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# **Halo-Gravity Traction followed by Growth-Friendly Instrumentation**

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# Disclosures:

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- **Consultant:**
  - Medtronic
  - Depuy/Synthes Spine
- **Royalties**
  - Depuy/Synthes Spine (VEPTR II)



# *HG traction before G-F Implants – Why?*

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- **Gradual correction:**
  - Chest wall, torso soft tissues
  - Non-fused coronal and sagittal spine deformity
  - Intraspinal contents
    - Not always safe in pre-existing deficit
- **Can't correct:**
  - Vertebral bars, fusions
  - Rib fusions
- **Contraindications?**
  - Abnormal C-spine?
  - Unstable main deformity
  - Kyphotic deformity with neuro deficit??
    - Cord drawn more tightly across kyphosis?
  - Behavior/psychiatric disorder
  - Seizures uncontrolled
  - Flexible deformity treatable by non traction

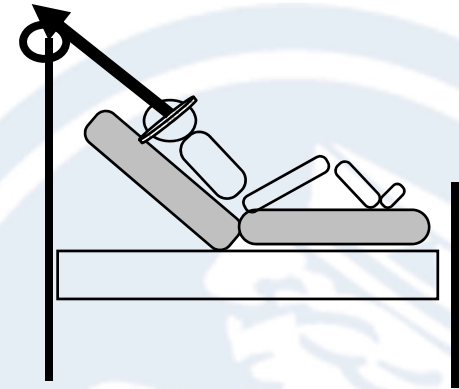
# *HG traction before G-F Implants – What works?*

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- **Best uses?**
  - Severe upper thoracic kyphotic deformity
  - Poor quality bone = weak anchors
  - Severe, correction-limiting chest wall deformity
- **Cephalad deformity more responsive to H-G traction**
  - C-T better than T, than T-L
  - L and L-S deformity often unaffected by pure H-G traction, particularly if legs are lightweight. Worse if hip deformities below.

# HGT protocol:

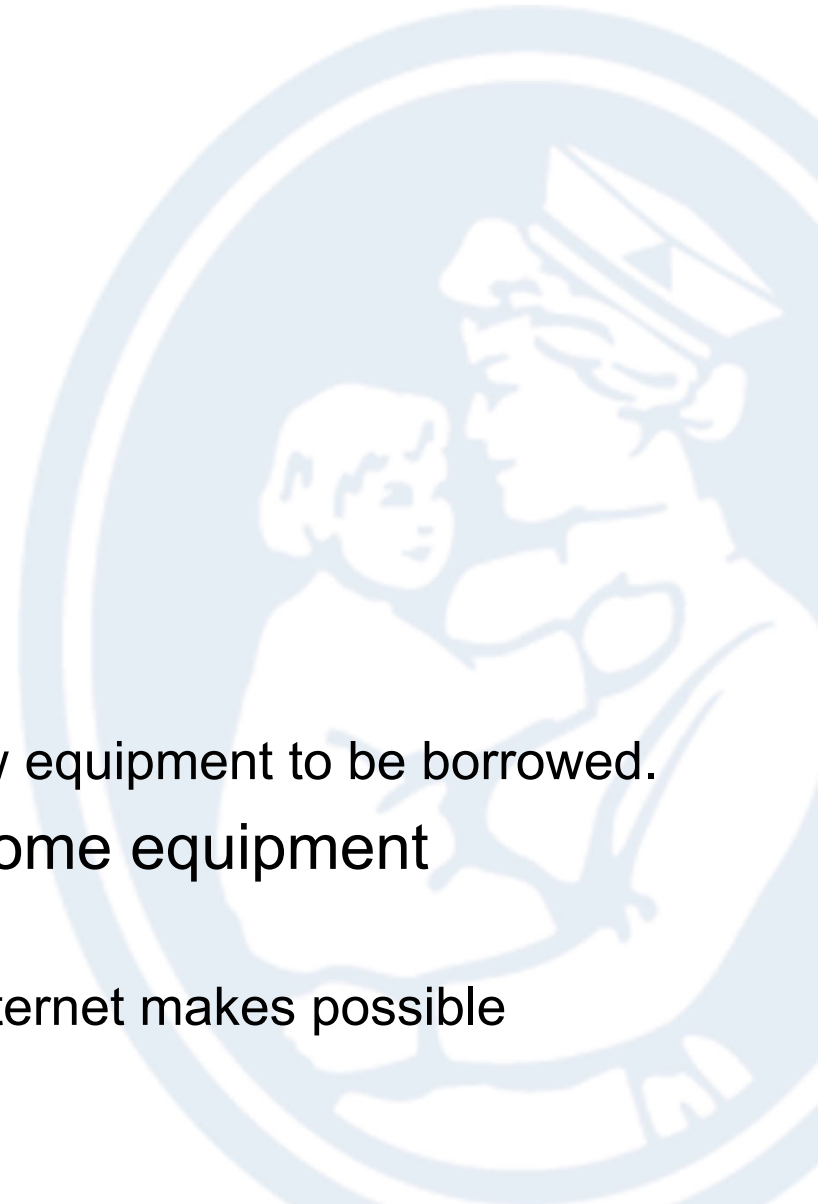
- **Traction 24/7 –out only for bathroom/shower**
  - Bed – 45 deg angle
  - W/C - upright
  - Walker – as much as possible
  - Treadmill – enforced by PT
- **Incremental addition of weight**
  - Goal is 50% body weight
    - Avoid cervical discomfort – common cause of setback
    - Monitor Triceps weakens, superior oblique weakness



