

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

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Background

“Growth-friendly” (GF) constructs provide control of large curves while allowing for chest wall development in Early Onset Scoliosis (EOS)

It is unclear at what age patients are not benefiting from GF devices compared to single fusion treatment



9 yo F's

Vs



Purpose: Compare outcomes of GF constructs versus PSFI in 8-11 year old patients with EOS

Study Design

CSSG Retrospective Review of Prospective Data

Inclusion: 8-11 years of age at Index Surgery
Ambulatory Early onset scoliosis
> 2 year follow-up

Exclusion: < 8 year or > 12 year of age at Index Surgery
< 2 year follow-up
non-ambulatory

Demographics

N = 141 patients were included in the study

	Fusion (N=31)	GF (N=110)	p-value
Female, n (%)	26 (83.9)	70 (63.6)	0.0328
Age, median (IQR)	11.0 (10.0-11.6)	9.4 (8.7-10.1)	<.0001
FU, median (IQR)	3.0 (2.6-4.3)	4.9 (3.4-6.6)	0.0006
Etiology, n (%)			0.0423
Idiopathic	16 (51.6)	29 (26.4)	
Syndromic	4 (12.9)	12 (10.9)	
Congenital	6 (19.3)	42 (38.2)	
Neuromuscular	5 (16.1)	27 (24.5)	

Radiographic measurements

	Fusion (N=31)	GF (N=110)	<i>p-value</i>
Pre Op Cobb, °, median (IQR)	58.0 (56.0-69.0)	70.0 (56.0-85.0)	0.0306
Post Op Cobb, °, median (IQR)	30.0 (22.0-33.0)	51.0 (41.0-72.0)	<.0001
Change in Cobb angle pre to post	-56.3 % (-64.5- -41.1)	-22.6 % (-40.7- -5.8)	<.0001

PSF patients had smaller pre- and post-operative curves

At last follow-up, curve size was significantly smaller in the PSF cohort, however, not all GF patients had finished GR treatment

Complications & Unplanned Surgeries

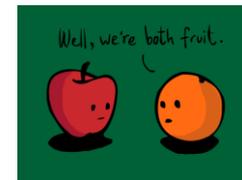
6 (19%) PSF patient had complications
 - 4 required unplanned surgeries

74 (67%) GF patients had complications
 - 52 required unplanned surgeries

	Fusion (N=31)	GF (N=110)	p-value
Complications, n (%)	6 (19.3)	74 (67.3)	<.0001
Minor complications, n (%)	3 (9.7)	27 (24.5)	0.0740
Surgeries, n (%)	4 (12.9)	62 (56.4)	<.0001
Unplanned Surgeries, n (%)	4 (12.9)	52 (47.3)	0.0006

Complications & Unplanned Surgeries

Logistic regression adjusted for age, pre-op BMI-for-age %, pre-op major Cobb angle, and etiology



Outcome	N	OR for GF vs. Fusion	95% CI	p-value
Complications	105	7.54	(1.81, 31.46)	0.0056
Minor complications	105	2.90	(0.50, 16.82)	0.2339
Surgeries	105	23.99	(2.77, 208.06)	0.0039
Unplanned Surgeries	105	13.76	(1.59, 118.93)	0.0172

Patients treated with GF surgery were more likely to have a complication and to undergo an unplanned surgery compared to PSF patients

Pulmonary Function – Spine Height

T1-T12 height was used as a proxy for pulmonary function.

Only 2 PSF patients (6.5%) and 37 GF patients (33.6%) had post-operative PFTs

	Fusion (N=31)	GF (N=110)	p-value
T1-T12 pre-op - median	21.3 cm	18.0 cm	<0.005
T1-T12 post-op - median	22.7 cm	20.9 cm	<0.005
<u>T1-T12 cm change</u>	2.40 (1.2, 3.8)	2.35 (1.6, 4.0)	0.722
T1-S1 pre-op - median	34.9 cm	29.8 cm	<0.005
T1-S1 post-op (cm), median	36.8 cm	34.7 cm	0.007
<u>T1-S1 cm change pre to post-op</u>	3.87 cm	4.01 cm	0.324
<u>T1-S1 % change pre to post-op</u>	11.40	13.20	0.192

Spinal Height increased similarly in GF patients and PSF patients

Health-related Quality of Life (HRQoL)

HRQoL was assessed using the EOS-Q24, a parent proxy questionnaire.

	Fusion (N=31)	GF (N=110)	p-value
Family Burden	85.9 ± 12.2	77.8 ± 16.6	0.041
Satisfaction	84.5 ± 14.7	74.7 ± 18.4	0.033
Transfer	94.7 ± 13.1	85.2 ± 18.2	0.025
Emotion	86.5 ± 13.5	76.5 ± 18.8	0.029
Parental Impact	86.3 ± 13.2	78.6 ± 16.4	0.041

PSF patients had better outcomes (higher scores):

- Family Burden, Satisfaction, Transfer, Emotion and Parental Impact

Conclusion

- **GF and PSF can control curves in older EOS**
- **GF were 7 x more complication & 13 x more unplanned surgery (UPROR)**
- **PSF and GF patients had similar spinal height growth**
- **Fusion patients had higher HRQoL scores**

Patients should be individualized in older EOS population
Single spinal fusion can decrease complications

Thank You



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