

THE ROLE OF TRADITIONAL GROWING RODS IN THE ERA OF MAGNETICALLY-CONTROLLED GROWING RODS FOR THE TREATMENT OF EARLY-ONSET SCOLIOSIS

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DISCLOSURES

Eric Varley, DO (This individual reported nothing to disclose); Submitted on: 04/04/2018

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AAOS: Board or committee member

DePuy, A Johnson & Johnson Company: Paid consultant; Paid presenter or speaker; Research support

Globus Medical: IP royalties; Paid consultant; Paid presenter or speaker

Harms Study Group: Research support

K2M: Paid consultant; Paid presenter or speaker; Research support

Nuvasive: Paid consultant; Paid presenter or speaker

Orthopediatrics, K2M: IP royalties

POSNA: Board or committee member

Scoliosis Research Society: Board or committee member

Spine Deformity: Editorial or governing board

Stryker: Paid presenter or speaker

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DePuy, A Johnson & Johnson Company: Paid consultant

Green Sun Medical: Stock or stock Options

Journal of Children's Orthopaedics: Editorial or governing board

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Pediatric Orthopaedic Society of North America: Board or committee member

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Growing Spine Foundation: Board or committee member

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K2M: IP royalties

NociMed: Stock or stock Options

Nuvasive: IP royalties; Paid consultant; Research support; Stock or stock Options

San Diego Spine Foundation: Board or committee member

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Growing Spine Subcommittee, Scoliosis Research Society: Board or committee member

San Diego Spine Foundation: Board or committee member

Matthew Oetgen, MD Submitted on: 04/10/2018

AAOS: Board or committee member

Pediatric Orthopaedic Society of North America: Board or committee member

Scoliosis Research Society: Board or committee member

◎ Surgical Treatment of EOS – 3 General Strategies

1. Growth Guided (Shilla)
2. Tension Based (Tether, Staple)
3. Distraction Based
 - Magnetically Controlled Growing Rods (MCGR)
 - Traditional Growing Rods (TGR)
 - VEPTR