# ***H-G Traction Issues***

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- **Hospital/Payer approval?**
  - (don't ask don't tell)
- **Home traction?**
  - How teach/do/
    - Ad hoc
    - No policies/protocols
    - No commercial equipment.
      - Family must build own
    - Hospital will not knowingly allow equipment to be borrowed.
  - Limiting factor is assessing home equipment
    - Old criteria included home visit
    - Now easy digital images and internet makes possible

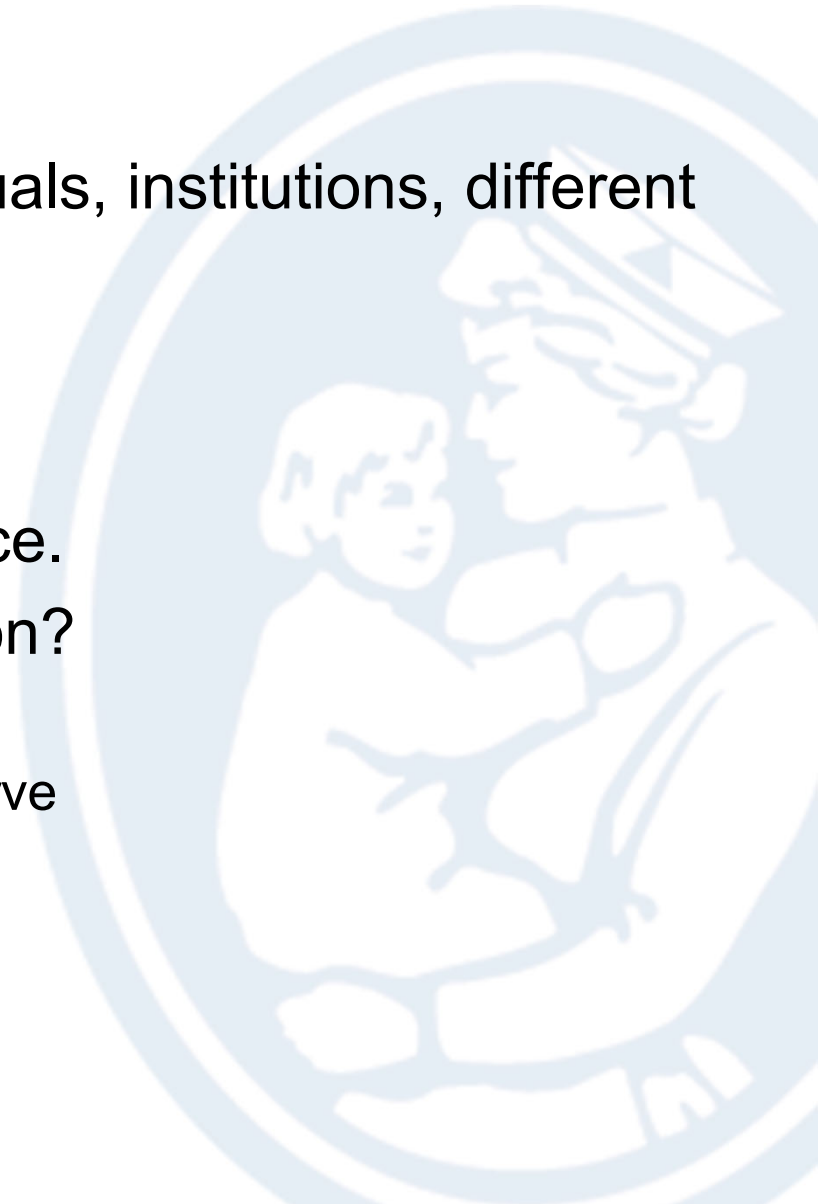


# Duration of traction?

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- **How long?**

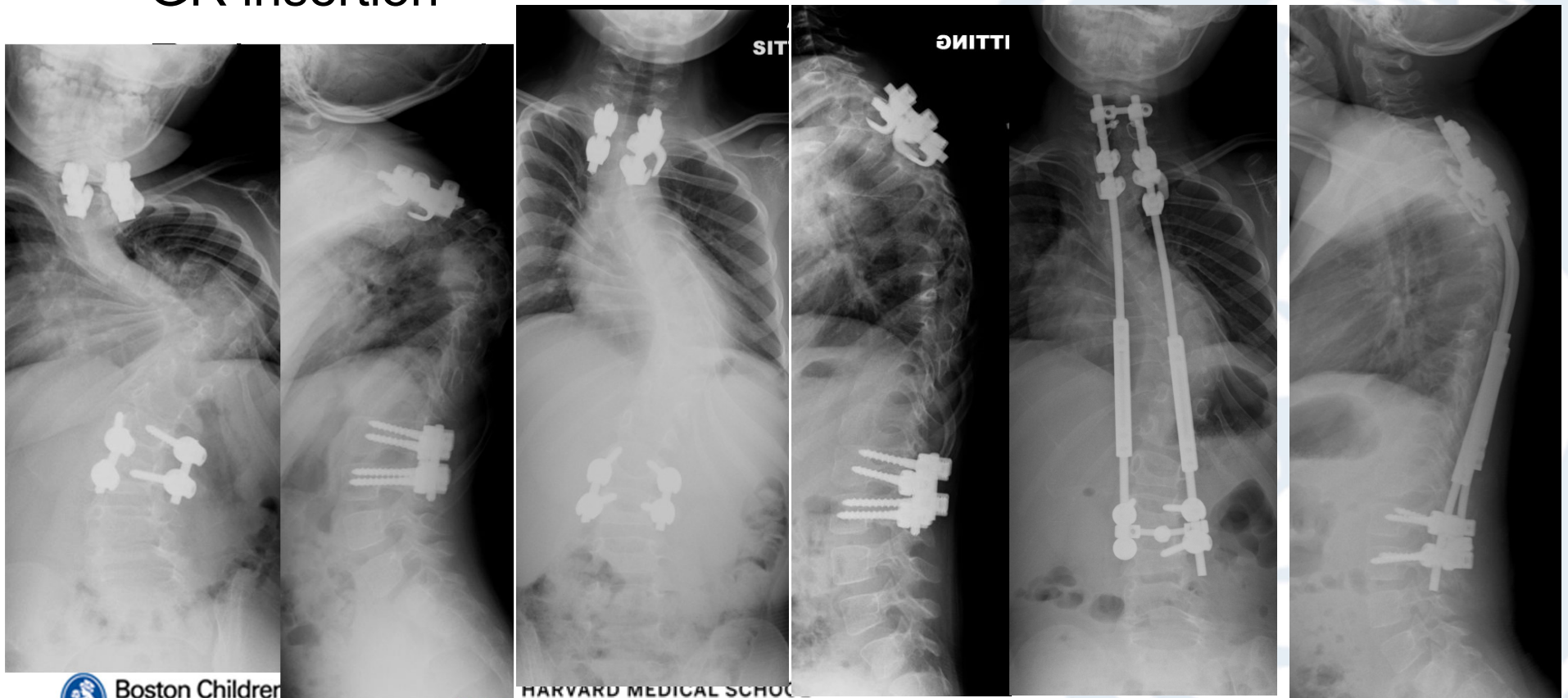
- Enormous variation – individuals, institutions, different patients
- Average for me? 6 weeks
  - FOCOS experience
  - Shriner's, TSRH experience.
  - Factors in deciding duration?
    - Deformity, goals, age
    - Minimal effect on milder curve



