

“Law of Diminishing Returns” regarding spine deformity correction in neuromuscular early onset scoliosis treated with a Rib to Pelvis Rib Base Distraction Device

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NEUROMUSCULAR SCOLIOSIS

- Difficult to treat
- High rate of complications
- Early Onset
- Rapid Progression after skeletal maturity
- Compromise Functional Abilities
- Long Curves
- May Include Sacrum & Pelvic Obliquity



INTRODUCTION

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 Journal (2011)

Limited effect of repeated surgical lengthening on T1-S1 spine height in early onset scoliosis patients treated with a growing rod system.

INTRODUCTION



Possible “law of diminishing returns” with respect to coronal and sagittal correction in N-EOS with rib to pelvis distraction device has never been evaluated, since they have been excluded from previous studies.

OBJECTIVE

The purpose of this study was to evaluate the effect of repeated surgical lengthening on coronal and sagittal spine deformity correction in children with neuromuscular early onset scoliosis treated with dual Rib to Pelvis Rib Base Distraction Device

METHOD

Design:

IRB approved Retrospective multicenter study review

Sample Composition:

All N-EOS patients treated with dual distraction device from the Children Spine Study Group database.

METHOD

Data Collection:

Minimum of 2-year follow-up

At least 3 lengthening procedures from 2008-2014

No prior history of invasive spine surgical treatment

Variables Recorded:

✓ Age

✓ Sex

✓ Pre-operative, post-operative and most recent follow-up of:

✓ Primary Cobb angle

✓ Major kyphosis

RESULTS

Table 1: Patient Demographics & Construction Data

<i>Variable</i>	<i>Mean \pm SD</i>
	<i>Total Sample (N= 57)</i>
Female Sex	
Age at Implantation	6.42
Follow-up	5.02
Average lengthenings	9.7

RESULTS

Table 2: Radiographic Measurements

Variable	Mean \pm SD Total Sample (N= 57)
Pre-Operative Visit	
Primary Cobb (deg.)	69 + 23
Secondary Cobb (deg.)	
T-L kyphosis (deg)	54 + 27
Post-Operative Visit	
Primary Cobb (deg.)	
Secondary Cobb (deg.)	
T-L kyphosis (deg)	
Most Recent Follow-up	
Primary Cobb (deg.)	61 + 22
Secondary Cobb (deg.)	37 + 22
T-L kyphosis (deg)	

CONCLUSION

Neuromuscular Early Onset Scoliosis patients are at risk of developing a “law of diminishing returns” regarding spine deformity correction with repeated lengthening of dual Rib to Pelvis distraction device.

Repeated lengthening showed a *net of 8° Cobb Angle and 3° kyphosis improvement*

THANK YOU!