Growing Rods for the Treatment of Scoliosis in Cerebral Palsy: A Critical Assessment

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GSSG
Growing Spine Study Group

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Disclosures

Author	Disclosure
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Behrooz A. Akbarnia, MD	DePuy Spine (a,b,e); Ellipse (a,b,c); K2M (a,b,c,d); Stryker (d); K Spine (a,b,c); Nuvasive (a,b,c); Nocimed (c)
Growing Spine Study Group	Growing Spine Foundation (a)

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Purpose

- Children with scoliosis due to cerebral palsy (CP) sometimes develop severe spinal deformity
- Growth-preserving strategies are attractive, but medical co-morbidities raise the risk/benefit ratio
- We sought to characterize growing rod (GR) treatment in this population

Methods

- Patients –GSSG
  - 26 patients with CP
  - 17 female, 9 male
  - GR insertion at age of 7.6 ± 2.4 years
  - Follow-up 53 ± 31 months (minimum 2 years)

Factors Analyzed

- Instrumentation
  - # of rods
  - Span
  - # of lengthenings and lengthening interval
- Radiographic measurements
  - Cobb angle
  - T1-S1 length
  - Space Available for Lung (SAL) ratio
- "Burden of Care"
  - Hospital stays
    - Post-initial surgery
    - Post-lengthening
  - Complications
  - Treatment abandonment

Results
Instrumentation

- Number of rods
  - Dual rods in 22 patients
  - Single rods in 4 patients
- Rod span
  - 15.1 ± 1.4 levels
- Lengthening intervals
  - 4.4 ± 3.1 lengthenings per patient
  - Interval of 10.3 ± 6.0 months (median 8.5 months)

Radiographic Findings

Primary Cobb angle

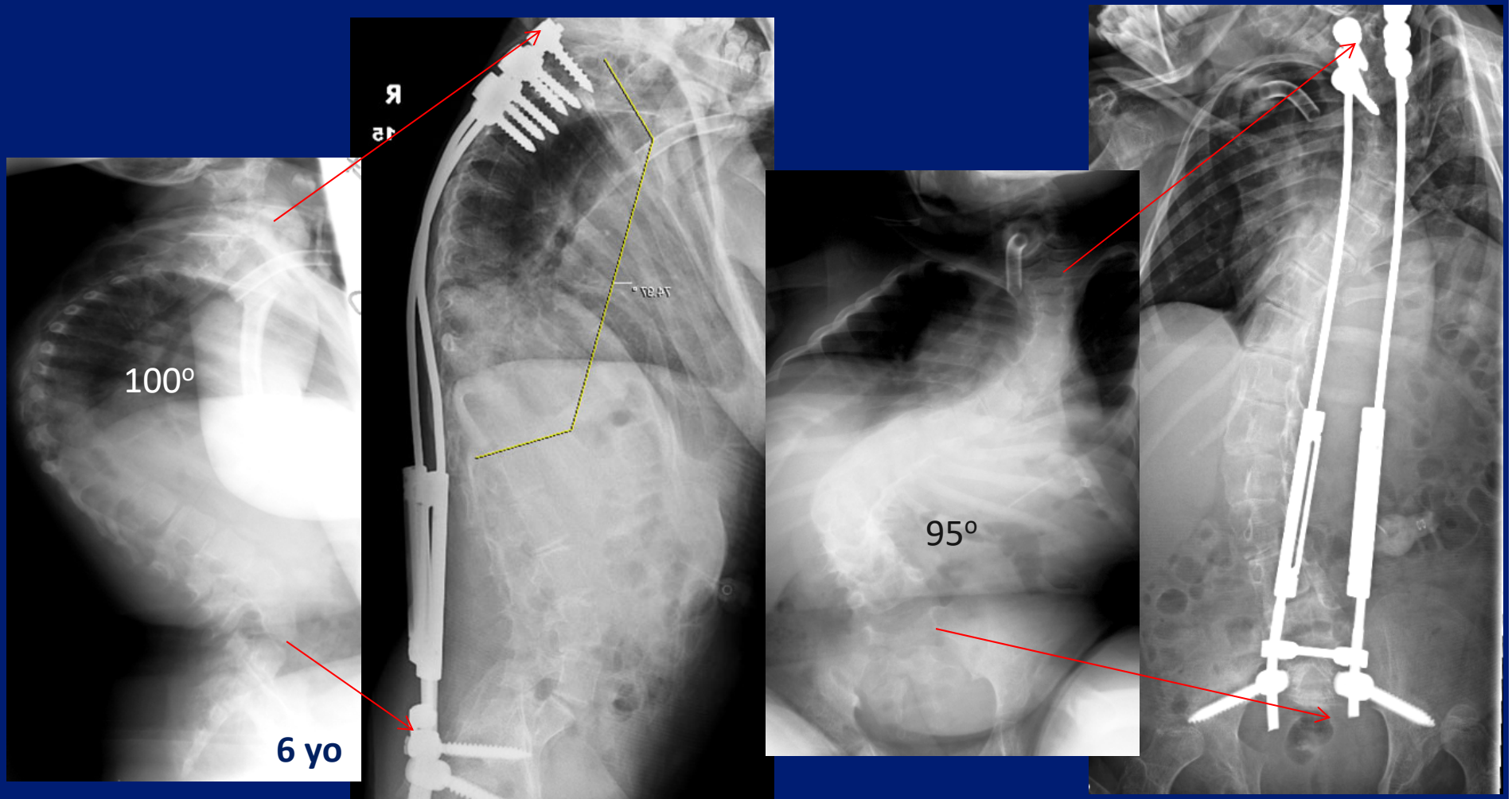
- Pre-initial ***86 ± 20˚ (highest mean in GSSG)***
- Post-initial 40 ± 15˚
- Latest follow-up 52 ± 22˚
- Correction 39 ± 30%