# Example: HGT and *pre-implanted anchors* for *neuro safety*

- 4yo Prader Willi syndrome
- Delayed paraplegia after GR insertion

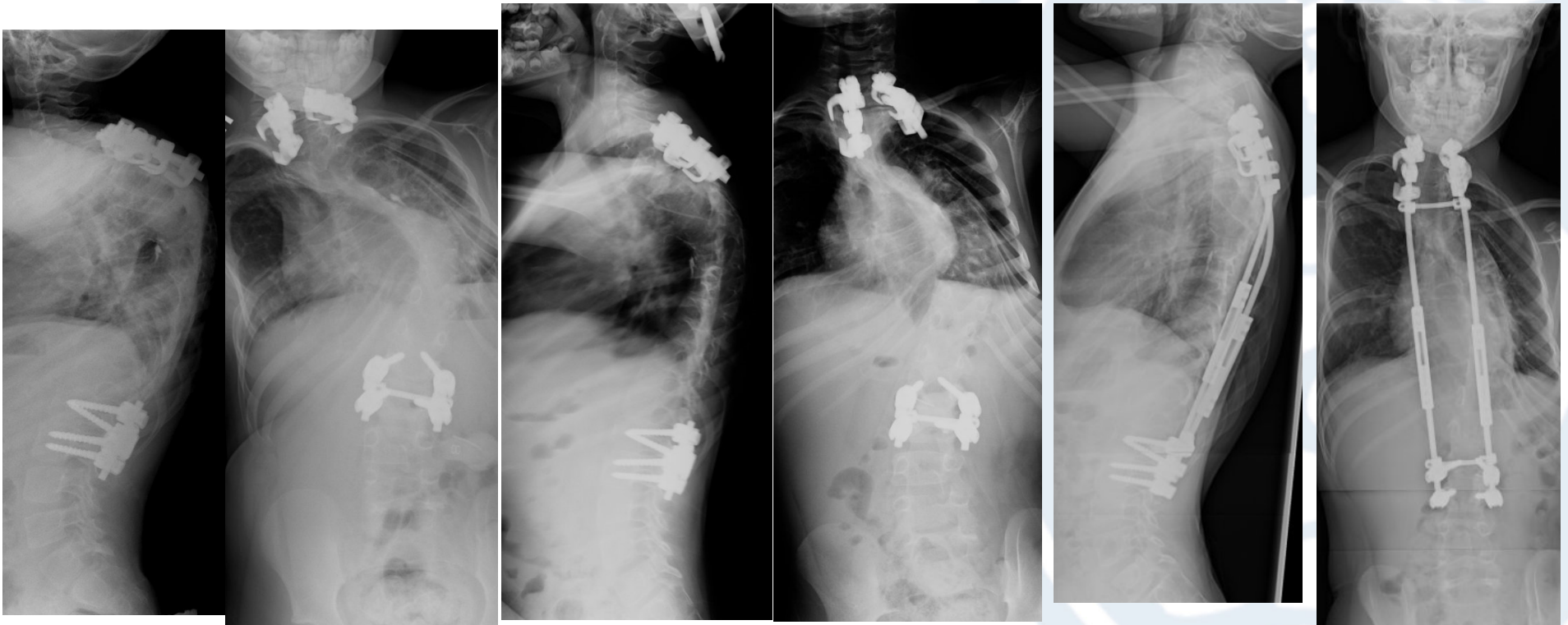
- 3 months to recover all neuro function
- 6 weeks H-G traction





