**Single Rod Constructs in Severe EOS Produce Similar Cobb Correction and Spinal Growth as Dual MCGR Constructs**

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**Disclosures**

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**Study Purpose**

1. Describe the surgical cases treated with single-growing rod constructs since Thompson/Akbarnia study publication in 2005.  
2. Report the radiographic and clinical outcomes of single-growing rods (2005-2016)

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**Methods**

- Two prospective databases were queried  
- Identify all patients with single TGR or MCGR with index surgery from 2005-2016  
- VEPTRs excluded  
- Inclusion criteria:  
  - <10 years of age  
  - Minimum 2 years of follow-up postoperatively  
- No case matching to Dual GRs
Methods

- 2005-2016 Single GR Cohort:
  - 25 patients (13 female, 12 male)
  - 10 TGR, 15 MCGR
- Dual-rod constructs (2005-2016)
  - GSSG: 590
  - CSSG: 367
  - Single-rod constructs = 2.6% of GR cases

Results

- Proximal foundations:
  - Ribs 92% (n=23)
  - Spine (PS) in 2 patients
- Distal foundations:
  - Spine in 84% (n=21)
  - Pelvis (1 L5-S1 and 3 S-hooks)
  - All single rods were on the concave side of the deformity.

Postoperative Spine Growth

- T1-T12 distance
  - Median: 13 mm = 4.3 mm/yr
    - 1.5-2.3
- T1-S1 distance
  - Median: 21 mm = 7 mm/yr
    - 8.1-9.7

Median | Preop | Postop | Final
---|---|---|---
Height (cm) | 94.5 | 99.0 | NS 122.5 (p=0.001)
Weight (kg) | 15.4 | 15.7 | NS
Primary Cobb | 81.0 | 54.0 (33%) | 62.0 (23.4%) (p=0.009)
T1-S1 (mm) | 229.5 | 255.0 (p=0.030) | 276.0 (p=0.009)
T1-T12 (mm) | 142.6 | 154.0 | NS 167.0 (p=0.033)
Maximal kyphosis | 46.0 | 38.1 (52%) | NS
T5-T12 kyphosis | 10.0 | 13.9 | NS

No differences between TGR and MCGR
Single rod cohort had 75% of predicted spinal growth (Dede)

Reoperations

- TGR (n=10): 100
  - 66 lengthenings
  - 32 revisions
  - 2 unknown
- MCGR (n=15): 10 in 9 patients
  - 7 for maximized actuators
  - 3 for foundation migration

Conclusion

- Single rods demonstrated
  - 23.4% coronal correction (28%-54%)
  - T1-S1 growth of 7 mm/yr (11.7-17.6)
  - T1-T12 growth of 4.3 mm/yr

- Single GRs in 4-8 y/o patients with severe, progressive EOS can provide acceptable outcomes when nonsurgical management is unable to control deformity.

Single-Rod Bridge Concept

- Permit initiation of treatment of patient with severe, progressive EOS
- Can avoid foundational fusions (iatrogenic shortening)

- 72% (18/25) of cases dual growing rods would be difficult/suboptimal due to
  - Patient size (longitudinal a/o weight)
  - Kyphosis/kyphoscoliosis with severe rotation.

- At final follow-up:
  - 20 continued with lengthenings (5 TGR & 15 MCGR)
  - 4 underwent definitive fusions
  - 1 completed lengthening (implants retained).