- Space Available for Lung (SAL) ratio
  - Pre-GR to latest follow-up: 0.9 ± 0.3 ⟹ 1.1 ± 0.2

- Pelvic Obliquity 24° ⟹ 11°

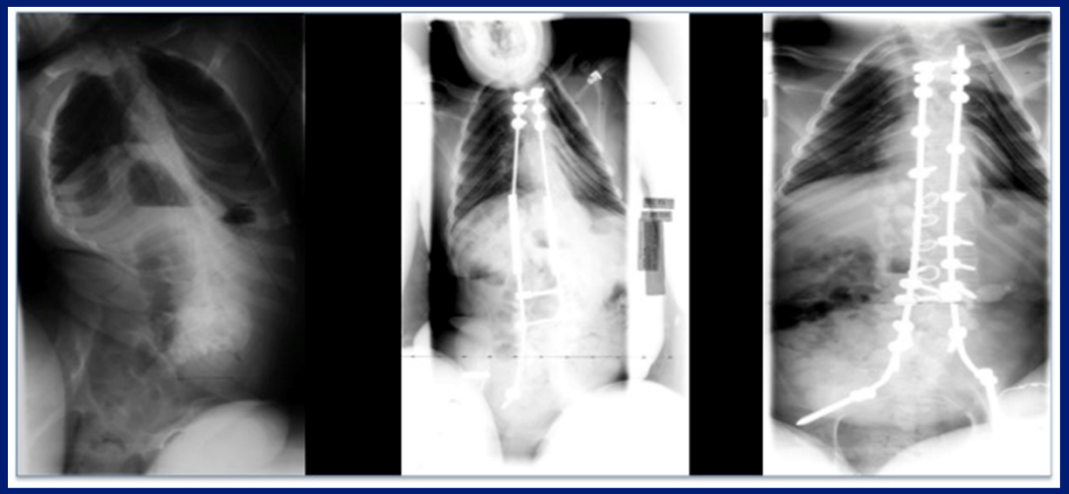
- T1-S1 Length
  - Pre-GR to latest follow-up increase of 7.6 ± 4.3 cm

7 yr f/u CP



Results
Radiographic Measurements

- 8 patients underwent final fusion
  - Age at fusion 12.3 ± 1.7 yrs
  - From pre-GR to post-fusion
    - Primary Cobb angle improved 43 ± 30% (from 86 ± 20˚ to 46 ± 15˚)
    - T1-S1 length increased 8.2 ± 4 cm



Pre-Operative **Pre-Fusion** **Post-Fusion**

Results
Burden of Care

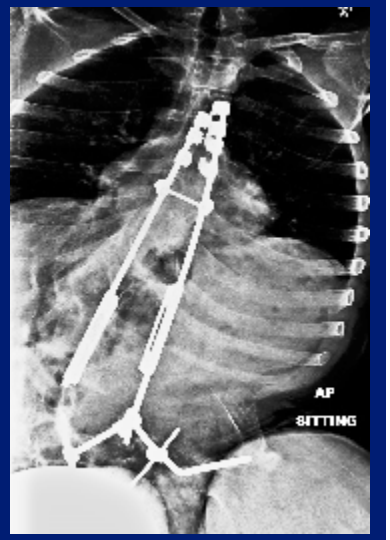
- Hospital Stays
  - 6.6 ± 5.3 days following GR-insertion
  - 1.3 ± 4.5 days following lengthening

Complications

- 137 total operations (GR insertions, lengthenings, fusions)
- 7 Deep wound infections (28%)
- 2 Superficial wound infections
- 5 Rod fractures
- 2 Anchor dislodgements
- 2 Wound dehiscence

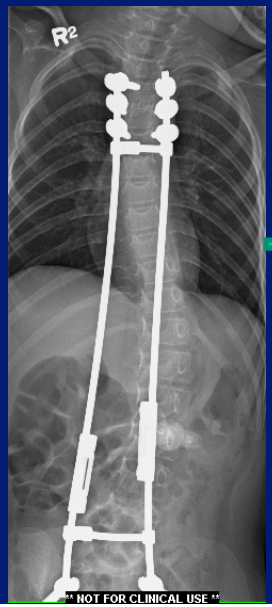
GR abandonment

- GR therapy abandoned in 4 patients (16%)
  - 1 at family's preference after rod fracture



Never lengthened

  - 3 due to DWI



Conclusions

- GRs used for selected patients with CP who develop severe scoliosis at young age
  - Control curve
  - Promote trunk growth
  - Improve SAL ratio
  - Can often be followed through to definitive
- However, incidence of deep wound infection is high and may lead to treatment abandonment
  - Curve correction is modest