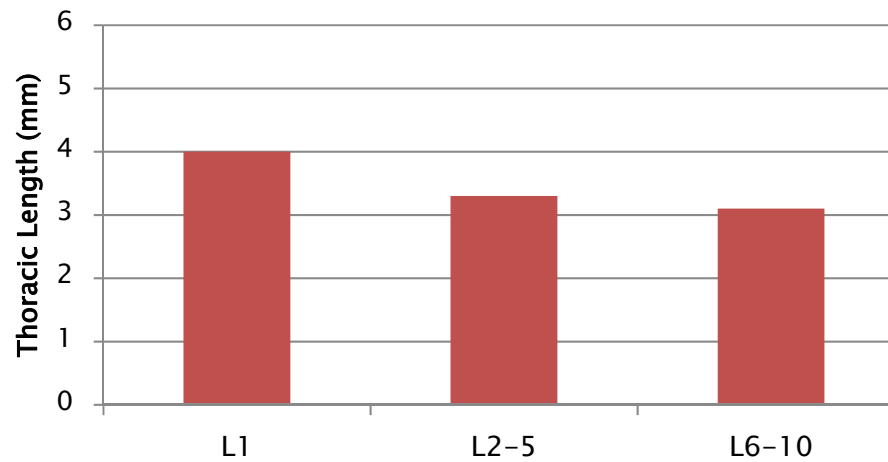
Gains in Thoracic Length per Procedure



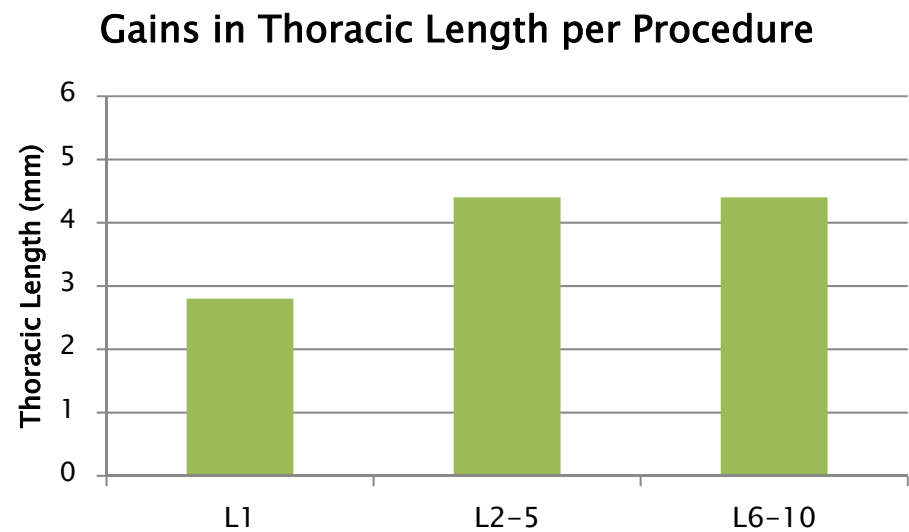
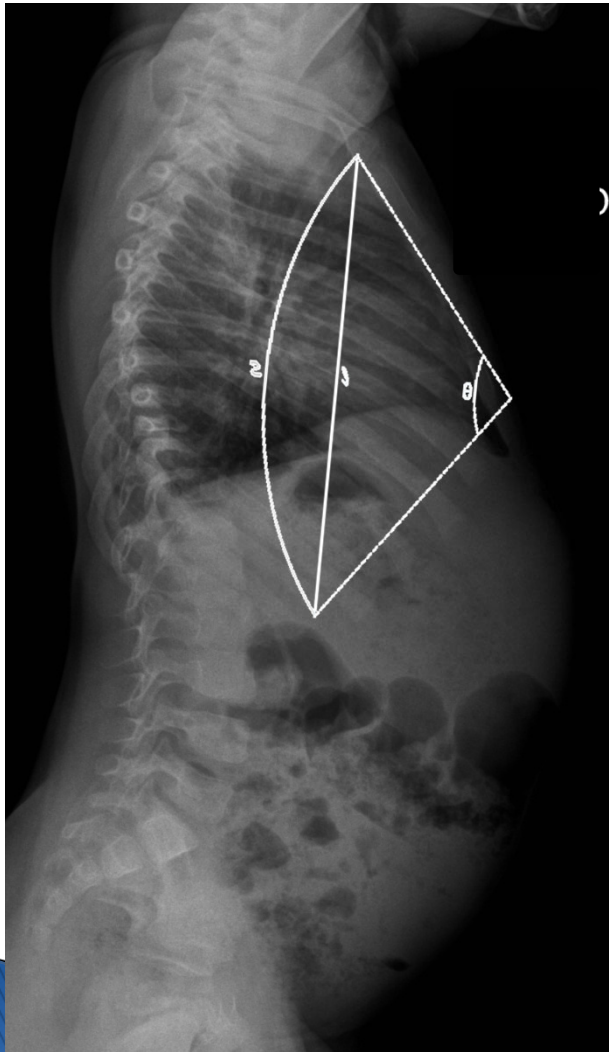
Sagittal T1-T12



