




ICEOS

8TH INTERNATIONAL CONGRESS
ON EARLY ONSET SCOLIOSIS
AND GROWING SPINE

November 20–21, 2014

The Sheraton Hotel, Warsaw Poland

A large, ornate library with high wooden bookshelves filled with books. In the center, a large, polished brass or copper globe sits on a wooden stand. The room has high ceilings with decorative moldings and large windows on the right side, letting in natural light.

DUAL GROWING ROD: TRADIZIONAL VS MAGNETIC SYSTEMS IN THE TREATMENT OF INFANTILE IDIOPATHIC SCOLIOSIS

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DISCLOSURE

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-
- I have nothing to declare (check if applicable) _____ Correct _____
-
-
- In the past TWO years,
- I was employed by _____ Istituto Ortopedico Rizzoli _____
- was previously employed (company and dates) by _____ NONE _____
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- am an inventor on (country)(patent number) _____ NONE _____
- receive royalties from _____ NONE _____
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- Other perceived conflict of interest _____ NONE _____

Background

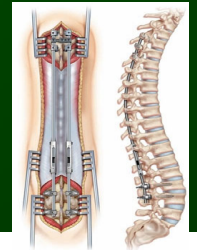
The "Growing rod" represent valid systems for the control of *Early-Onset Scoliosis* , when the vertebral arthrodesis is not indicated, as in patients under 10 years old.

PROBLEMS:

Multiple surgeries

Several anesthetics

Pre-, intra and postoperative risks (infections, etc.)



Complications of Growing-Rod Treatment for Early-Onset Scoliosis Analysis of One Hundred and Forty Patients

Shay Bess, MD, Behrooz A. Akbarnia, MD, George H. et al

Hospitalization

Expenses for the family

Stress for young patients



Magnetically controlled growing rods for severe spinal curvature in young children: a prospective case series

Kenneth Man-Chee Cheung, Behrooz A Akbarnia, et al. Lancet 2012

Caldas JC, Pais-Ribeiro JL, Carneiro SR. General anesthesia, surgery and hospitalization in children and their effects upon cognitive, academic, emotional and sociobehavioral development—a review. Paediatr Anaesth 2004; 14: 910–15.

21 Kain ZN, Wang SM, Mayes LC, Caramico LA, Hofstadter MB. Distress during the induction of anesthesia and postoperative behavioral outcomes. Anesth Analg 1999; 88: 1042–47.

Magnetically controlled growing rods (MCGR) are increasingly used for the treatment of early onset scoliosis.

Aim of the study is to retrospectively review our patients treated with MCGR

Material And Methods

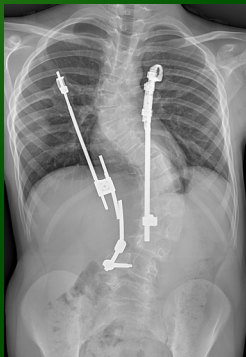
6 patients 3 males 3 females

Age: from 4 to 11 years old

Aethiology: **6 early and late onset scoliosis**
(infantile or juvenile)

Charatteristics: $>40^\circ$ Cobb,

No Mieloradicular Malformations at the MRI



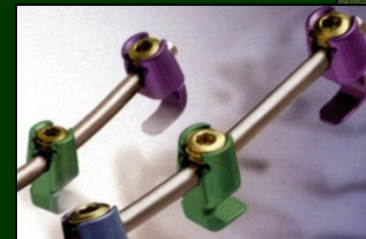
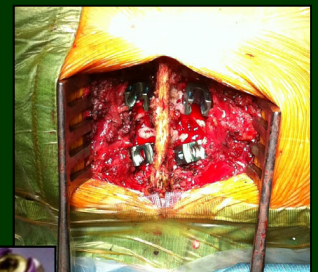
- In one case a VEPTR and a GSP was first implanted before using MCGR.
- In all cases a dual growing rod was implanted, using as distal anchors pedicle screws, as proximal anchors hooks.

