Nutritional Improvement Following Growing Rod Surgery in Children with Early Onset Scoliosis

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Growing Spine Study Group	None

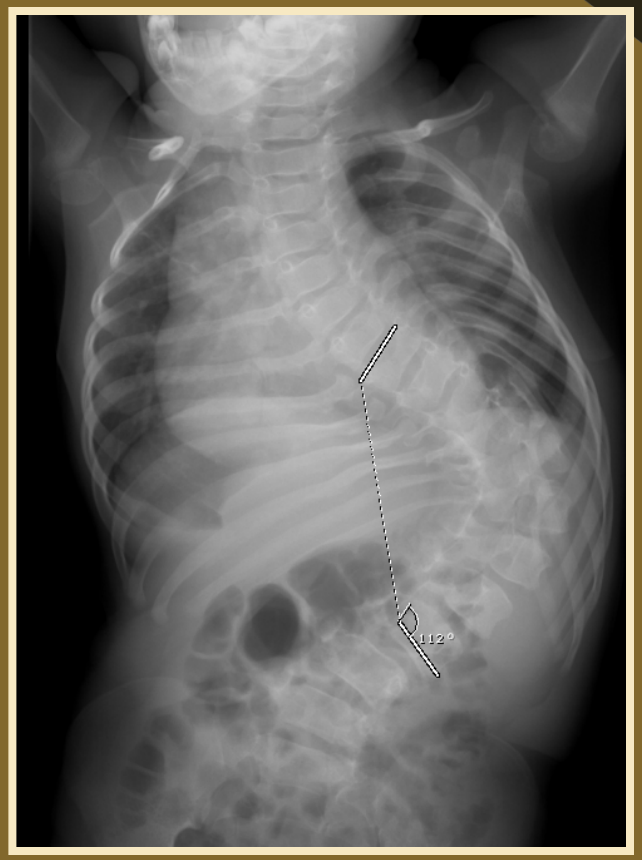
Introduction

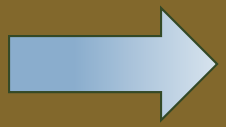
- The energy expenditure of breathing in children with EOS consumes excessive calories, resulting in poor nutritional status.

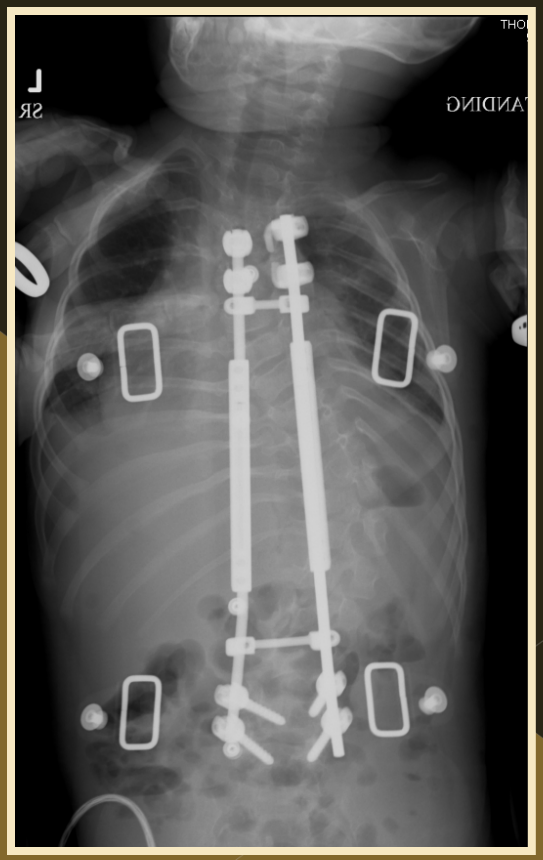
- Growing rod instrumentation can diminish progression of spinal and chest wall deformity and, thus, improve lung function.

