

Radiological Comparison of Pre-Contoured Vs Conventional Rods in Posterior Surgical Correction of Adolescent Idiopathic Scoliosis

S Singh, C Woodward, D Winson, DA Jones, S Ahuja, J Howes, PR Davies, SH James, MJH McCarthy

Cardiff Spinal Unit
Children's Hospital of Wales

Disclosures

The authors confirm that no funding was received for this study

MJH McCarthy - Educational Contracts Globus Medical

DA Jones - Educational Contracts Nuvasive

SH James - Educational Contracts Nuvasive

Introduction

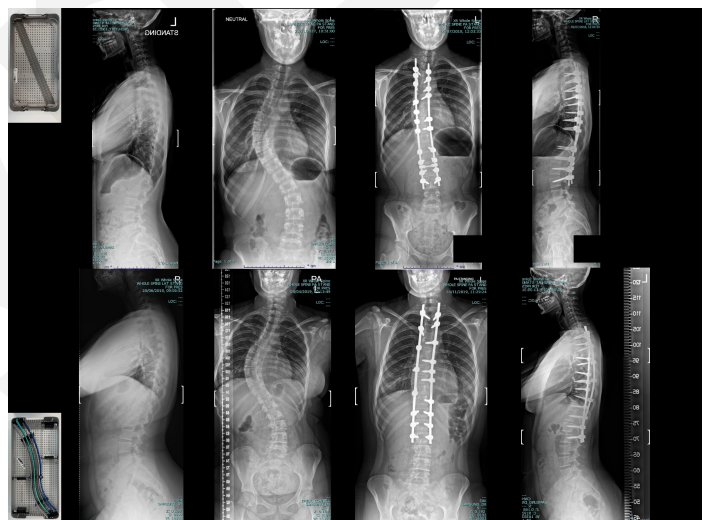
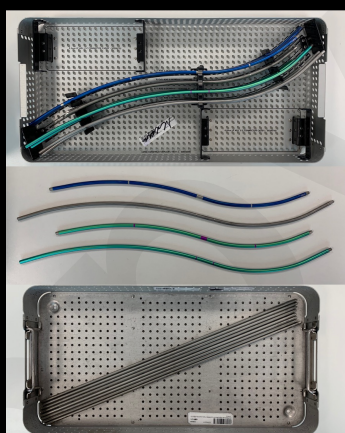
- Intra-op contouring of rods reduces fatigue strength, endurance limit, yield strength and bending stiffness
- Pre-contoured rods exhibit higher stiffness and ultimate load to failure
- Pre-contoured rods can potentially help reduce operative time
- Two teams of dual surgeons regularly use either pre-contoured or conventional rods
- Comparison study of both cohorts – are there any differences?

Aims & Objectives

- Primary
 - Radiological comparison - pre-contoured vs conventional rods
 - Pre vs post-op Cobb angles
 - Pre & post-op kyphosis measurements
 - Flexibility rate
 - Correction index
 - Bending index
 - Apical Vertebral Rotation correction
- Secondary
 - Implant density
 - Time for surgery
 - Implant costs
 - Complications

Material & Methods

- Retrospective
- Non blinded
- AIS patients
- 2016-2019
- Group A – Pre-contoured
 - Nuvasive Reline®
- Group B - Conventional
 - DePuy Synthes Expedium / URS
- Statistics - SPSS® software