Follow-up 10 - 39 month

Xrays after each lengthening at the begining, then every 6-10 months, now ultrasound control e.l..

Clinical Out-come clinici with SRS-30 Questionaire.

Daily Brace for every patient



Ultra-sounds control



To reduce X-rays exposure after each lengthening

Results

	PRE-OP	POST-OP	CORRECTION	F.U.	CORRECTION
RIGHT THORACIC	62.7°	32°	49%	24.6°	60%
LEFT LUMBAR	58°	31°	46,5%	27,8°	48%
T1-T12				+2 cm/yy	

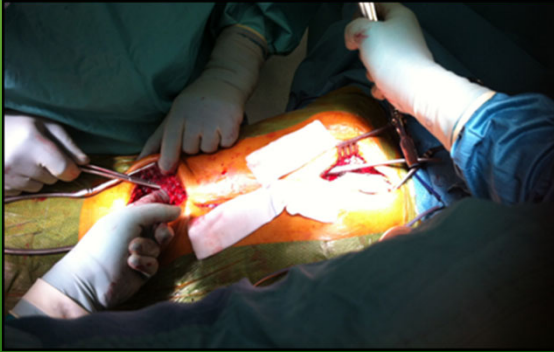


The lengthening were performed every 60-90 days (min 3 mm - max 6 mm each) Day Surgery.

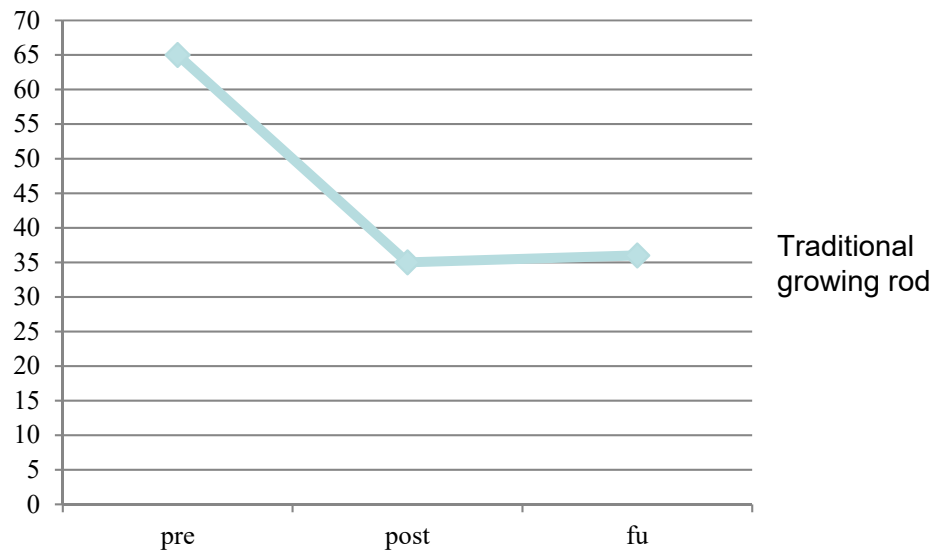
At a minimum follow up of 6 m, max 30 m, after performing 5.7 lengthening procedures per patient, main thoracic scoliosis was corrected from 62.7° to 24.6° (mean correction 60%), lumbar curve form 58.5° to 27.8° (48%).

