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Can "Final Fusion" Procedure be Avoided at Skeletal Maturity After GR ?

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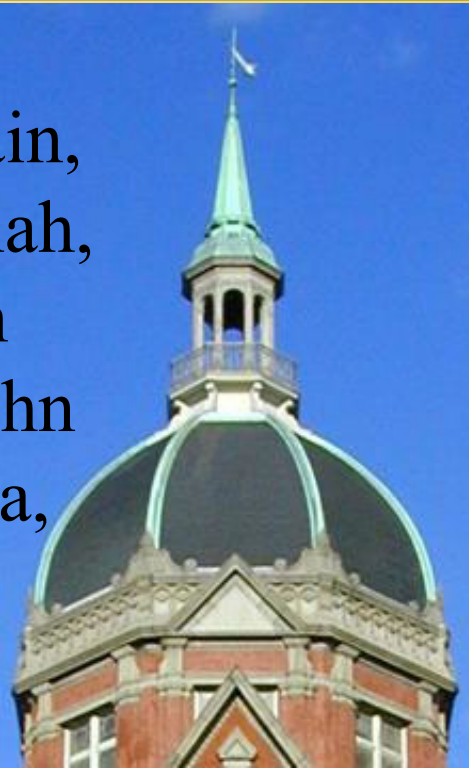

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Background

- "Final fusion" is a common endpoint to growing rod treatment (GR) for early onset scoliosis (EOS).
- Recent literature suggests that the rate of autofusion after growing rods is high, which can lead to difficulty obtaining further correction at definitive fusion (Cahill 2010).

Hypothesis

- Final fusion may not be necessary for a subset of EOS patients who have reached skeletal maturity with good alignment
  - Risser 3-4
  - No fractures in prior 2 years
  - "Diminishing returns"; <1 cm at last distraction
  - No implant problems

- Aim: characterize patients who completed GR but received no final spinal fusion (NF).

Methods

- Growing Spine Study Group database identified 160 patients with GR who reached skeletal maturity.

- 137 patients had final fusion (FF)
- 23 patients did not have a final fusion surgery (NF).

- Radiographs and clinical records were compared

Methods
Patient Diagnoses

	NF	FF
Idiopathic Scoliosis	7	33
NM Deformity	8	27
Congenital Deformity	2	25
Genetic or Syndromic Deformity	6	52
TOTAL	**23**	**137**

Results:
Patient Characteristics

Groups comparable in:

- **Age** at start: 7.4±3.8 years (NF group) vs. 6.1±3.4 years (FF group), P=0.80
- **Gender** (47% in NF group were female vs. 58% in FF group were female, P=0.34)
- **Diagnoses** (p=0.24)

Results:
Surgical Characteristics

Also comparable in:

- **Number of lengthening** procedures: 6.4±3.5 (NF) vs. 5.6±3.9 (FF), P=0.36
- Overall **treatment time** (from index to last procedure): 7.8±3.5 years (NF) vs. 7.6±3.4 years (FF), P=0.79

Results: Radiographic Outcomes

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- **Correction of major curve**
  - NF group: 46% correction
  - FF group: 37% correction
  - **No significant difference in curve correction (P=0.23)**

- **Increase in trunk height (T1-S1 length)**
  - NF group: 30% (11.5cm)
  - FF group, 25% (9.5 cm)
  - **Trunk height gain in NF significantly higher (P<0.01)**

NF Group Followup

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- Of the 23 patients in the NF group, **13 patients** (57%) had a minimum of 2 year clinical followup after their last surgery (**mean 3.3 years**, range 2 to 7 years)
- All patients had their rods retained. There were **no rod fractures** and no evidence of **pseudarthrosis**.

Discussion

- Patients who did not receive a final fusion had:
  - equivalent final coronal correction
  - trunk height
  - no rod fractures or known pseudarthrosis
- "No final fusion" at maturity is a viable option for select patients treated with GR who have satisfactory final alignment
- Further followup of non-fusion patients required to better understand long term implications

Thank you

A Growing Rod Saga

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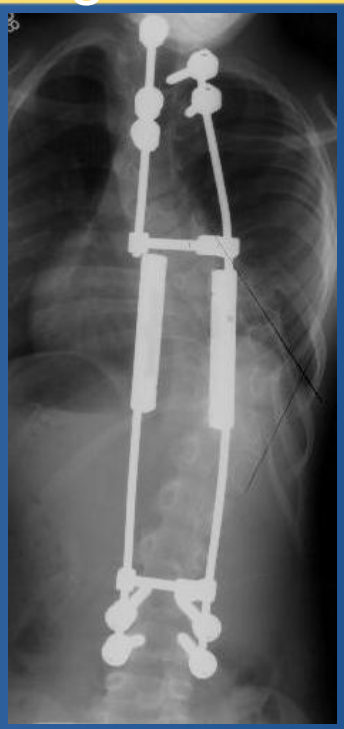
Age 6

Age 8



Age 9

EOIS 95^{o} at age 6. Rods fractured multiple times

End of the saga

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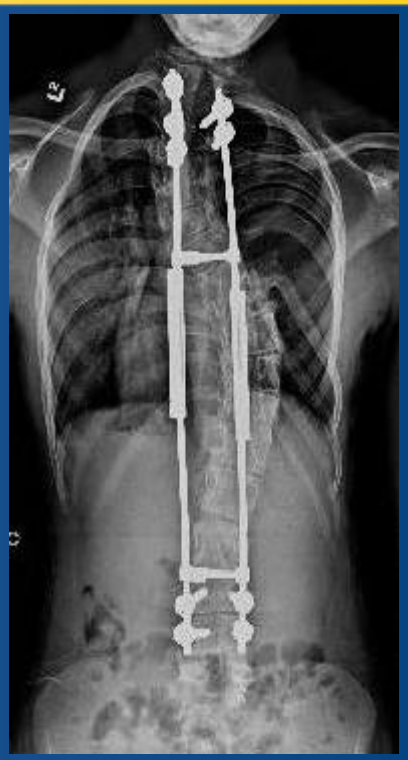
Age 6

