Comparison of Single Posterior Spinal Fusion (PSF) vs Growth-Friendly (GF) Surgery in Older Neuromuscular EOS Patients

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Disclosures

- See program

Background – ICEOS 2018

Single Fusion Vs Growth Friendly Instrumentation in Older EOS Patients How do Outcomes Compare?

Jaime A. Gomez, Ryan Xin, Regina Hanstein, Yungtai Lo, Tricia St. Hilaire, Tara Flynn, Klane White, Ron El-Hawary, Sumeet Garg, Patrick Cahill, Michael Vitale, Gregory Redding
Children's Spine Study Group *CSSG*

- PSF and GF devices effective at controlling scoliosis in 8-11 yo ambulatory EOS patients
- PSF: ⇩ complications and unplanned returns to operating room (UPROR), ⇧ quality of life (QoL)
- Similar spinal growth

Background – SRS 2019

139. Is Performing a Definitive Fusion for Scoliosis in Juvenile Cerebral Palsy (CP) Patients a Good Long-term Surgical Option?

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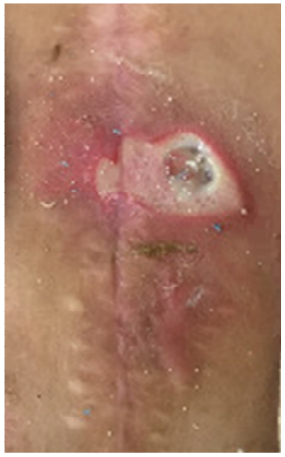
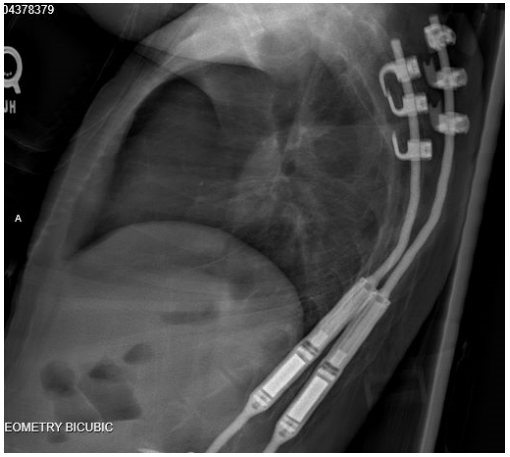
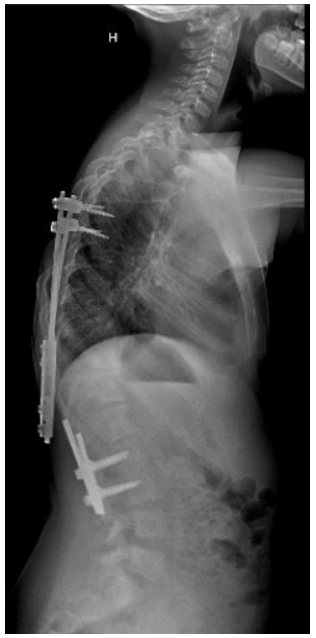
- Definitive fusion achieves good and stable curve correction in 8-10 yo cerebral palsy patients
- CPCHILD personal care, mobility, comfort, total scores improved
- No reoperations
- No comparison group treated with GF surgery

Background

- GF devices have high complication rate
- Need to balance risk of repeated surgeries with desire to facilitate spinal growth





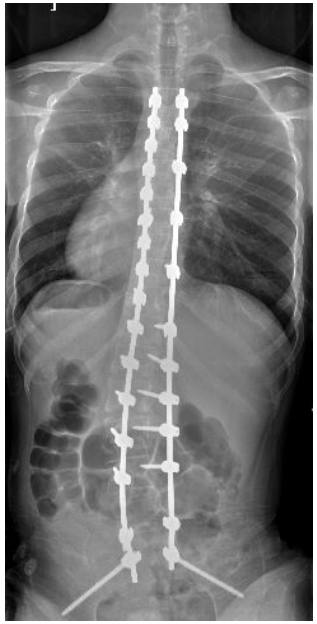


Purpose

- Compare radiographic outcomes, complications, and QoL in older neuromuscular EOS patients treated with single PSF or GF surgery

Hypothesis

- Single PSF provides good curve control, and has a lower complication rate and higher QoL



Methods

- Multicenter retrospective review

- Inclusion criteria:
  - Neuromuscular scoliosis
  - Age 8-11 years at index surgery
  - PSF or GF devices (TGR, MCGR, rib-based growing constructs)
  - Minimum 2 year f/u

- Exclusion criteria:
  - Prior surgery for EOS

- QOL measured using EOSQ-24

Results

	PSF (n = 16)	GF (n = 125)	p-value
Female, n (%)	7 (43.8)	76 (60.8)	0.19
Age, median (IQR)	**10.8 (10.0-11.2)**	**9.28 (8.6-10.2)**	**<0.001**
Follow-up, median (IQR)	3.1 (2.9-4.4)	5.1 (3.7-7.4)	0.97
BMI preop, median (IQR)	17.3 (14.3-22.6)	16.0 (14.4-19.6)	0.77
BMI last follow-up, median (IQR)	20.5 (18.5-23.7)	18.7 (15.6-22.6)	0.59

Results

	PSF (n = 16)	GF (n = 125)	p-value
Major curve preop, median (IQR)	65.9 (54.5-84.6)	80.0 (65.5-93.0)	0.31
Major curve last follow-up, median (IQR)	**23.0 (13.5-41.0)**	**41.0 (30.0-61.0)**	**0.001**
Change in major curve pre to last follow-up (%), median (IQR)	**-62.0 (-79.0- -44.0)**	**-42.0 (-60.0- -24.0)**	**0.005**

Results

- 4 PSF patients (25%) had 10 complications
  - 5 UPRORs

- **<u>86 GF patients (69%) had 195 complications</u>**
  - Implant-related complications most common
  - **78 UPRORS**

- Regression analysis adjusting for age, BMI, preop major curve
  - ➡ **<u>GF group more likely to have a complication</u>**

Results

- Spinal growth occurred in both groups
- GF patients had shorter preop spine length but larger increase in length
  - Similar T1-T12 and T1-S1 lengths at last f/u
- PSF patients had better postop EOSQ-24 Financial Impact and Family Burden scores

Results

- Sub-analysis comparing PSF patients to GF patients ≥ 2 years post-final fusion showed similar results

	PSF (n = 16)	GF + Fusion (n = 43)	p-value
Major curve preop, median (IQR)	66 (55-85)	72 (58-86)	0.95
Major curve last follow-up, median (IQR)	**23 (14-41)**	**40 (25-61)**	**0.005**
Change in major curve pre to last follow-up (%), median (IQR)	**-62 (-79- -44)**	**-38 (-58- -22)**	**0.001**
Total complications	**10**	**83**	**0.001**
Total UPRORs	**5**	**45**	**0.01**

- GF + fusion group had more spinal growth
- PSF group had better Financial Impact and Family Burden scores

Limitations

- Majority of GF patients had TGR/rib-based growing constructs
  - 11/23 MCGR patients (48%) had 16 complications (8 UPRORs)
- Differences in group size
- Included all neuromuscular diagnoses

Conclusion

- PSF may be more effective than GF surgery at controlling scoliosis in older neuromuscular EOS patients
- GF patients had more spinal growth but more complications and UPRORs
- PSF patients had better QoL