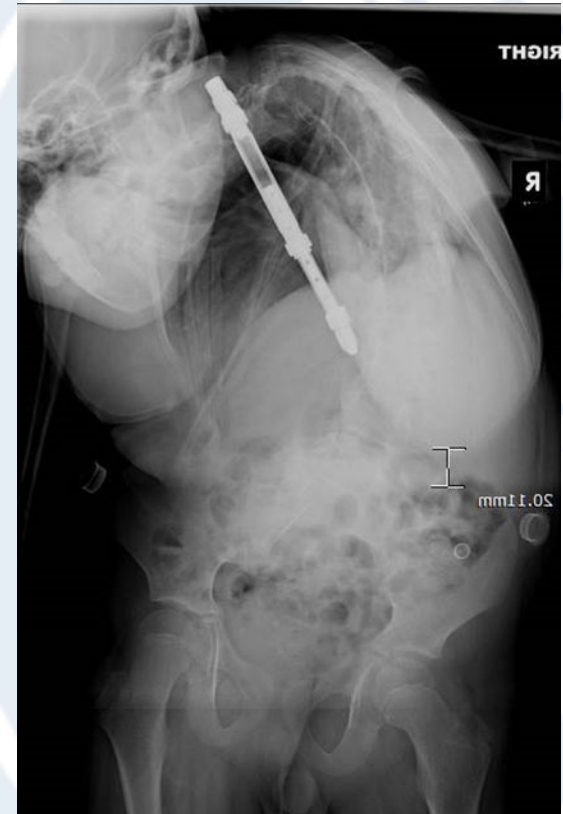
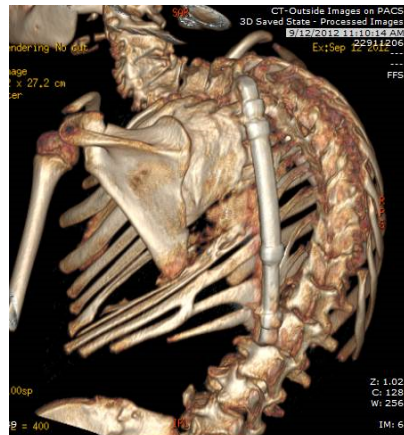
# Example: HGT and pre implanted anchors for *kyphosis* and *poor bone quality*

- 5 yo with multiple chest wall ops for TEF
- Failed VEPTR with severe disuse and nutritional osteopenia
- Progressive scoliosis, rigid upper thoracic kyphosis
- Insert anchors, wait 2 mos
- H-G traction 6 weeks



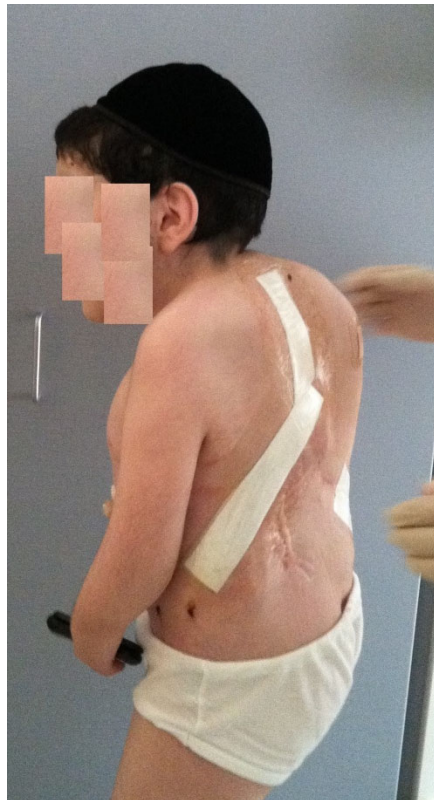
# Example: HGT for severe chest wall scarring

