Debate:
Growth Guidance in EOS

Scott J. Luhmann, M.D.

Washington University School of Medicine
St. Louis, Missouri, USA
Chief of Staff, Shriners Hospital for Children

Children's HOSPITAL • ST. LOUIS BJC HealthCare

ICEOS Annual Meeting
Lisbon, Portugal
November 15, 2018

Disclosures

- Speaker's Bureau
  - Medtronic
  - Stryker Spine
  - Orthopaediatrics
- Consultant
  - Medtronic
  - Stryker Spine
  - Orthopaediatrics
  - Wishbone Medical
- Royalties
  - Wolters Kluwer
  - Globus
  - Medtronic
  - Stryker Spine


(Growth Guidance)
Right Way
Wrong Way
(Distraction-based)

Need a variety of tools in the toolbox for optimal EOS management

Goals of EOS treatment

- Maximal T1-T12, T1-S1 distance
- Permit radial expansion of the ribs/chest
- Minimize 3D spinal deformity
- Maximize spinal motion and function

- Fewest # of anesthetic episodes possible
- Low complication rate
- Fewest number of outpatient care episodes
- Minimize pain and psychological stress
- Low imaging radiation exposure
- Minimize cost

Spine Deformity

www.spine-deformity.org

Spine Deformity 5 (2017) 277–282

Radiographic Outcomes of Shilla Growth Guidance System and Traditional Growing Rods Through Definitive Treatment

Scott J. Luhmann, MD[a,b,*], June C. Smith, MPH[c], Ann McClung, RN, BSN[d], Frances L. McCullough, RNP, MNSc, ONC[e], Richard E. McCarthy, MD[e], George H. Thompson, MD[f], Growing Spine Study Group

[a]*St Louis Shriners Hospital, 4400 Clayton Ave, St Louis, MO 63110, USA*
[b]*St Louis Childrens Hospital, One Childrens Place, St Louis, MO 63110, USA*
[c]*Wash U Ortho Surgery, 660 S. Euclid Ave, Campus Box 8233, St Louis, MO 63110, USA*
[d]*Growing Spine Study Group, Growing Spine Foundation, 555 East Wells St., Suite 1100, Milwaukee, WI 53202, USA*
[e]*Akansas Childrens Hospital, 1 Childrens Way, Little Rock, AR 72202, USA*
[f]*Rainbow Babies & Childrens Hospital, 11100 Euclid Ave, Cleveland, OH 44106, USA*

Received 15 August 2016; revised 25 January 2017; accepted 28 January 2017

- 18 in each group
- Matched by age, preoperative curve magnitude and diagnosis

Radiographic Outcomes of Shilla Growth Guidance System and Traditional Growing Rods Through Definitive Treatment

- Overall mean number surgeries
  - GGS 3.1
  - TGR 9.3 (5.8 lengthenings)
- Curve correction: =
- T1-T12 “growth” and final height: =
- T1-S1 “growth” and final height: =
- Complications: =

