

Magnetically controlled Growing Rod technique in 33 patients with Early Onset Scoliosis - preliminary results

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Disclosures

- Consultant
 - Synthes GmbH
 - Ellipse

Problems associated with growing rods

- Repeated surgeries
- Infections
- Junctional kyphosis
- Psychological distress
- Autofusion

Patients

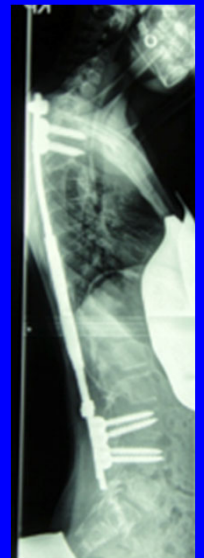
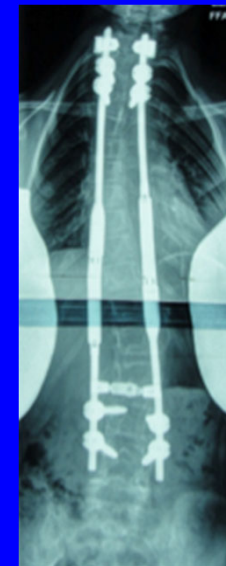
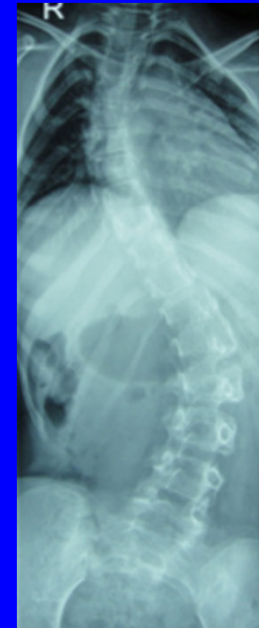
- 33 patients had surgery with MCGR (*MAGEC*★) since 6'2011
- 24 fulfilled *inclusion criteria* for study
 - EOS of any etiology
 - $> 40^\circ$ scoliosis and $> 5^\circ$ progression / year
 - Minimum follow-up of 12 months or at least 3 lengthening procedures (lengthening is performed every 4 months)

Patients

- 16 female, 8 males
- Age: 8.9 (4.6-14.4 years)
- 9 syndromic, 5 neuromuscular, 4 neurofibromatosis, 3 idiopathic, 2 thoracogenic, 1 congenital scoliosis
- 20 thoracic, 1 thoracolumbar, 3 lumbar curves
- Average F/U – 21.1 months

Surgical technique

- 2 separate incisions
- 4 screws as distal fixation
- 4 screws + 2 clamps proximally
- Dual 5.5 mm rods
- Contouring
- Testing of distraction
- Subfascial positioning
- Cross linking