- 5 yo with VACTERL
- Multiple VEPTR procedures, infection
- Rigid chest wall scar
- Tissue expanders
- VEPTR now protruding from wound



# Example: HGT for severe chest wall scar

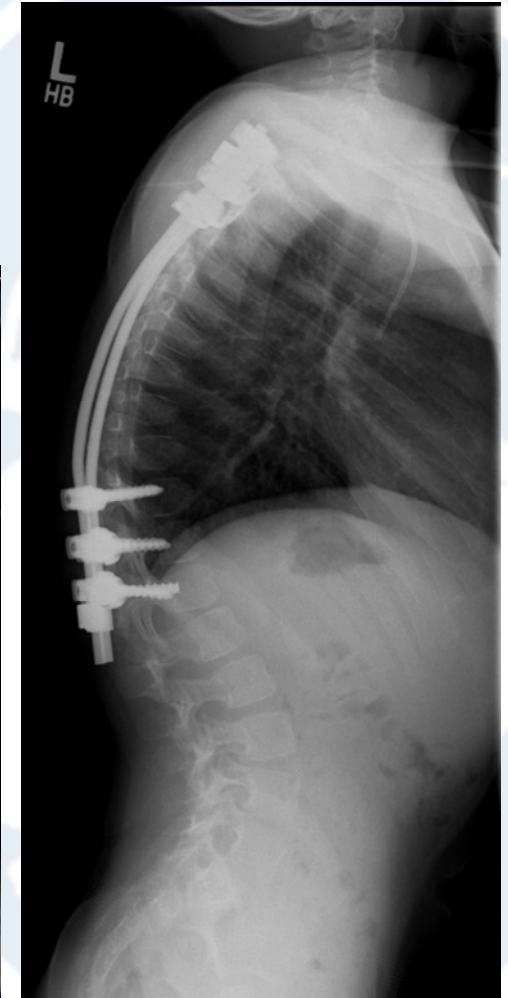
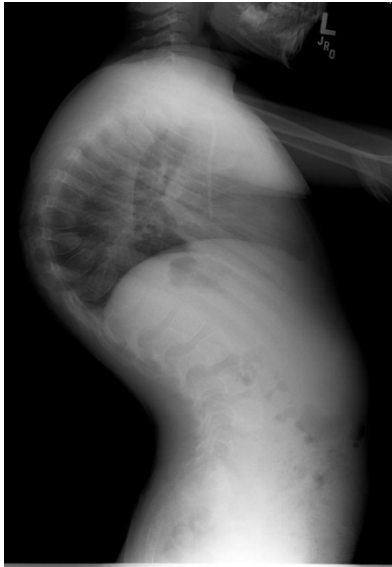
- Remove VEPTR
- Scar release and rib osteotomies beneath tissue expanders
- 8 weeks H-G traction



# Example: HGT for post tumor laminectomy kyphosis

- Progressive kyphosis after laminectomy for glioma
- Neurologically intact
- Rigid deformity