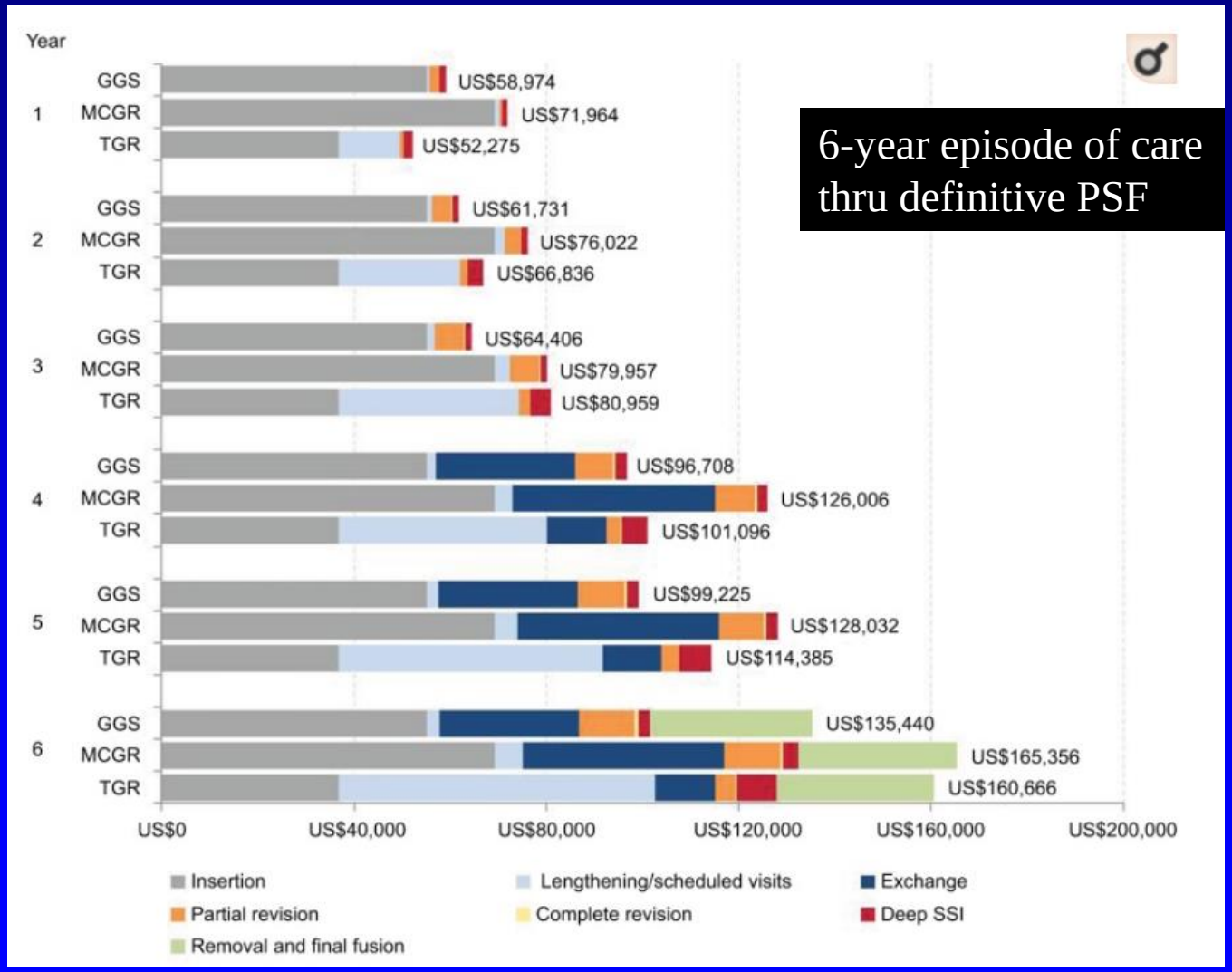
What are some of the other advantages of Growth Guidance over Distraction-based constructs?

- Low reoperation rate
  - No “scheduled” GGS surgeries
  - GGS << TGR but = to MCGR?
- Infrequent outpatient care episodes: 6-12 m
- Low imaging radiation exposure
- Fewer surgeries + Fewer outpatient care episodes = less pain and psychological stress?

Clinicoecon Outcomes Res. 2018 Mar 16;10:179-187. doi: 10.2147/CEOR.S152892. eCollection 2018.

Cost analysis of a growth guidance system compared with traditional and magnetically controlled growing rods for early-onset scoliosis: a US-based integrated health care delivery system perspective.

Luhmann SJ[1,2,3], McAughey EM[4], Ackerman SJ[5], Bumpass DB[6], McCarthy RE[6].



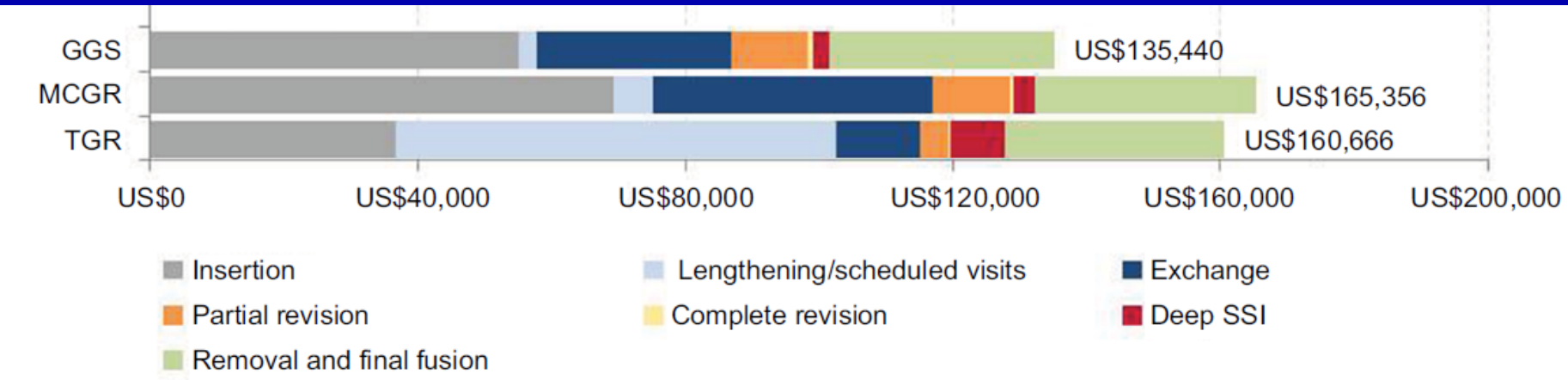
6-year episode of care thru definitive PSF