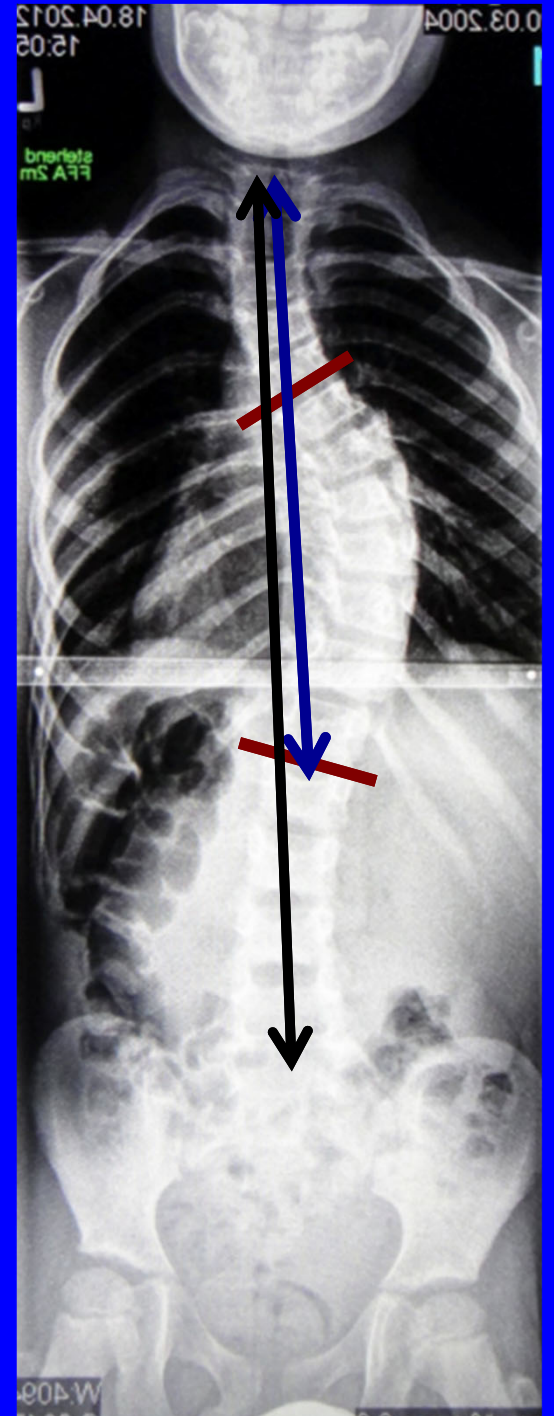
Distractions

- Outpatient procedure
- Use of Dimeglio data
- X-rays pre and post lengthenings
- Ultrasound documentation of lengthening
- 4 months intervalls
 - Logistic reasons
 - Reduce radiation exposure



Radiographic analysis

- Cobb angle
- T1-T12 length
- T1-S1 length
- Kyphosis (T1-T12)
- Lordosis (L1-L5)