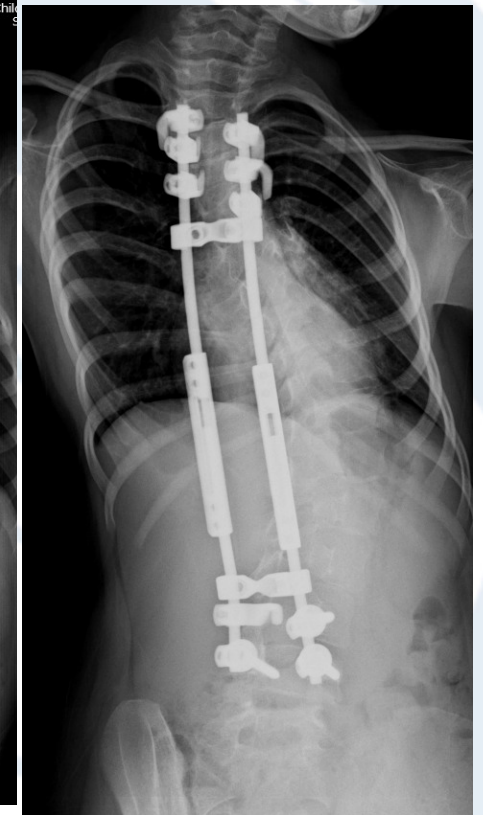
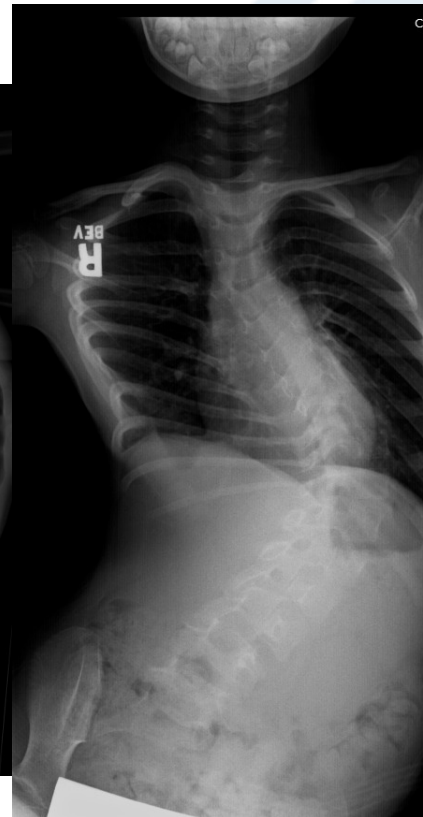
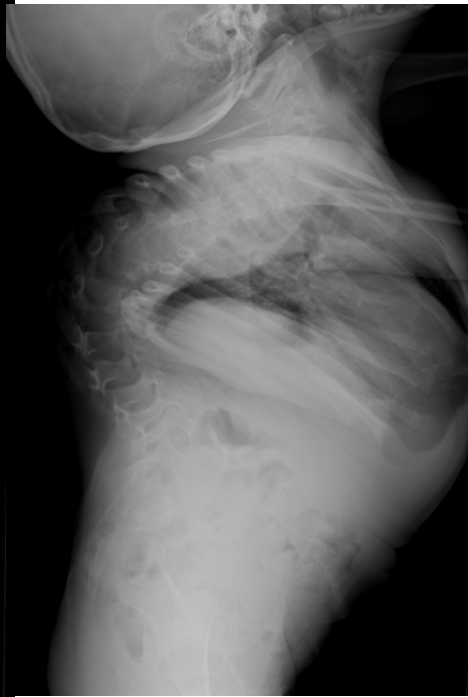
- 8 weeks home traction



# **Example: HGT for neglected infantile idiopathic scoliosis**

- Neglected IIS (family refused treatment)
- Rigid deformity

- 1 month in-hospital traction



# Problems and Caveats?

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- **Cervical spine discomfort?**
  - One known multilevel post traction ankylosis/fusion
    - Pay attention to complaints of neck pain
- **Neuro deficit?**
  - One paraplegia with initiation of traction
    - Resolved only with VCR, decompression
- **Anchor displacement**
  - Several anchor displacements immediately after insertion
    - Consider supporting construct for a while to off-load anchor forces – continue traction? – halo-vest?
- **Choosing levels**
  - Base on pre-traction deformity not corrected in-traction!

# Conclusions?

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- **Think of HGT for severe curve and:**
  - Chest wall contracture
  - Severe upper thoracic kyphosis
- **Think of HGT and pre-implanted anchors for**
  - Poor bone



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**Thank You**

**Come to Utrecht in  
2016!**