Results

TRADITIONAL DUAL GROWING ROD



mean	PREOP	POSTOP	F.U.	Mean correction
SCOLIOSIS	65°	35°	36° (p > 0.05)	44,6% (p < 0.05)



6 patients 2 males 4 females

Age: from 7 to 12 years old

Aethiology: **6 early and late onset scoliosis**

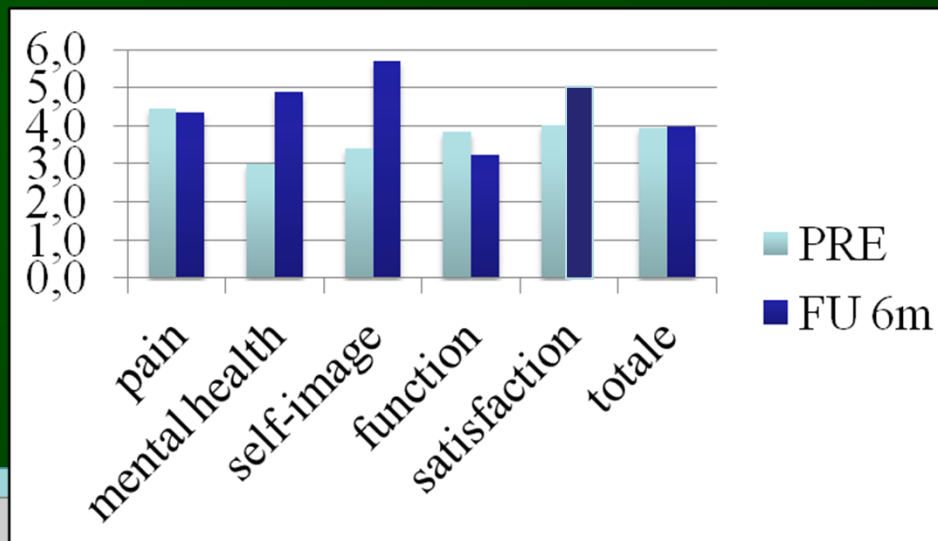
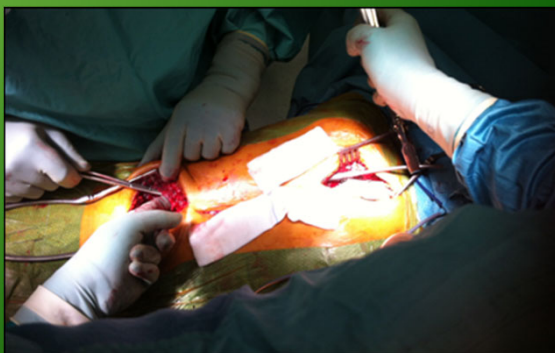
(infantile or juvenile)

Charatteristics: >40° Cobb,

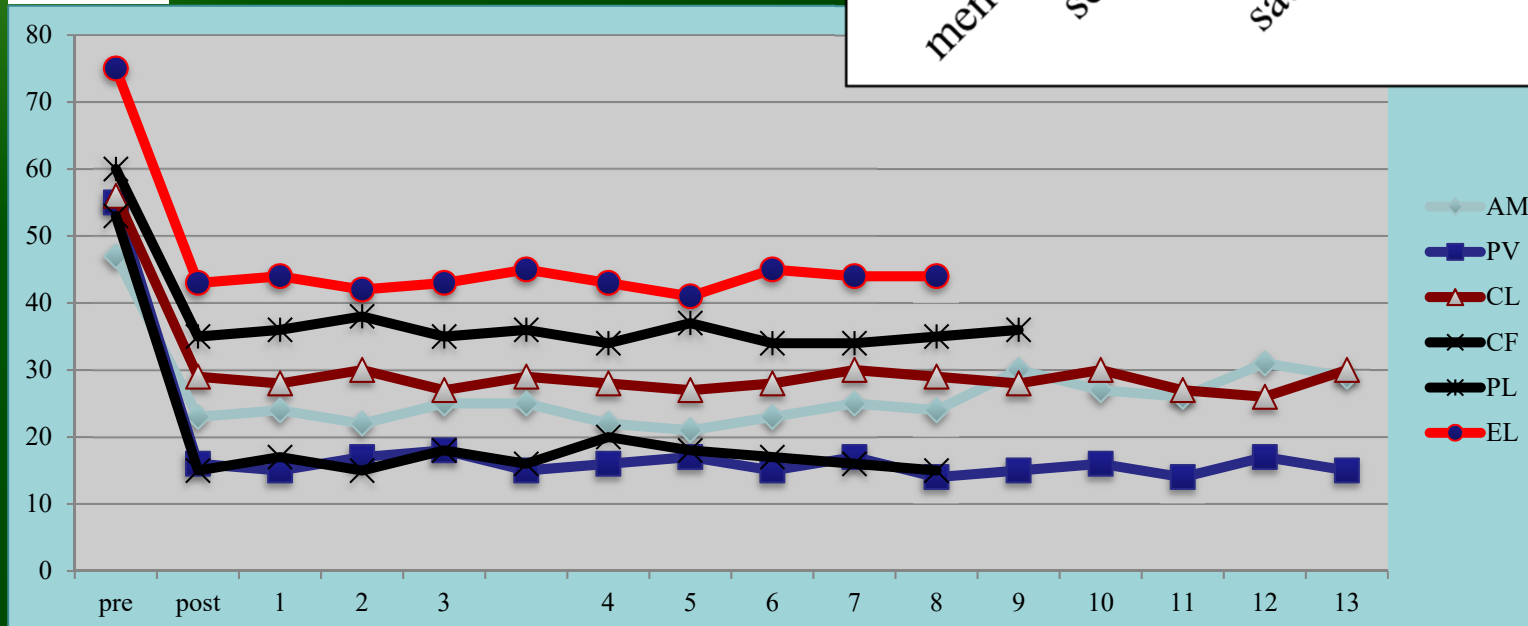
No Mieloradicular Malformations at the MRI