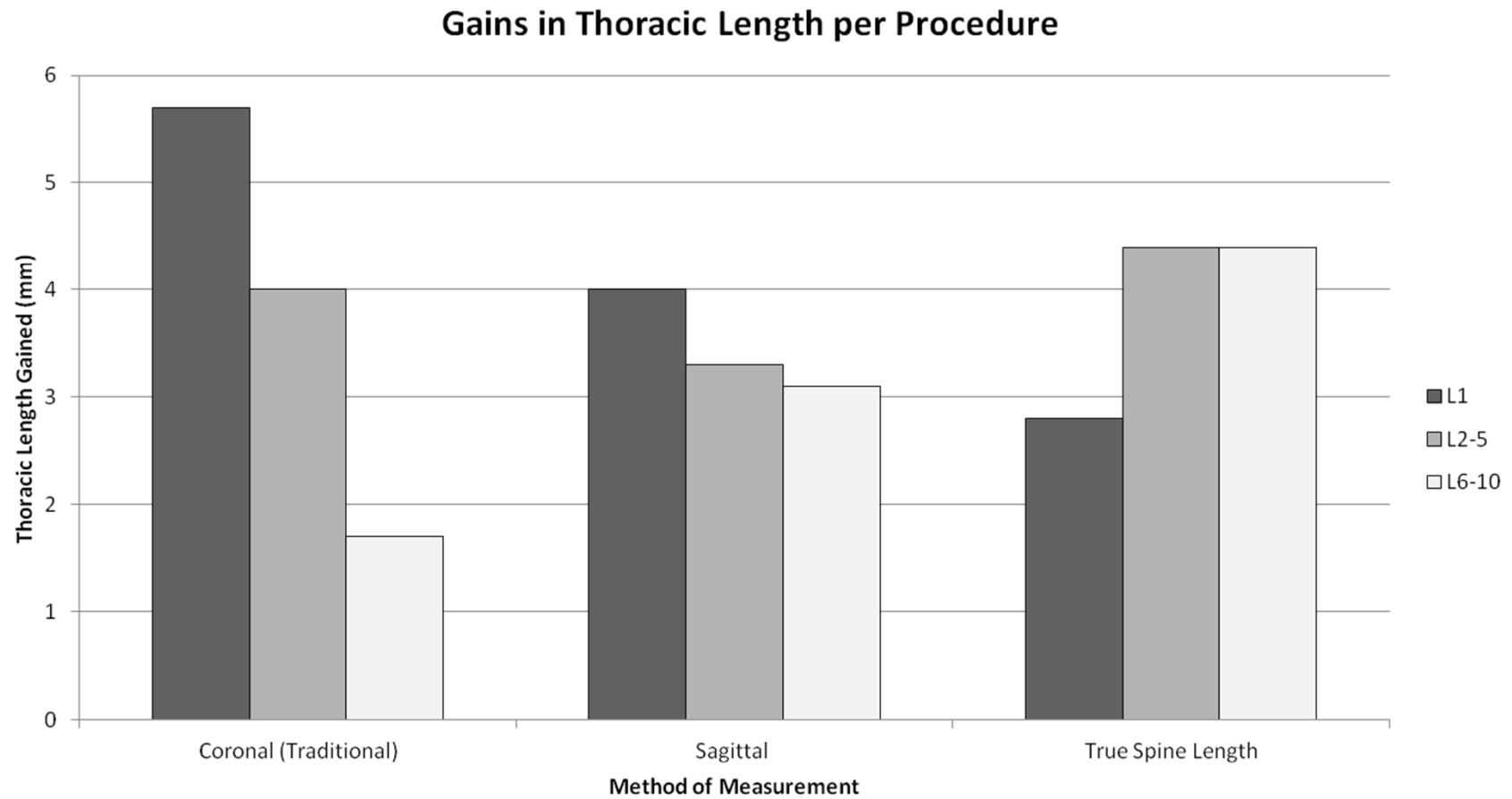
Gains in Thoracic Length per Procedure



True Spine Length T1-T12



Results



Conclusions

- ▶ Although there is the appearance of a law of diminishing returns when measured in the coronal plane, these changes were:
 - Less apparent when measured in the sagittal plane.
 - Nullified with measurement of true spine length.



Conclusions

- ▶ These findings support the hypothesis that, when measured in the plane of distraction, a law of diminishing returns may not be apparent.



Thank You



IVWK Health Centre