Clinicoecon Outcomes Res. 2018 Mar 16;10:179-187. doi: 10.2147/CEOR.S152892. eCollection 2018.

Cost analysis of a growth guidance system compared with traditional and magnetically controlled growing rods for early-onset scoliosis: a US-based integrated health care delivery system perspective.

Luhmann SJ[1,2,3], McAughey EM[4], Ackerman SJ[5], Bumpass DB[6], McCarthy RE[6].

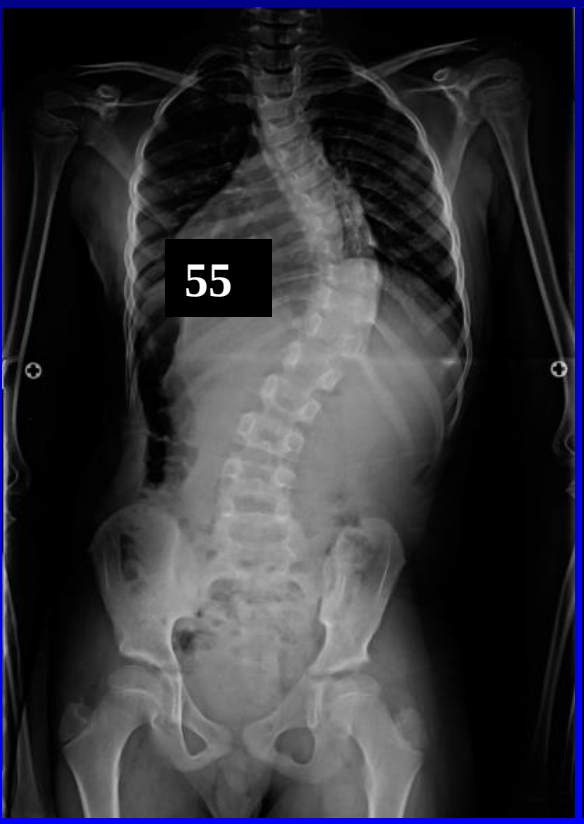
6-year episode of care thru definitive PSF