Results

SRS-30



° Cobb



Scoliosis correction and maintenance of correction during the elongations

Results

Costs €

	MCGR	TRADITIONAL GR
1° implant	27000	10500
lengthening	300	4200

Although MCGR instrumentation costs more (HK\$50 000; US\$6451) than does the traditional growing rod (HK\$25 000; US\$3225), the traditional procedure is associated with further costs due to frequent operations, spinal cord monitoring, use of general anaesthesia, hospital stays, drug use, manpower, consumables, and time off work for the parents.

Magnetically controlled growing rods for severe spinal curvature in young children: a prospective case series.

[Cheung KM](#), [Cheung JP](#), [Samartzis D](#), [Mak KC](#), [Wong YW](#), [Cheung WY](#), [Akbarnia BA](#), [Luk KD](#).

[Lancet](#). 2012 May 26

After 3 year the costs are the same

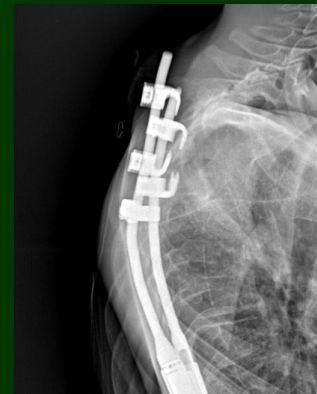
Results

Complications

INFECTIVE	NO
NEUROLOGICAL	NO
POST OPERATIVE PAIN	1
MECHANICAL	1

30%

At final follow up, no patient presents pain or functional limitation.

