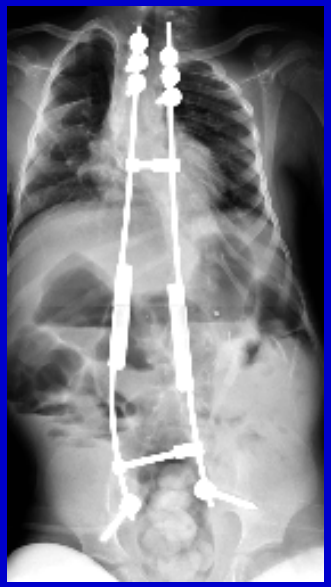
Pelvic Fixation of Growing Rods



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- *for the GSSG*

Financial Disclosures

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b. Consultant
c. Stock/Shareholder
d. Speakers' Bureau
e. Other Financial Support

Introduction

- Growing rods = “internal brace” for young patients with severe scoliosis extending to the pelvis
- No prior studies of growing rods to pelvis
  - How do foundations behave over time?
- This project analyzed the outcomes and complications unique to this construct

Patients and Methods

- 22 patients from 8 centers
- Indications/Inclusion criteria
  - Severe pelvic obliquity
  - Distal deformity
  - Lack of satisfactory alternative anchor sites
  - ≥ 2 years treatment with growing rods fixed to the pelvis

Diagnoses

- Myelomeningocele 4
- Congenital 4
- Cerebral palsy 3
- Arthrogryposis 1
- SMA 1
- Miscellaneous/syndromic 9

Patient Characteristics

- Age at surgery 6.1 ± 3.1 years.
- Preop curve 86 ± 22°
- Coronal imbalance **9.7 ± 8.2 cm**
- Follow up **50** months.
- Mean of **2.9 ± 1.8** lengthenings (1-9)

Anchor types

- Pelvic Fixation:
  - Iliac screws or rods -17
    - 3 s-rods
    - 5 iliac rods
    - 11 screws
  - Sacral hooks -5
- Proximal fixation
  - Hooks-12
  - Screws-10
- Dual rods used in 18 patients; single in 4
- Distal crosslink used to improve stability

Results

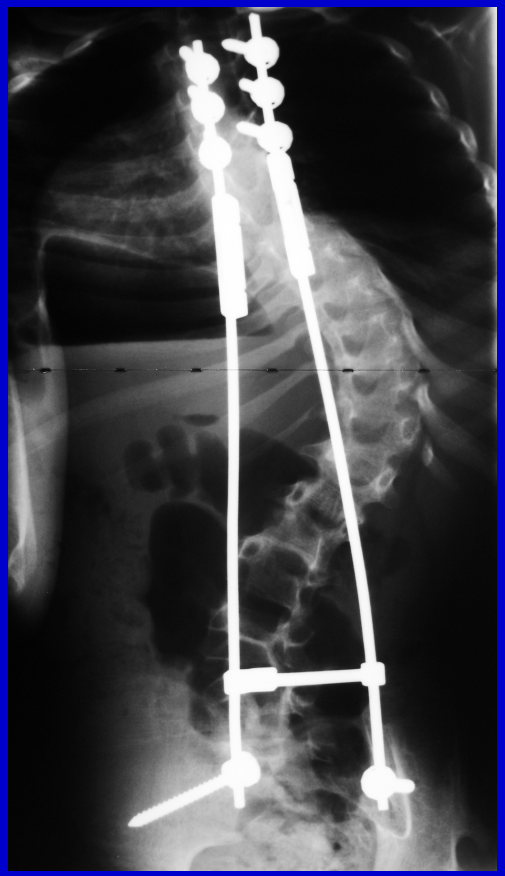
- Curve improved from 86^{o} to 47^{o} $\pm$19^{o} at final follow up.

- Correction same w. Sacral vs iliac anchors
  - 45% vs 46%; ns
- Coronal imbalance improved from 9.7 to 4.4 cm

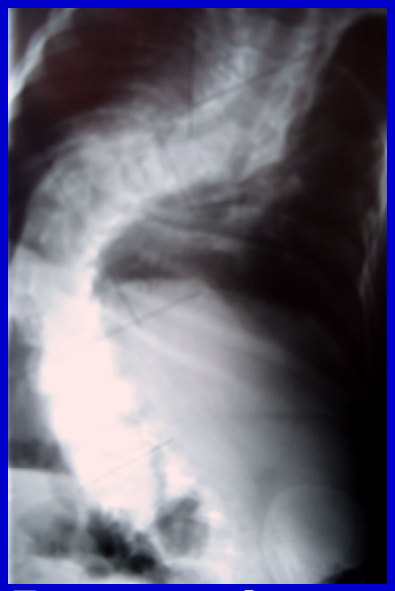
Results

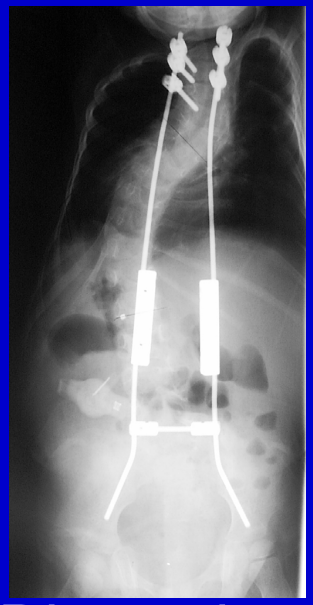
- Mean increase in T1-S1 length **7.3 ± 2.9 cm** during distraction
- Seven patients have undergone final fusion at a mean of **10.8 + 1.4** years

