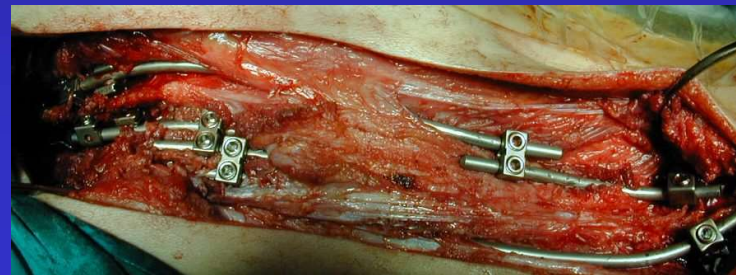


***FINAL FUSION IS RARELY
REQUIRED IN GROWTH-
SPARING SURGERY***

*F.S Pérez-Grueso. MD
Hospital La Paz
Madrid. Spain*



Arthrogryposis multiplex congenita

INITIAL EVALUATION

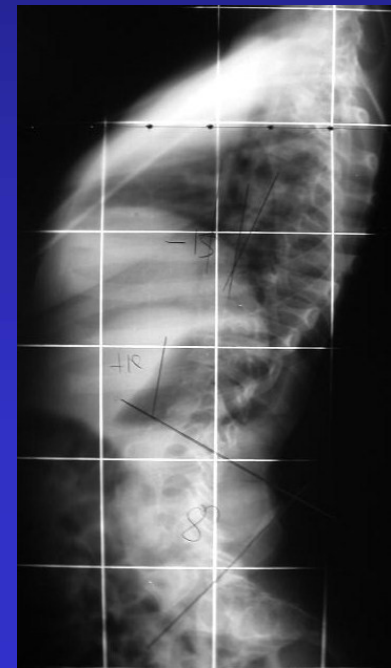
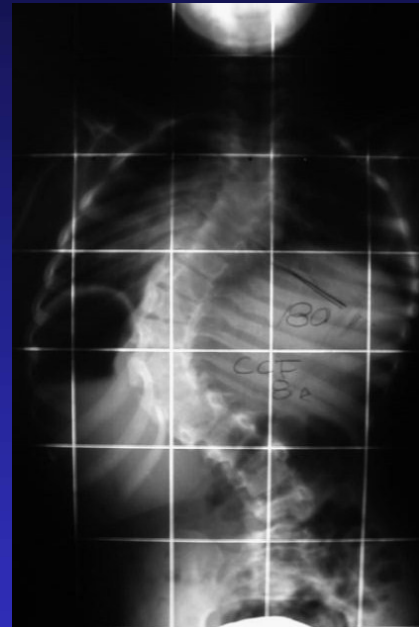
- Female. Age 8
- Repeated surgeries for joint contractures
- Previous treatment: Milwaukee brace
- Standing height : 1.02 m.



Arthrogryposis multiplex congenita

Radiography

- Left thoracic curve. T7-L2: 80°
- Th. Kyphosis: 15°
- L. Lordosis: 80°
- T1-S1 height : 22.3 cm
- MRI: no anomalies



SURGERY

- INDEX SURGERY (1/06)

- Growing Rods: T2-L3. UFL:T2-T3. LFL:L2-L3

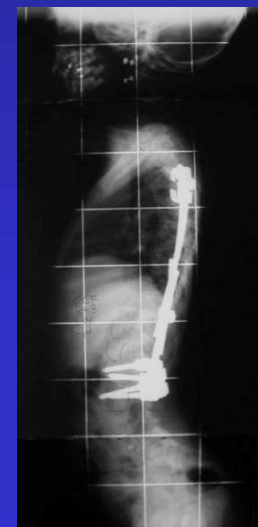
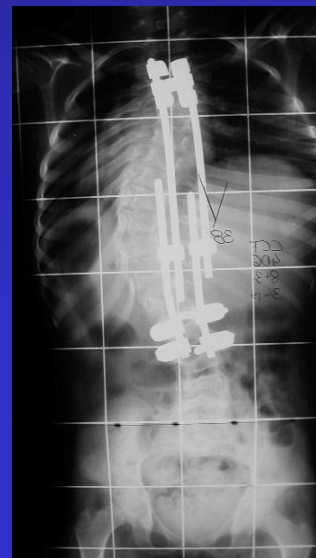
- Lengthening #1: 9/06