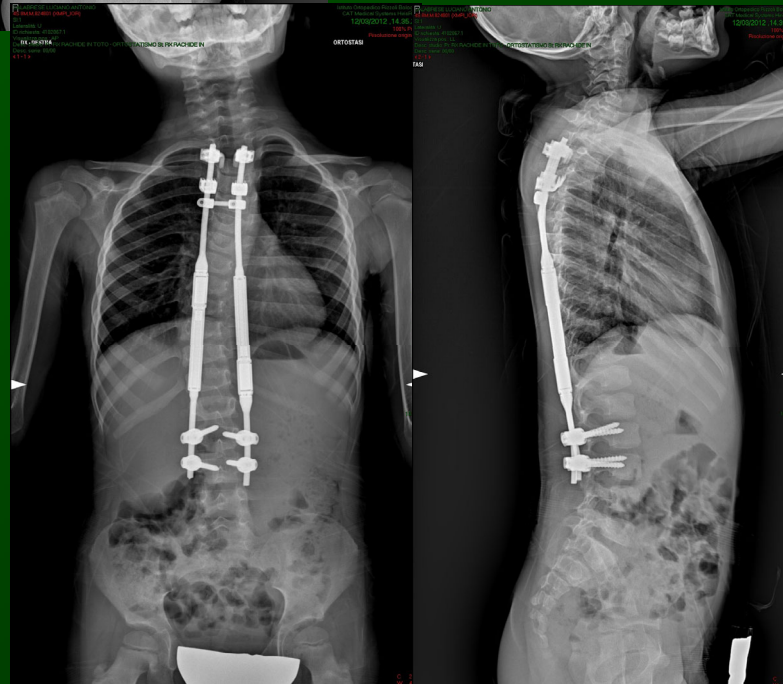
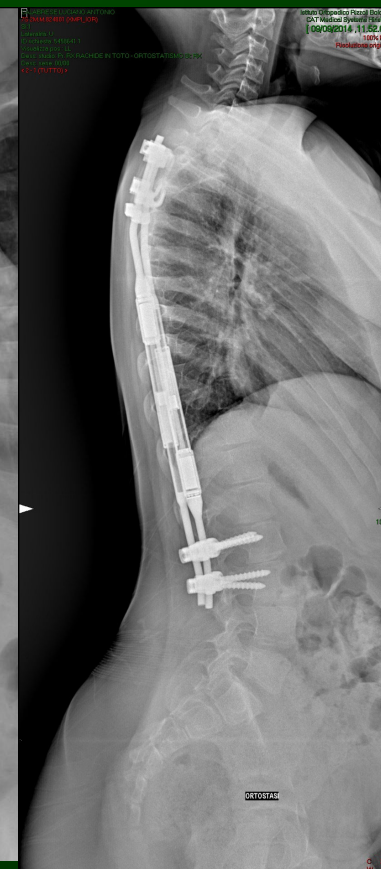
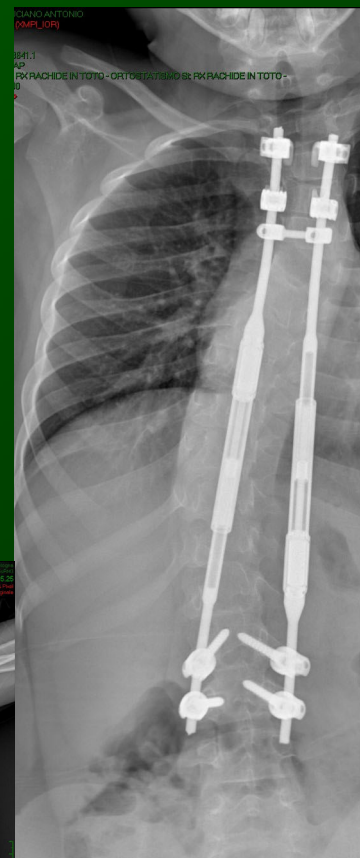