Introduction

- HYPOTHESIS: Treatment of children with EOS with growing rod instrumentation improves their nutritional status







Methods

- 88 patients identified with a retrospective multi-center EOS database
- All patients treated with spine-based growing rod instrumentation
- ≥ 2 year clinical follow-up of weights (mean of 4.1 years)
- Weights converted to normative percentile weights based on the patient's age and gender

Results

- Mean age at initial surgery = 5.8 years
- Mean initial Cobb angle = 75˚
- 46% (41/88) patients were initially ≤ 5th percentile for weight, thus meeting the criteria for failure to thrive

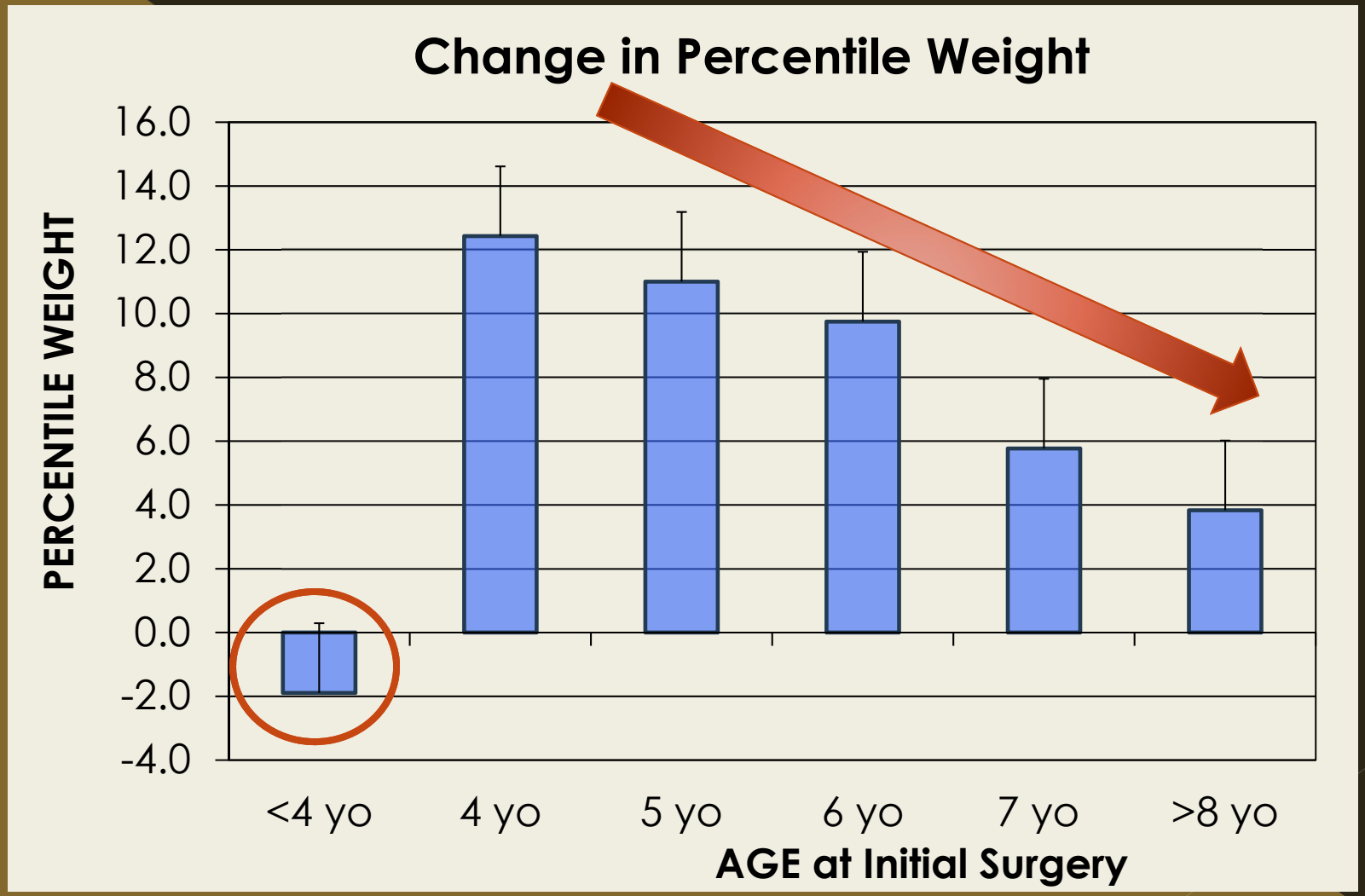
Results

- Nutritional status, as measured by weight percentile, improves after growing rod instrumentation:
  - Significant increase in weight percentiles at latest follow-up ($p=0.004$)
  - 49% of patients gained weight percentile, by an average of 18 percentiles
  - Of the 41 patients who initially were ≤ 5 percentile for weight, 27% no longer failed to thrive after surgery

Results

- Age at initial surgery affects weight percentile gain:
  - A significant relationship exists between age at initial surgery and percentile weight gain ($p<0.005$)
  - This relationship was not confounded by preoperative weight, preoperative Cobb angle, or years of follow-up ($p>0.05$).