Age 14

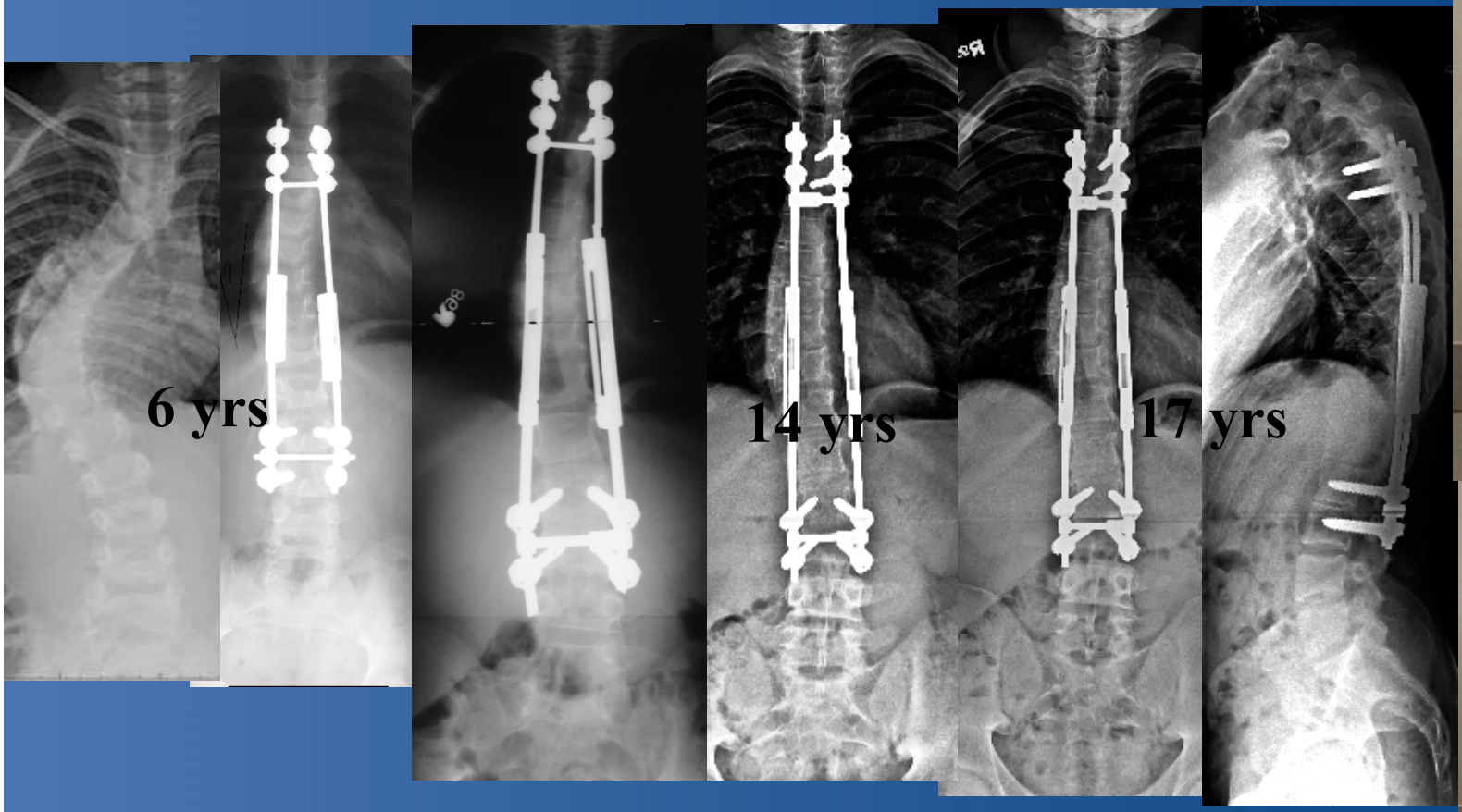
Age 15

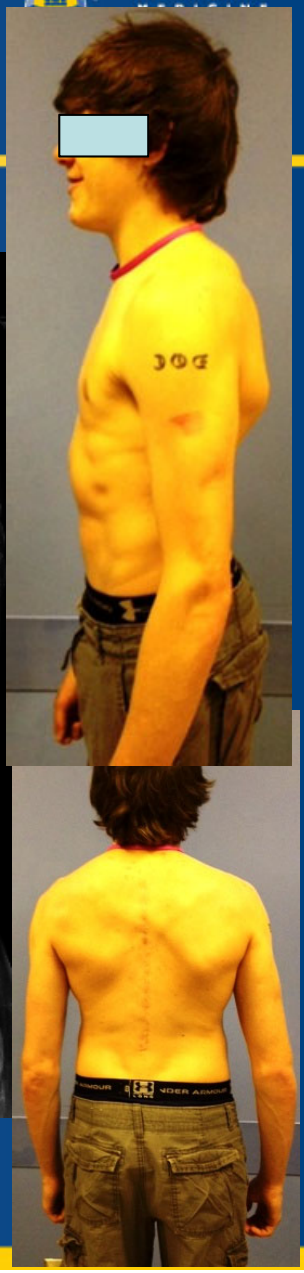
Age 16



Construct stable for 3 yrs at maturity. No final fusion planned

Another story -IIS





No Final Fusion