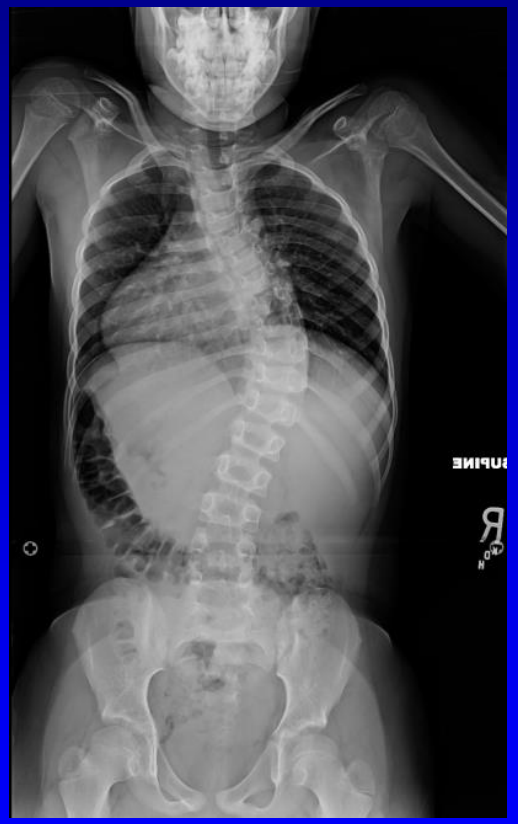


GGS = Distraction-based

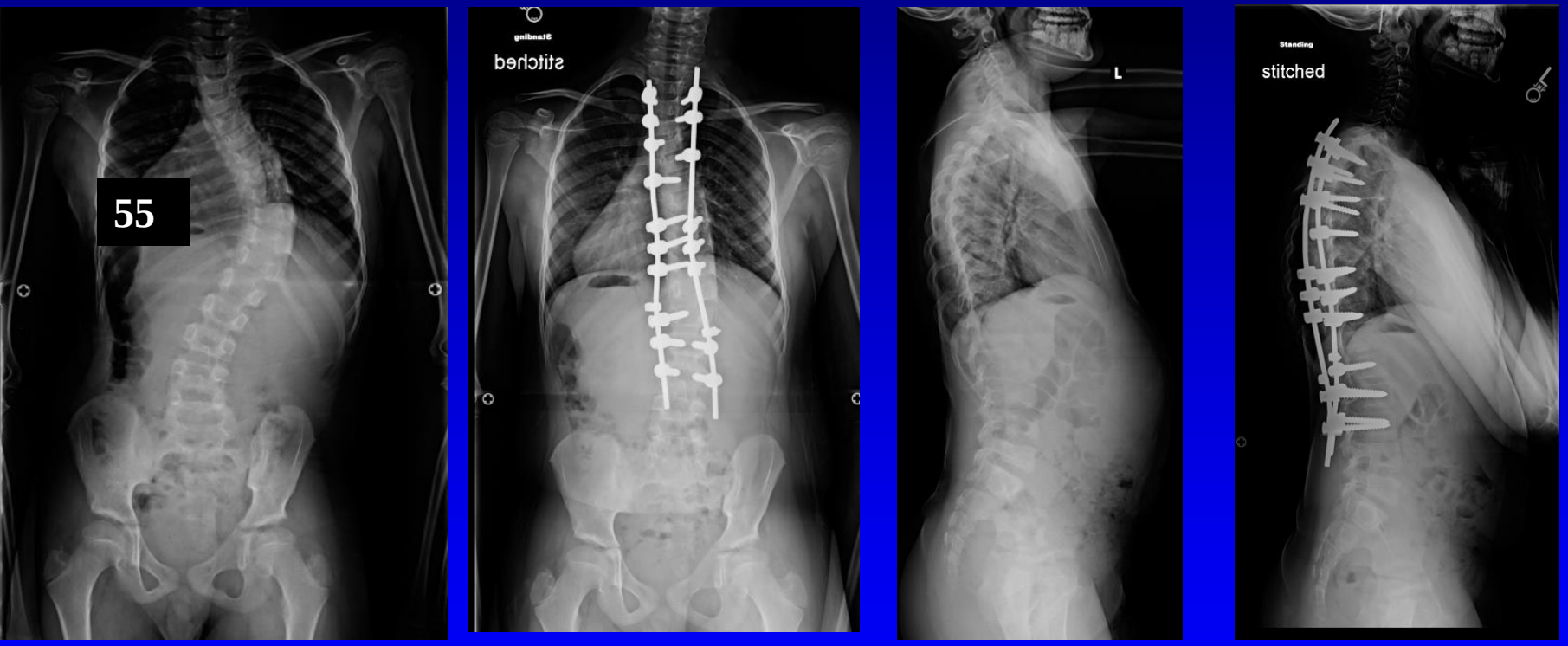
- Radial expansion of chest (?-able impact of rib-based fixation)
- Spinal motion: fusion length and implant removals
- 3D spinal deformity: GGS controlled apical derotation and fusion
- Metal debris

9.5 y/o male, JIS





3 years s/p GGS procedure T3-L3



3 level apical fusion
Blockers

Goals of EOS treatment

TGR	MC GR	GGS	
=	=	=	Maximal T1-T12, T1-S1 distance
=	=	=	Permit radial expansion of the ribs/chest
		+?	Minimize 3D spinal deformity
=	=	=	Maximize spinal motion and function
	+	+	Fewest # of anesthetic episodes possible
=	=	=	Low complication rate
		+	Fewest number of outpatient care episodes
		+?	Minimize pain and psychological stress
		+	Low imaging radiation exposure
		+	Minimize cost

Conclusion

When GGS is an option:

- Similar T1-T12 and T1-S1 growth & height
- Similar coronal deformity correction
- Surgeries: <TGR, =MCGR?
- Lower healthcare costs
- Lesser impact on child and caregivers

Thank you