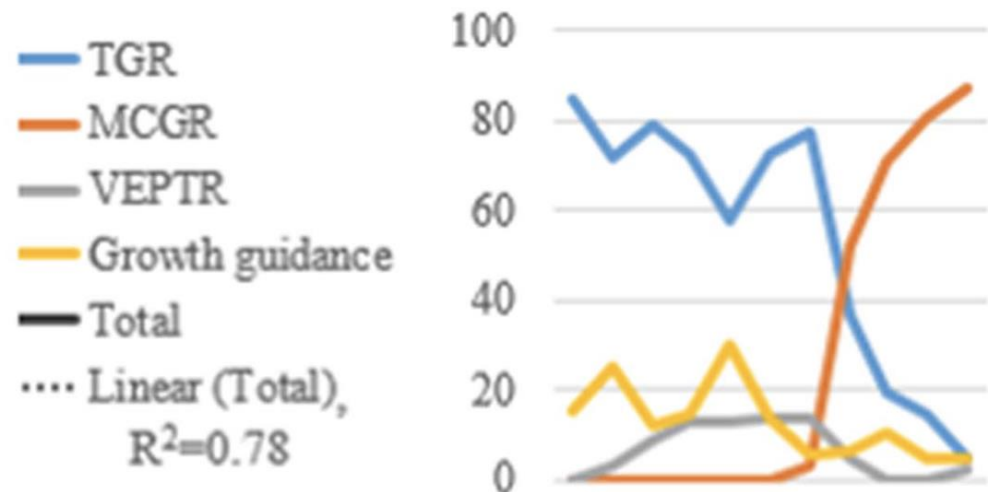


BACKGROUND

⊙ MCGR Rapid Adoption in EOS Treatment

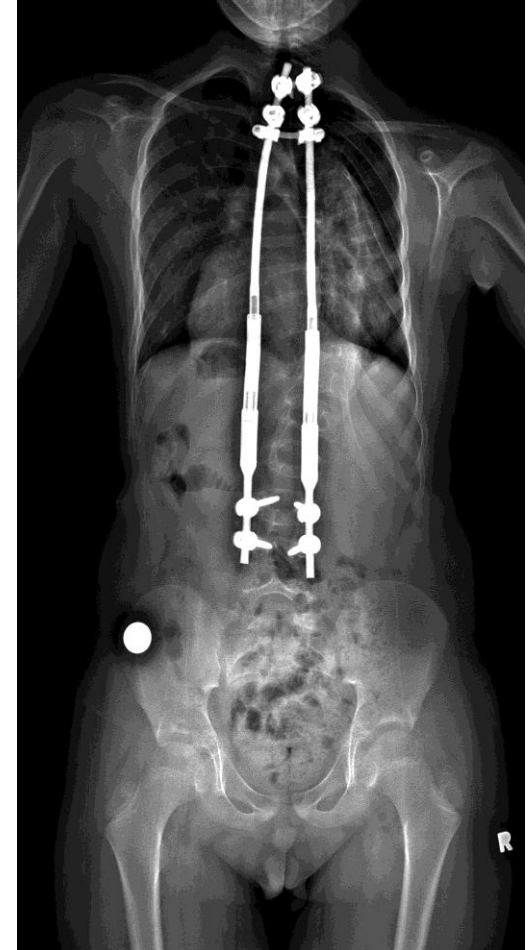
- ⊙ Fewer surgical procedures
- ⊙ Outpatient lengthenings

% of New Pts vs. Year, 2007-2017



INTRODUCTION

- ⊙ **Role of traditional growing rods (TGR) remains unclear in the era of MCGR technology**
- ⊙ **Contraindications to MCGR have not yet been established in the literature**
- ⊙ **MCGR may not always be the best distraction-based treatment option for some EOS patients**



PURPOSE



- ① To describe the *surgeon rationale* and *clinical profile* of patients treated with TGR in the MCGR era in an effort to define the utility of TGR and possible contraindications of MCGR.

STUDY DESIGN/METHODS

⊙ Retrospective review of multicenter EOS registry

1. ID first MCGR surgery performed in all U.S. based institutions
2. ID all TGR surgery **AFTER** first MCGR surgery performed

⊙ Patient data collected

- ⊙ Demographics
- ⊙ Etiology of Scoliosis
- ⊙ Co-Morbidities
- ⊙ ***Radiographic Parameters***
- ⊙ Surgeon Rationale for TGR

- Spinal height (T1-S1)
- Thoracic height (T1-T12)
- Lumbar Lordosis (L1-S1)
- Maximum Kyphosis

⊙ Descriptive comparisons

- ⊙ Between the MCGR and TGR groups based on clinical and radiographic data to identify differences between groups

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- ⊙ Radiographic Parameters
- ⊙ ***Surgeon Rationale for TGR***

All surgeons were surveyed to explain clinical rationale for using TGR instead of MCGR for each case in the series

⊙ Descriptive comparisons

- ⊙ Between the MCGR and TGR groups based on clinical and radiographic data to identify differences between groups

RESULTS

DEMOGRAPHICS & ETIOLOGY

	TGR	MCGR
N (152 total)	25 (16%)	127 (84%)
Index Age (years)	6.9 (2.8 - 13.8)	7.5 (2.7 to 11.7)
Follow up (years)	1.4 (0.1 - 3.1)	1.6 (0.02 – 4.0)
Etiology	<ul style="list-style-type: none"> • Congenital = 10 (40%) • Idiopathic = 7 (28%) • Syndromic = 6 (24%) • Neuromuscular = 2 (8%) 	<ul style="list-style-type: none"> • Neuromuscular = 65 (51%) • Idiopathic = 25 (20%) • Syndromic = 22 (17%) • Congenital = 15 (12%)

RESULTS

SURGEON RATIONALE

TGR INDICATIONS	N
Kyphosis	11
Spinal Height	6
MRI/Pacemaker	4
Other	4

- ◎ INDICATION FOR TGR
 - ◎ Maximal Kyphosis
 - TGR: 71.2°
 - MCGR: 55.2°
 - ◎ Short Trunk
 - TGR: 88.7 cm
 - MCGR: 115.3 cm

RESULTS

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⊙ INDICATION FOR TGR

⊙ MRI/Pacemaker

- MRI (MCGR artifact concern) n=3
- Pacemaker n=1

⊙ Other

- Behavioral Problem/ Unable to remain still for lengthening: n=1
- Parents wary of new technology: n=1
- Excessive chest wall penetration of spine n=1
- Cost effectiveness considering growth remaining n=1

CONCLUSION

- ⦿ **SURGEON RATIONALE for TGR in MCGR Era**
 - **Congenital (stiffer curves?)**
 - **Sagittal Plane Profile (maximal kyphosis)**
 - **Spinal Height (adequate space for 70 mm actuators)**
 - **MR imaging (MCGR artifact)**
 - **Other (patient/parent specific)**

- ⦿ **Future research targeted at the utility of TGR in MCGR era.**