Results


Change in Percentile Weight
PERCENTILE WEIGHT
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
-2.0
-4.0
<4 yo
4 yo
5 yo
6 yo
7 yo
>8 yo
AGE at Initial Surgery

Discussion

- Children < 4 years old at time of initial implant do not appear to improve their mean nutritional status after surgery.

- Improvement in nutritional status is greatest at age 4 and decreases in a linear fashion as age increases thereafter.

Conclusions

- Following treatment of EOS with growing rods there was significant improvement in nutritional status in approximately 50% of patients, similar to that reported with VEPTR.
- These findings add support to the theory that growing rods improve pulmonary status in children with EOS, as nutritional improvement is one outcome of improved pulmonary status.
- The relationship between age at initial surgery and nutritional improvement is intriguing.


THANK
YOU

Complications vs. Age at Initial Surgery

- 13% decreased risk of complications with each additional year of age at initial surgery
- Less complications if fuse later

Bess, ICEOS, 2008

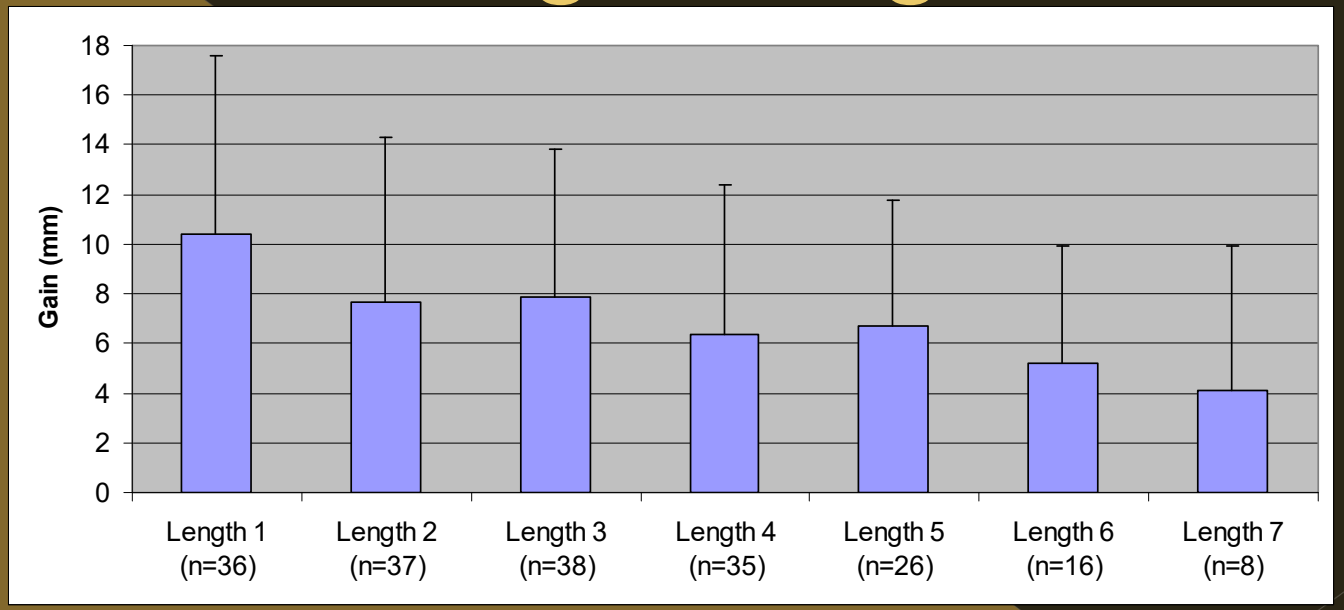
Complications vs. # of Surgeries

- 24% increased risk of complications with each additional procedure
- Less complications operate less

Bess, ICEOS, 2008

Lengthening of Dual Growing Rods and the Law of Diminishing Returns

- T1-S1Gain vs. Lengthening



Gain (mm)

p<0.0007

Lengthenings

Skaggs, SRS, 2009

Should We Delay Initial Growing Rod Surgery?

- 13% less complications each year older child is at initial surgery
- 24% higher risk of complications with each surgery
- Length gained drastically reduced by 7th lengthening
- Weight gain occurs only in those >4yrs old