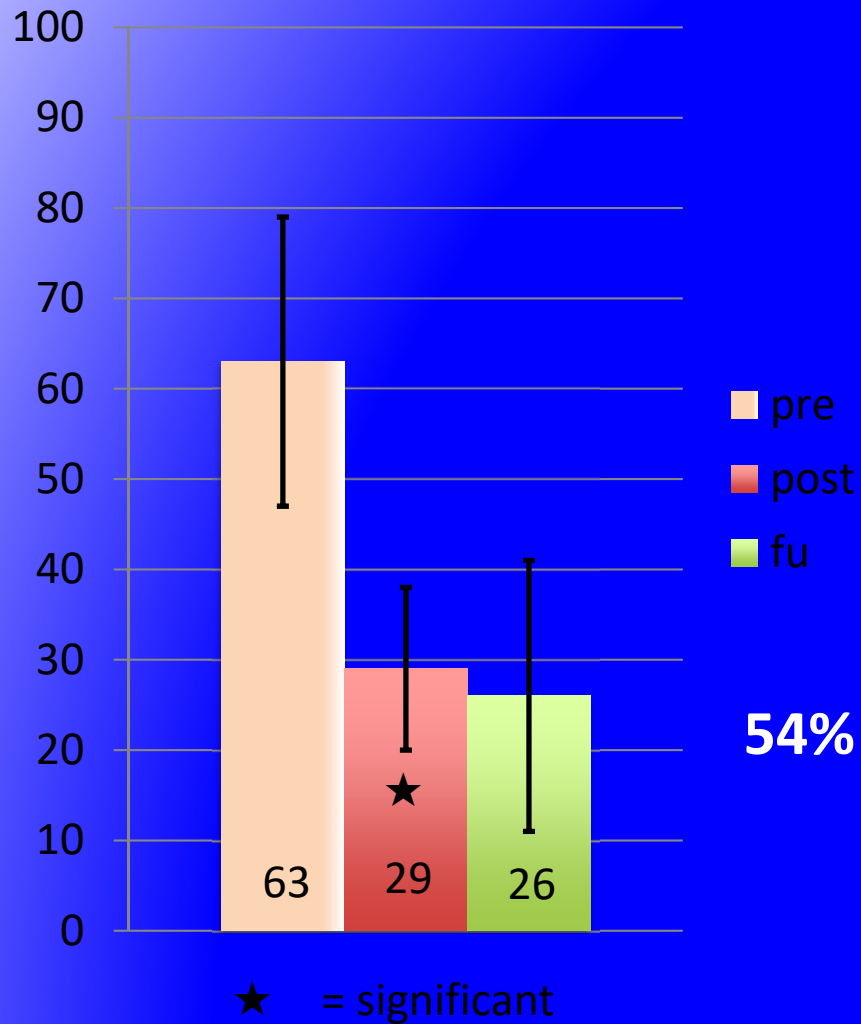
Results

	Pre-op	Post-op	Change (%)	FU	Change (%)
Cobb (°)	63 ± 15	29 ± 11	54	26 ± 12	58
Kyphosis (°)	43 ± 24	27 ± 12	37	32 ± 12	26
Lordosis (°)	41 ± 15	31 ± 12	24	35 ± 11	15
T1-T12 (cm)	18.2 ± 2.4	20.3 ± 2.5	12	21.7 ± 2.6	19
T1-S1 (cm)	29.6 ± 4.2	33.1 ± 4.0	12	35.0 ± 3.9	18



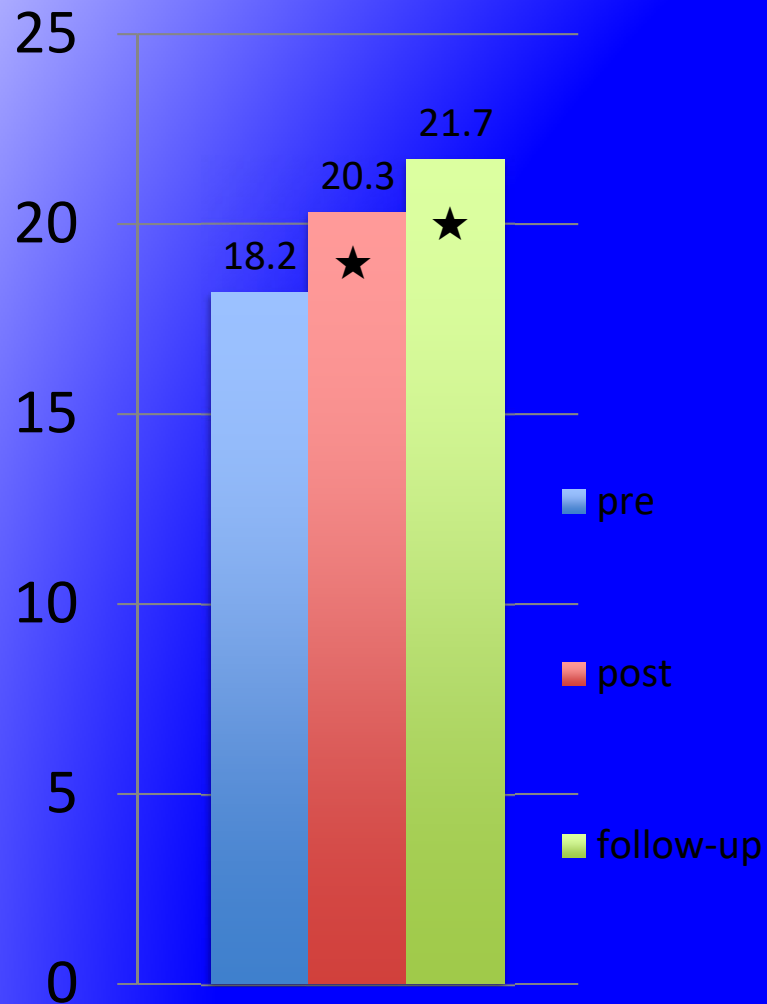
= statistically significant (p < 0,05)

