Radiographic Outcomes of Patients Treated with SHILLA GROWTH GUIDANCE SYSTEM and Definitive Posterior Spinal Fusion

Podium presentation #9

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Disclosures

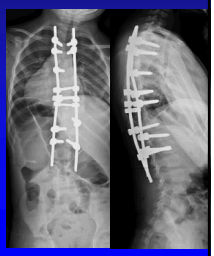
- Speaker's bureau for:
  - Medtronic Sofamor Danek
  - Stryker Spine
- Consultant for:
  - Medtronic Sofamor Danek
  - Stryker Spine
  - Orthofix
  - Depuy Synthes
- Royalties:
  - Globus Medical

Background

- SGGS vs. traditional distraction-based GR
  - POSNA papers
    - Luhmann/McCarthy
    - Andras/Skaggs/Luhmann/McCarthy
  - Similar T1-S1 monthly growth
  - Similar control of coronal deformity
  - SGGS: Fewer reoperations
- No study has evaluated the group of patients treated with SGGS through definitive fusion.

Study Purpose

- To evaluate the outcome of patients who had undergone the SHILLA GROWTH GUIDANCE SYSTEM (SGGS) procedure for management of scoliosis of the growing spine and subsequently underwent definitive posterior spinal fusion (PSF)



Methods

- IRB approval retrospective study
- Washington University Spine database query
- Inclusion
  - Skeletally-immature patients who underwent SGGS for management of scoliosis >/= 50 degrees
  - Definitive posterior spinal fusion at or near skeletal maturity
  - St. Louis Children's Hospital, Shriner's Hospital for Children

Shriners Hospitals for Children St. Louis

Children's HOSPITAL • ST. LOUIS BJC HealthCare

Methods

- 10 patients
- Mean age at SGGS: 9.0 yrs (3.5 to 11.9)
- Mean interval between SGGS & PSF: 4.3 yrs
- Mean age at definitive PSF: 13.4 yrs (10.3 to 15.9)
- Mean f/u after PSF: 1.3 yrs (0.1 to 2.5)

Results

- SGGS Revisions
  - 7 of 10 patients underwent SGGS revisions
  - Overall mean 1.2 revisions for entire cohort
- SGGS construct
  - 9 constructs w/ SHILLA set plugs
  - 1 construct w/ closed multi-axial screws CMAS)
  - Mean 2.7 vertebra fused (2 to 4)

Results

	Pre-SGGS	Post-SGGS	Pre-PSF	Post-PSF	Final
Major Curve Cobb°	**61.0 (51.0 to 85.3)**	**24.5**	**56.6**	**30.6**	**26.9**
% improvement		**59.1%**		**49.8%**	**55.9%**

Results

	Pre-SGGS	Post-SGGS	Pre-PSF	Post-PSF	Final
Thoracic Sagittal Alignment (°)					
T5-T12	**24.5**	**14.7**	**40.2**	**22.5**	**22.1 (-2.4)**
T10-L2	**14.4**	**6.1**	**11.0**	**8.0**	**10.1 (-4.3)**
T12-S1	**52.2**	**50.2**	**60.3**	**53.5**	**56.4 (+4.2)**
T1-S1 length (cm)	**33.0**	**35.3**	**37.0**	**40.1**	**40.5 (+7.4)**

Results

- T1-S1 length
  - ↑ by 7.4 cm during treatment period: 1.7 cm/year
  - ↑ 4.8 cm post-SGGS to post-fusion: 1.1 cm/year
- 60% had a compromised construct (rod fracture or screw pull-out) at time of definitive PSF. No association with outcome.

Results

- Spontaneous partial facet fusions infrequent at non-fusion levels. Most common at level cephalad to apical fusion

- 20% (2/10) developed PJK during study period. Both occurred after definitive PSF

Comparison of Single and Dual Growing Rod Techniques Followed Through Definitive Surgery

Thompson, Akbarnia, Kostial et al
Spine 2005

7 patients with dual-GR constructs, no apical fusion

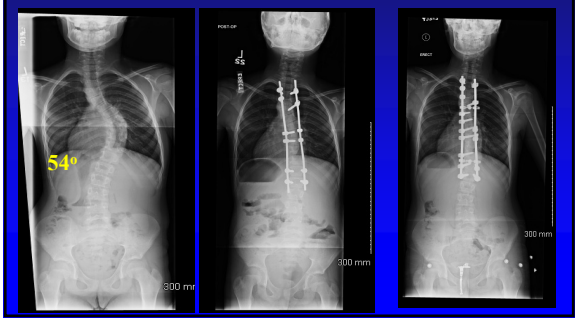
Autofusion in the Immature Spine Treated With Growing Rods

Cahill, Marvil, Cuddihy et al
Spine 2010

- **9 patients with varied diagnoses**
- 89% of patients demonstrated autofusion
- Mean 11 levels/patient

	Cahill (n=9)	Thompson (n=7)	This Study
Major Cobb			
Pre-GR	72.6	92	61
Post-GR	34.8 (52.1%)	39 (57%)	24.5 (59.1%)
Pre-fusion	48.7 (32.9%)	33 (64%)	56.6 (49.8%)
Post-fusion	28.4 (60.9%)	26 (72%)	26.9 (55.9%)
T1-S1			
Age at GR insertion	4.8 years	7.0 years	9.0 years
Age at fusion	12.0 years	13.0 years	13.4 years
F/u length (GR insertion to fusion)	7.2 years	6.0 years	4.4 years
T1-S1 length change: Pre-GR to Post-fusion	11.2 cm	12.1 cm	7.4 cm
T1-S1, pre-GR to post-fusion (cm/yr)	1.6 cm/yr	2.0 cm/yr	1.7 cm/yr

10 y/o female; DD, Sz d/o
Conversion to PSF 3 yrs s/p Shilla



Conclusion

- SHILLA GROWTH GUIDANCE SYSTEM is a viable alternative to traditional distraction-based constructs
- 55.9% improvement in coronal deformity with a mean 3.2 operative procedures (SGGS implantation, SGGS revisions, definitive PSF)
- Minimal alteration in sagittal alignment by surgical interventions.