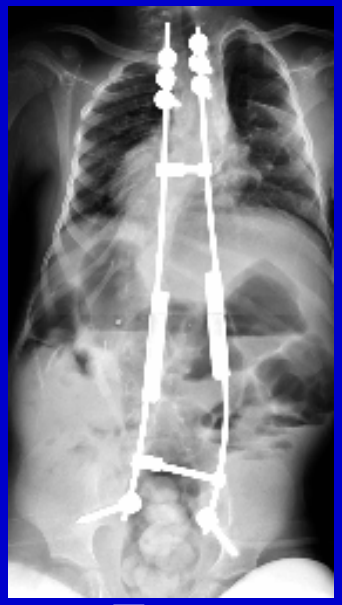
CP
4 yrs; final fusion



Arthrogryposis

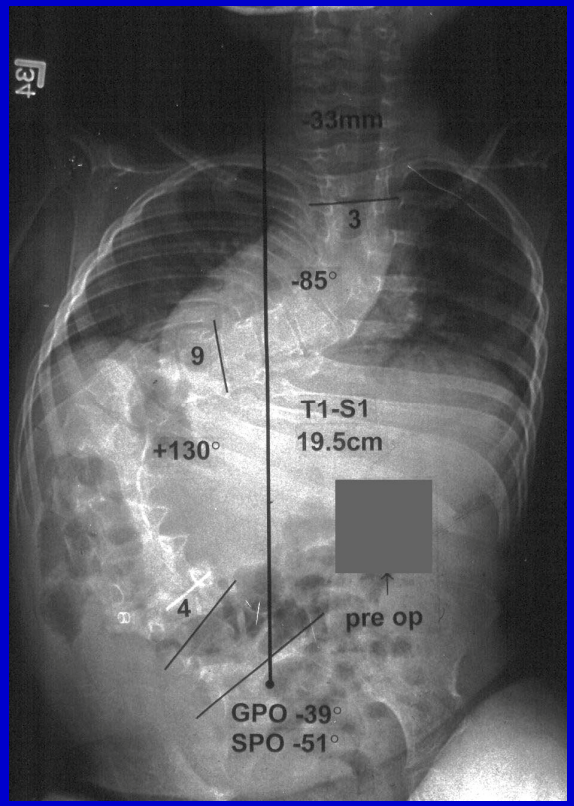


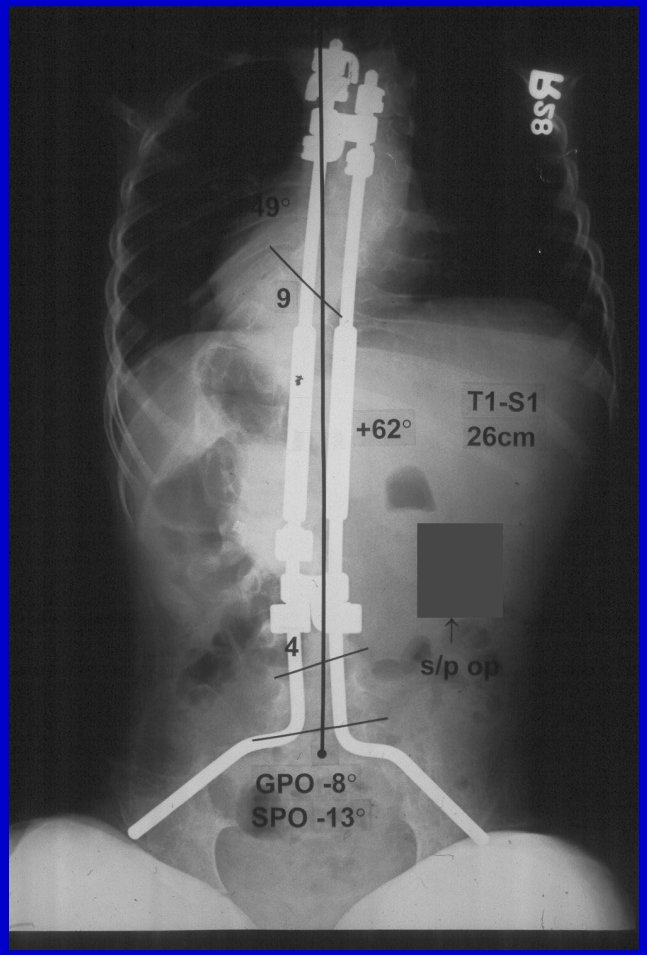


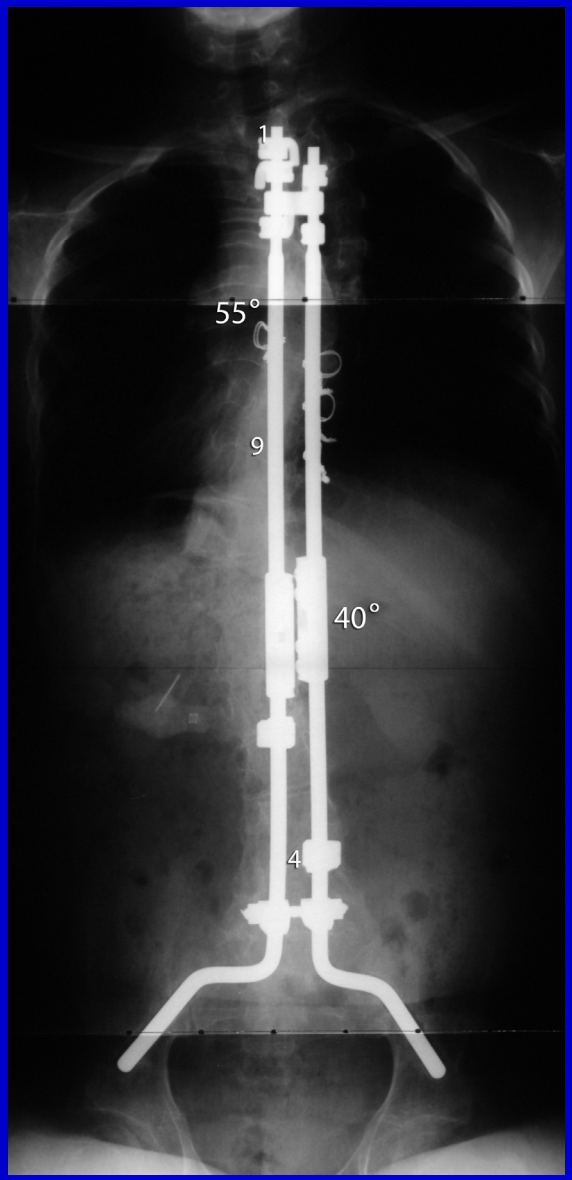


- Pre-op → 1st Distraction→ Last Follow-up

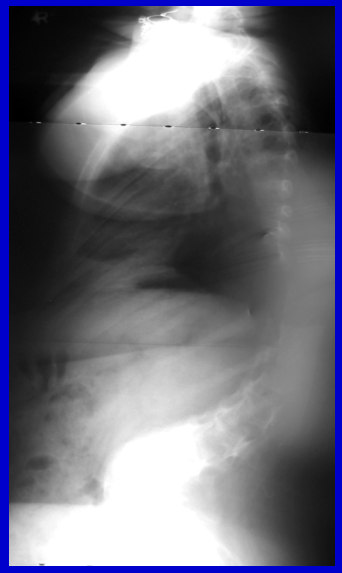
Syndromic Curve

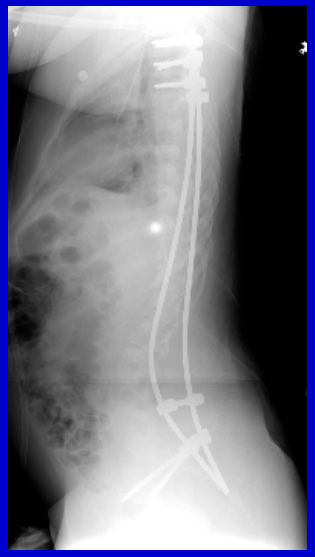






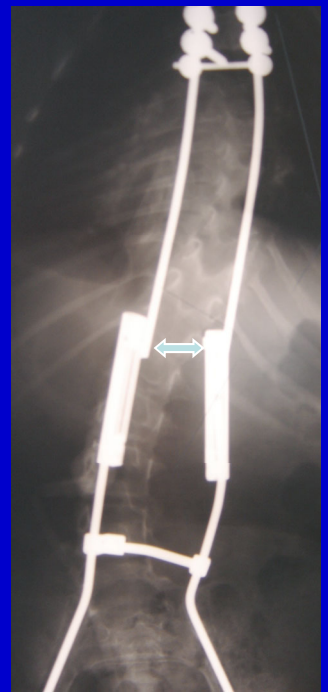
SMA II





Complications

- 6 deep wound infections
- 6 distal fixation complications; all salvaged
- 3 rod breakages
  - this rate did not differ statistically from the rate for dual growing rods as a whole
  - (3/22 vs/ 25/144; ns)



Complications by distal anchor type

- Hooks:
  - 2/3 distal erosions
- S-rods
  - 2/3 migrations
- Screws:
  - 2/11 edge prominences
- Iliac rods
  - no complications reported

Suggestions

- Bilateral pelvic fixation
- Maximize intra-pelvic length
- Rigid distal cross link
- Avoid prominent implant edges

Conclusions

- Pelvic fixation an effective caudal foundation for growing rods
- Both screws and hooks satisfactory;
  - Iliac rods/screws had lower complication rate
- Age & Indications still being defined
  - For start and stop
- 10+ cm realistic
- Indicated when definitive fusion will involve pelvis

Thank You