- Lengthening #2: 9/07. Upper hooks revision

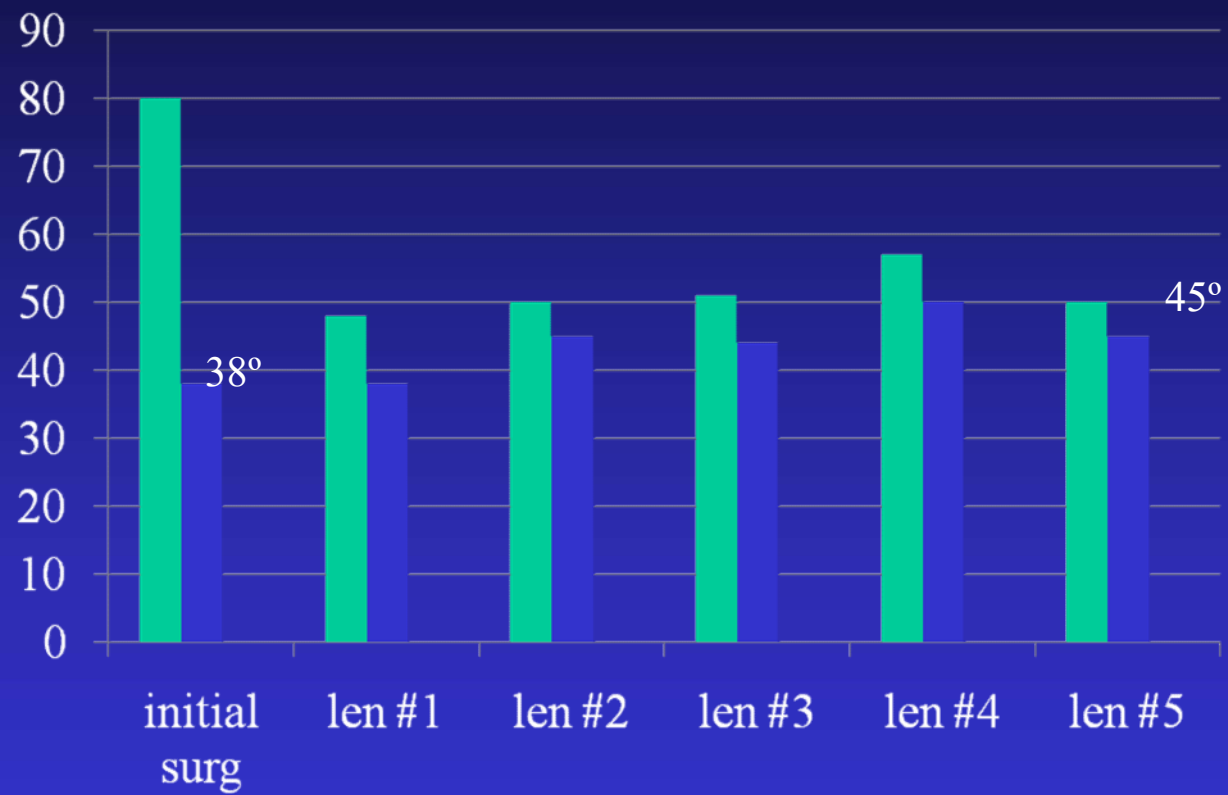
- Lengthening #3: 5/08

- Lengthening #4: 12/08

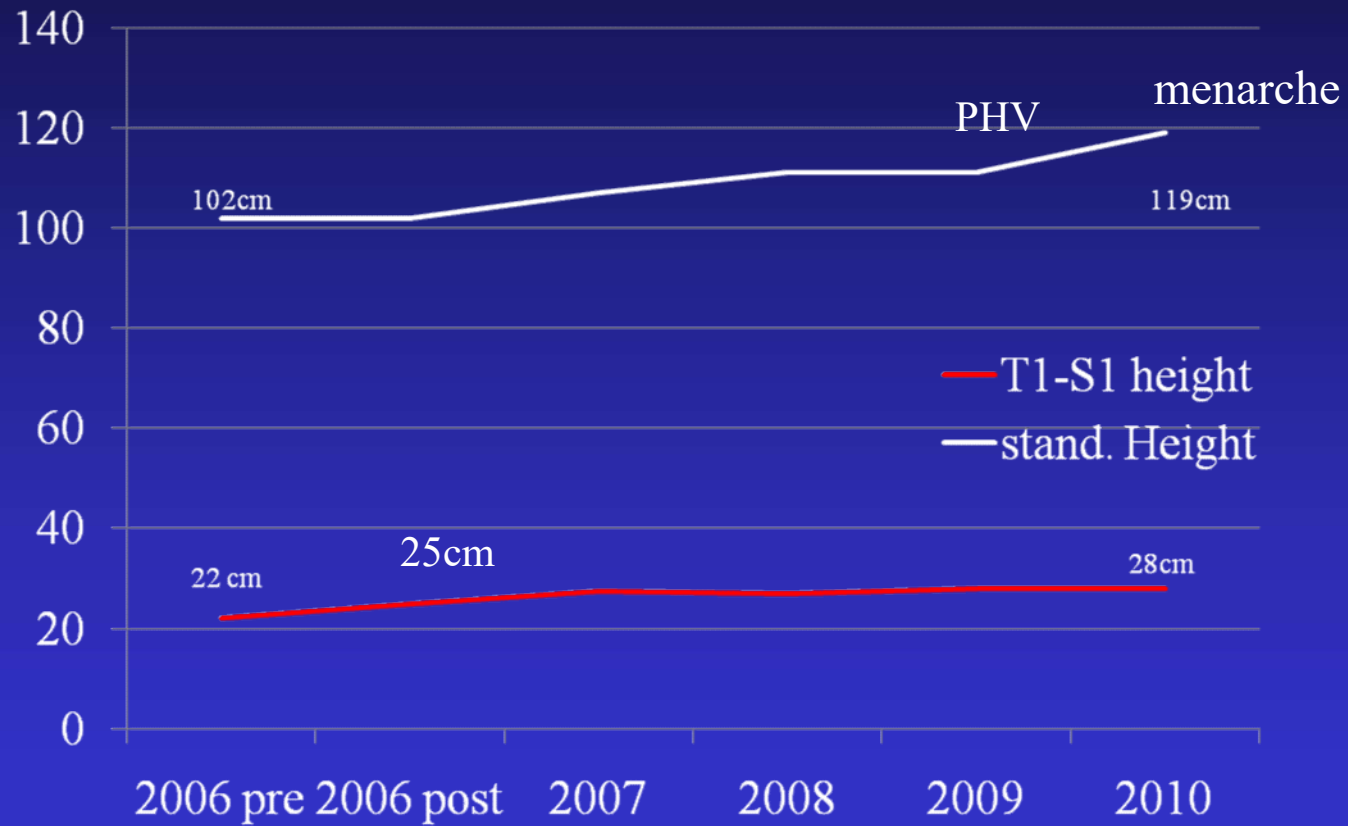
- Lengthening #5: 11/09

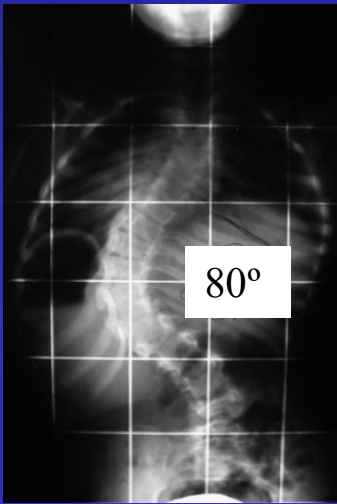


Cobb correction

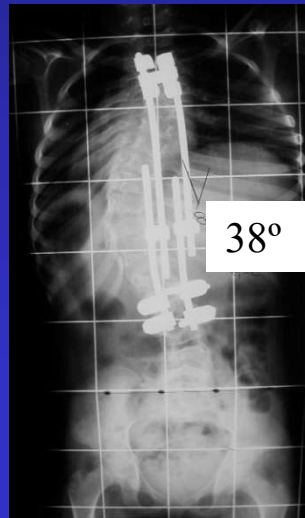


GAIN IN HEIGHT

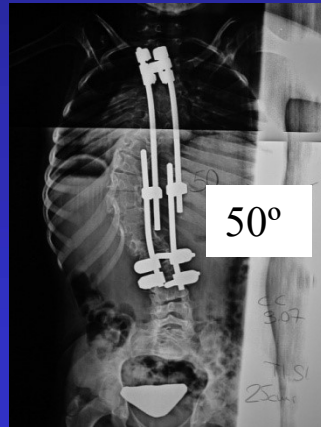




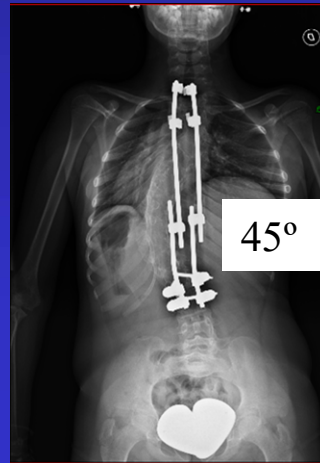
2006



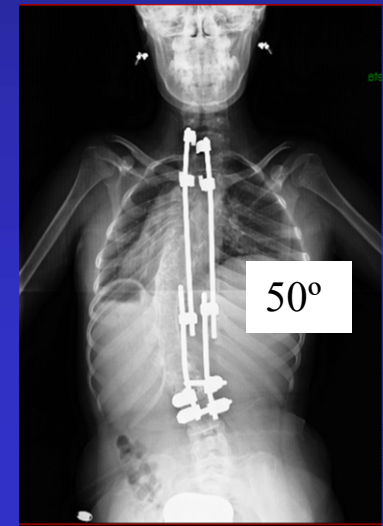
2006 post



2007



2009



2010

ABSOLUTE TRUTH (for this case):

FINAL FUSION IS NOT REQUIRED

TRUTH

FINAL FUSION HAS BEEN ALWAYS DONE

UNLESS SPONTANEOUS FUSION OCCURED

*OR AN ANTERIOR EPIPHYSIDESIS WAS PREVIOUSLY
PERFORMED*

Summary Statement: Deformity

Braun, John; Akbarnia, Behrooz; Emans, John; Lowe, Thomas

Spine. 30(17S):S34, September 1, 2005.