Results

M 4,9 YY: infantile idiopathic scoliosis

7 YY

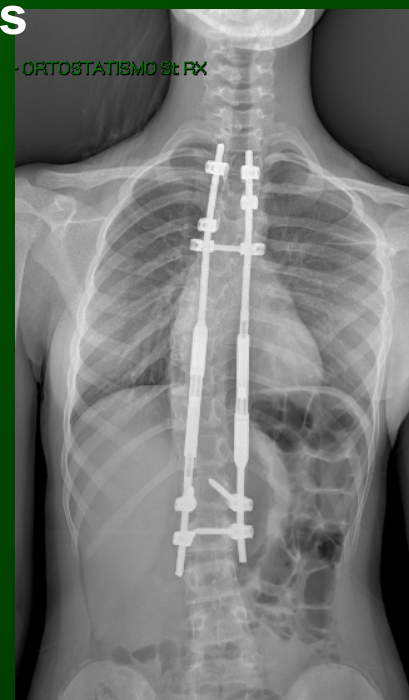
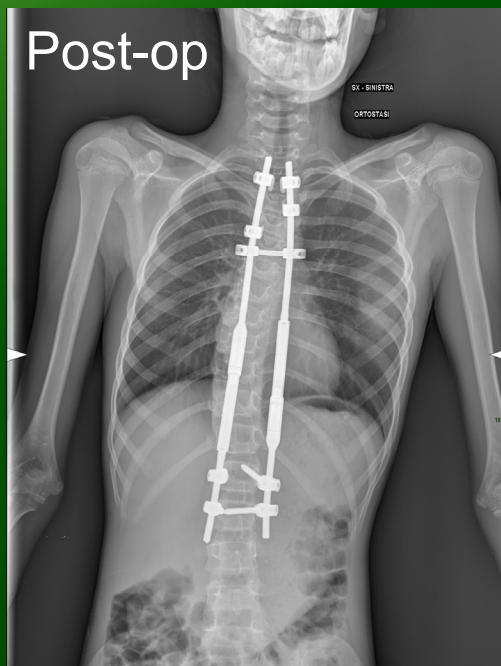
Post-op



Last lengthening: 11°
Tot: + 30 R e + 24 L

Results

F 9 yy: juvenile idiopathic scoliosis

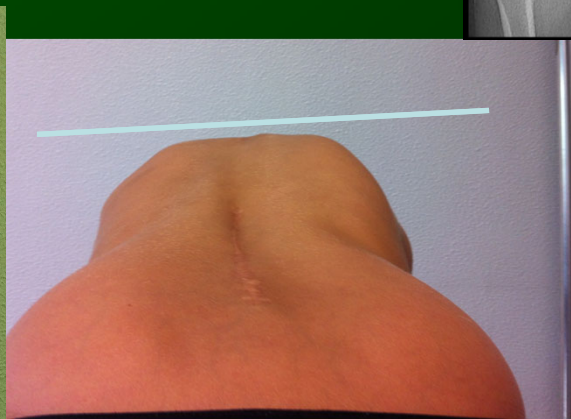
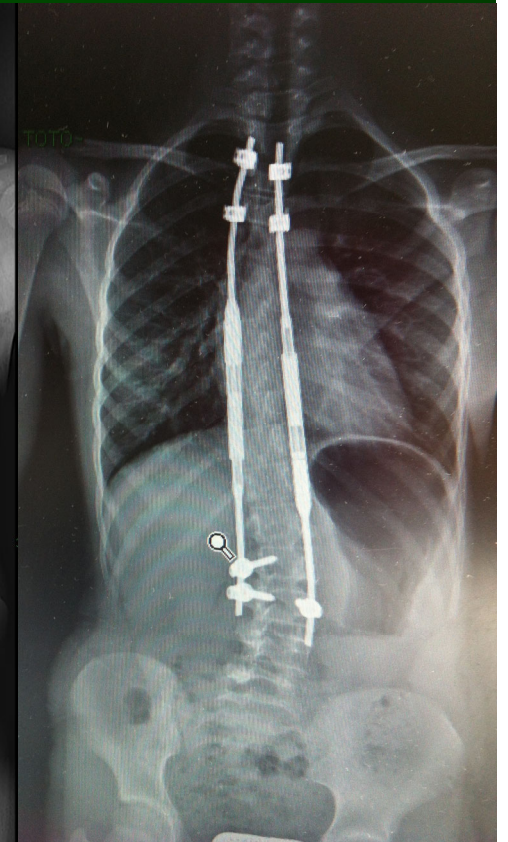
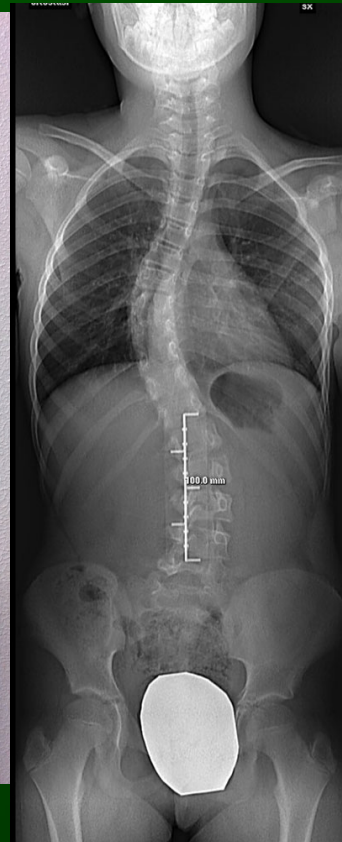
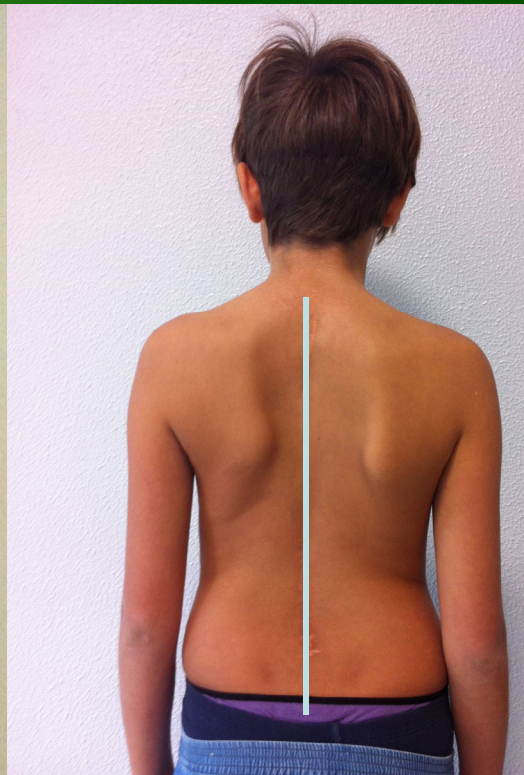