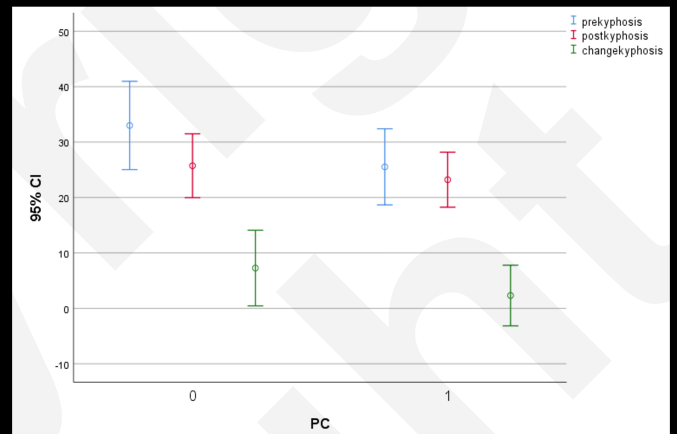
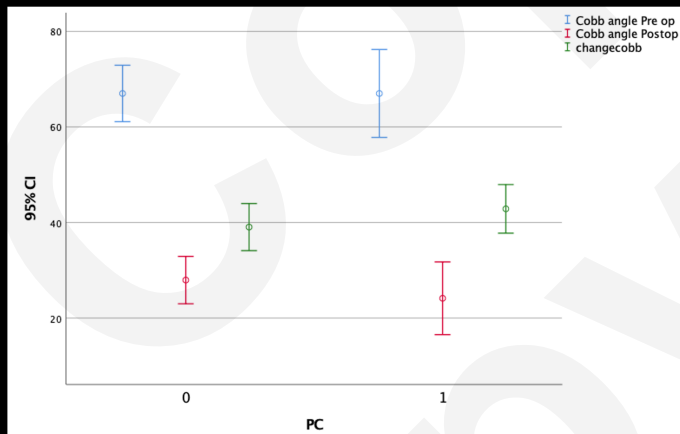
Results

	Group A	Group B	Sig
N	21	22	NS
Age	14.7	13.8	NS
Gender (males)	2	3	NS
Levels of surgery	13.7	13.6	NS
Mean FU (months)	11.86	15.64	NS

Risser	0	1	2	3	4	5
Group A	0	2	2	5	9	3
Group B	2	0	2	5	12	1

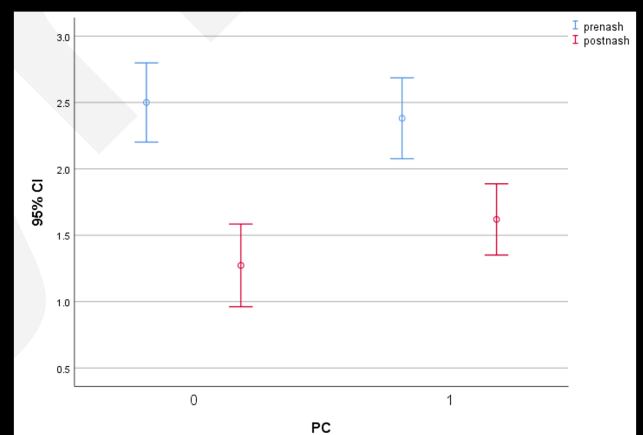
Results

	Group A	Group B	Sig
Pre-op Cobb	67°	67°	NS
Post-op Cobb	24°	28°	NS
Change in Cobb	43°	39°	NS
Kyphosis pre-op	30°	33°	NS
Kyphosis post-op	23°	24°	NS
Change in Kyphosis	2.3°	7.3°	NS



Results

	Group A	Group B	Sig
Flexibility rate	0.10	0.24	NS
Bending index	4.0	7.4	NS
Correction index	0.67	0.59	NS
AVR Pre-op	2.4	2.5	NS
AVR Post-op	1.6	1.3	NS



Results

	Group A	Group B	Sig
Cost of implant	£9543	£15589	p<0.001
No. of screws	18	22	p<0.001
Implant density	1.32	1.58	p<0.001
Surgical Time /mins	280	365	p<0.001

Complications

Pre Contoured (n=21)

- 1 Prominent metalwork
- 1 Loose screw
- 3 Back pain

Conventional (n=22)

- 1 Halo around screw
- 2 Thoracic/rib pain
- 4 Back pain

Conclusion

- Demographically well matched cohorts
- Over multiple radiological parameters both rods demonstrate equal performance – no significant differences
- Trends
 - Precontoured rods seem to give greater cobb correction
 - Conventional rods seem to give more AVR but reduce kyphosis
 - Related to implant density / technique / degree of contouring
 - Need to increasing sample size and reanalyse – type 2 error

Conclusion

- No metalwork failure in either group
- Cost of implants requires further investigation
 - Significantly higher cost of conventional rod construct
- Cannot attribute shorter operating times simply to rod design