2) temporizing measures that delay fusion (*e.g.*, growing rods, VEPTR);

“...Temporizing measures that prevent deformity progression in a young child potentially allow additional vertical spinal growth, chest volume expansion, and continued pulmonary development. Although fusion is eventually required in these children,”

Growing rod graduates: Lessons from 58 patients who have completed their lengthenings.

John M. Flynn et al.

Paper #78 SRS Annual meeting. KYOTO. 2010

- 58 Patients who reached skeletal maturity
 - 53 (91%) had a final fusion
 - 3 were observed with GRs in place
 - 1 had implant removal without fusion

Conclusions: *For most patients the final fusion will include more levels than were spanned by the GRs and < 50% of correction of the pre fusion deformity*

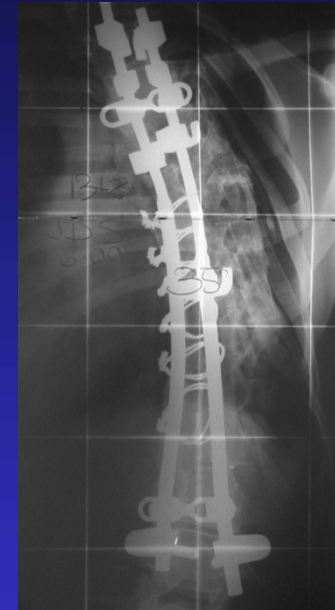
Dual Growing Rod Technique Followed for Three to Eleven Years Until Final Fusion: The Effect of Frequency of Lengthening

Akbarnia, Behrooz A.; Breakwell, Lee M.; Marks, David S.; McCarthy, Richard E.; Thompson, Alistair G.; Canale, Sarah K.; Kostial, Patricia N.; Tambe, Anant; Asher, Marc A.; the Growing Spine Study Group
Spine. 33(9):984-990, April 20, 2008.

- *13 patients*
- *Age at index surgery: av 6.6 years*
- *Length of treatment: av 4.37 years*
- *Age at fusion: av 11 years*

	Pre index	Post index	Pre fusion	final
COBB	81°	35.5°	39.5°	27.7° (30%)

No correlation between solid fusion and chest deformity progression



AGE 10:
50% CHEST GROWTH

DIMEGLIO

TRUTH

It seems that final fusion is indicated because surgeons have been doing it since non fusion techniques were developed.

There are still no data in favor of leaving these type of patients without final fusion.

THANK YOU