Lengthening: 9°
Tot: +18 R e + 14 L



Results

F 9 yy: juvenile idiopathic scoliosis



Last lengthening: 12°
Tot: + 35 R e + 32 L

Discussion and Conclusion

The extendable magnetic systems are safe and effective (poor literature).

**The systems have maintained the elongation performed;
Ultra-sounds control grants the evaluation of the evolution
reducing X-rays exposure**

Health care costs, in relation to the traditional growing systems, are similar to the individual patient and the quality of life of young patients and their families is satisfactory.

Indications: early onset idiopathic scoliosis

Contraindications: inability to perform MRI (mieloradicular malformations)

There were no complications related to the operation of elongation.

Discussion and Conclusion

Those results showed that MCGR can be safely and effectively used in patients affected by early onset idiopathic scoliosis, with an acceptable complications incidence (33%) if compared with literature regarding growing spinal implants, offering excellent deformity control and functional outcome.

The control of the deformity is granted at final follow up and the spinal growth of the children seems to be similar to the normal people.

Early results of a remotely-operated magnetic growth rod in early-onset scoliosis.

Dannawi Z, Altaf F, Harshavardhana NS, El Sebaie H, Noordeen H.

Bone Joint J. 2013 Jan;95-.

Next Generation of Growth-Sparing Techniques: Preliminary Clinical Results of a Magnetically Controlled Growing Rod in 14 Patients With Early-Onset Scoliosis.

Akbarnia BA, Cheung K, Noordeen H, Elsebaie H, Yazici M, Dannawi Z, Kabirian N.

Spine (Phila Pa 1976). 2013 Apr 15

Magnetically controlled growing rods for severe spinal curvature in young children: a prospective case series.

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Lancet. 2012 May 26




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