Changes of Cobb angle

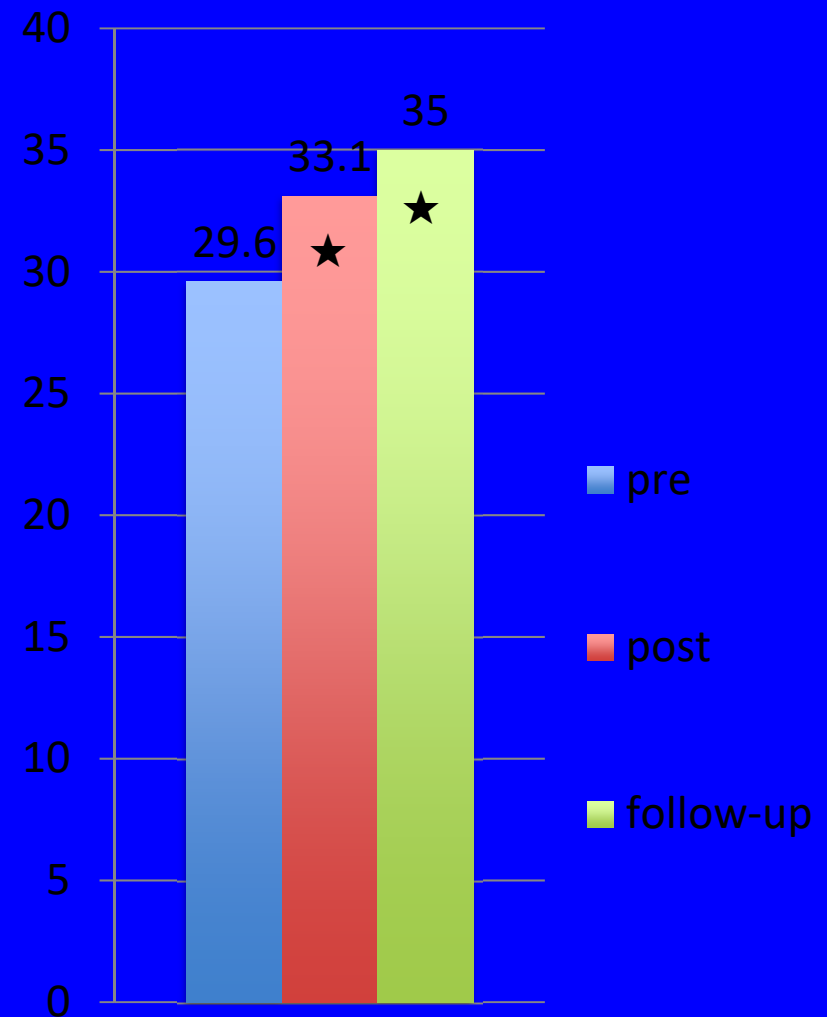


**54% correction after index procedure,
58% correction at follow-up**

T1-T12 in cm



T1-S1 in cm



Complications

(neurologic injury, unplanned surgery, infection)

- 1 loss of distraction
 - First case with 1. generation MCGR
 - All other cases werde done with 2. generation rods
- 2 junctional kyphosis needing revision
- 1 screw pull out needing revision



MCGR - Reports

Author	Patients	Primary / Revisions	Complications	Distractions
Cheung et al 2012	5 1 single rod 4 dual rods	5 / 0	1 superficial infection, 1 loss of distraction	1 / month
Dannawi et al 2013	34 patients 12 single rod 22 dual rods	32 / 2	2 superficial infections, 2 loss of distractions, 1 pullout of hook, 1 prominent screw, 2 rod breakage	every 3 months
Akbarnia et al 2013	14 patients 5 single rod 9 dual rods	14 / 0	1 superficial infection, 1 prominent hardware, 3 loss of distraction	variable
Hickey et al 2014	8 patients 2 single rods 6 dual rods	4 / 4	Proximal screws pullout + junctional kyphosis, 1 rod fracture (only primary procedures)	Individual decisions

Curve correction and T1-S1 growth

Author	Cobb before surgery (only primary procedures)	Cobb after surgery Correction in %	Cobb at follow-up Correction in %	T1-S1 growth/month
Cheung n=2	67°	25° (67%)	29° (57%)	1 mm
Dannawi n=34	69°	47° (32%)	41° (41%)	0,9 mm
Akbarnia N=14	60°	34° (43%)	31° (48%)	1,6 mm
Hickey n=4	74°	42° (43%)	42° (43%)	0,4 mm (2 patients)
Hamburg N=24	63°	29° (54%)	26 (58%)	0,9 mm

MCGR - preliminary results

- Results in terms of correction and maintaining correction comparable to traditional growing rods
- Safe technology
- No serious complications
- Distraction mechanism reliable

Questions to be answered

- What is the complication rate after longer follow-up ?
- Is distraction mechanism reliable after longer follow-up ?
- Can autofusion be avoided ?
- What is the best distraction protocol ?

Thank you

