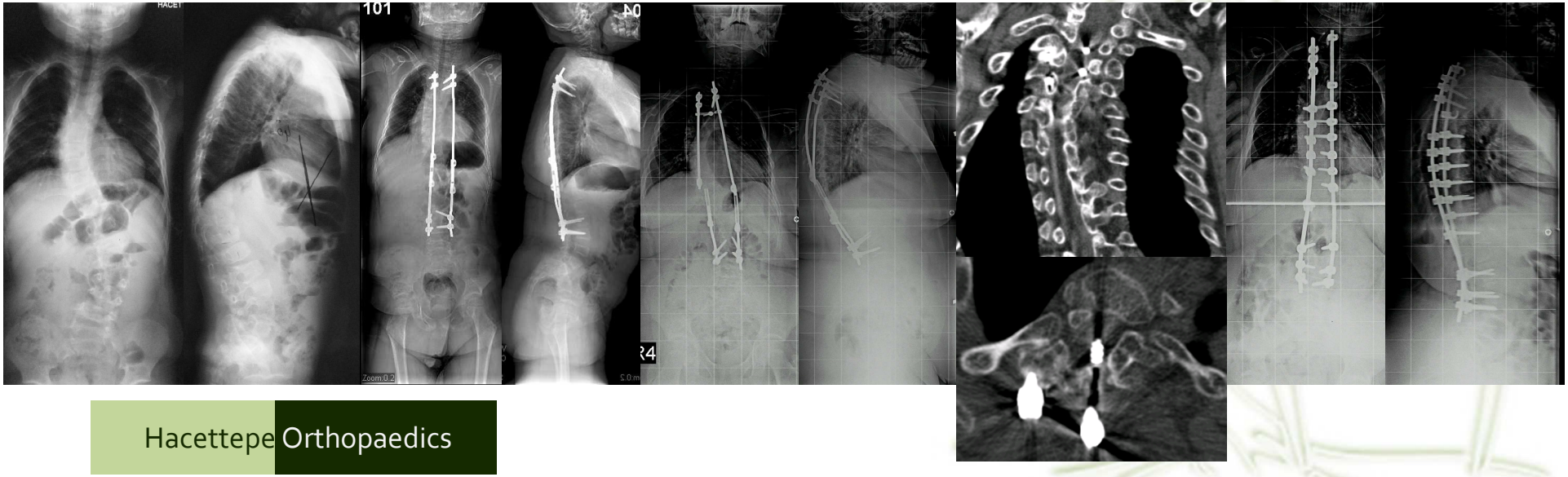
Pull-out of the upper thoracic pedicle screws can cause spinal canal encroachment in Growing Rods treatment

Senol Bekmez, Z Deniz Olgun, I Aykut Kocyigit, Mehmet Ayvaz, Gokhan H Demirkiran, Muharrem Yazici
Hacettepe University, Ankara, Turkey

Hacettepe Orthopaedics

Proximal foundation failure of GR

- Very common complication
- Pedicle screw pull-out is a frequent cause of revision surgery
- Enchroachment of the spinal canal after screw pull-out has been anectodally reported



Aim

- To report the prevalance and describe the risk factors of this potentially devastating complication in growing rods treatment for EOS

Methods

- Inclusion criteria
  - GR
  - Pedicle screw in at least one level at the proximal foundation
  - Pull-out of an upper thoracic pedicle screw
- Pedicle screw pull-out was initially detected in the plain X-ray
- Presence of medial migration into the spinal canal was later confirmed by CT

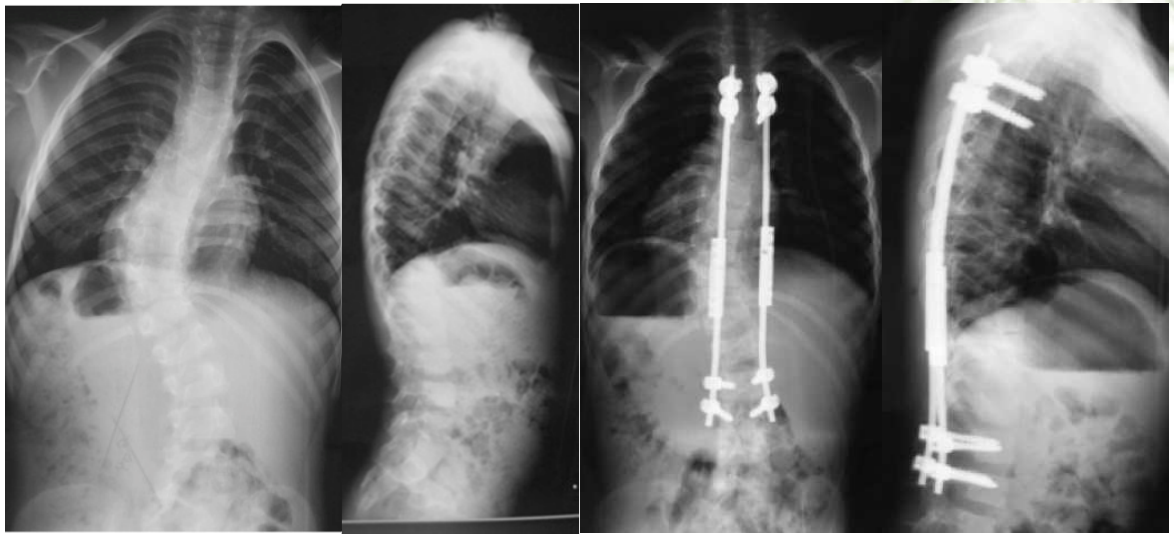
Methods

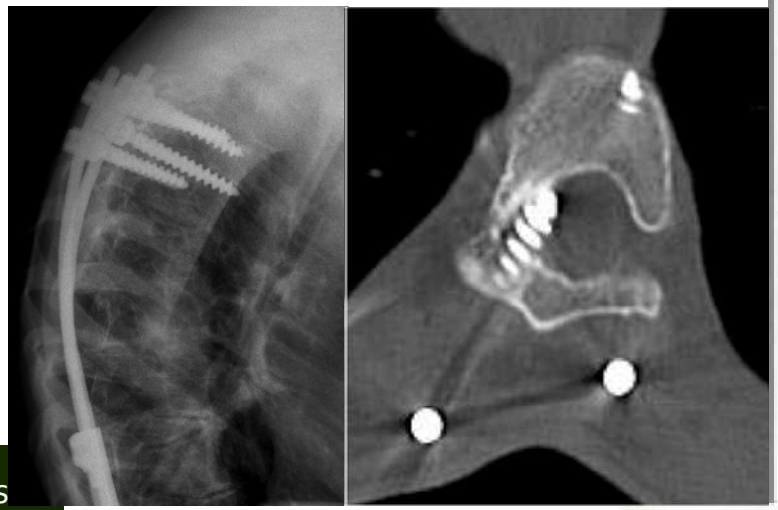
- Analysis
  - Demographic and clinical information
  - Etiology
  - Radiology
  - Neurological status
  - Revision procedures and the final status of the patient
  - Intra-operative surgical details of the procedure

Results

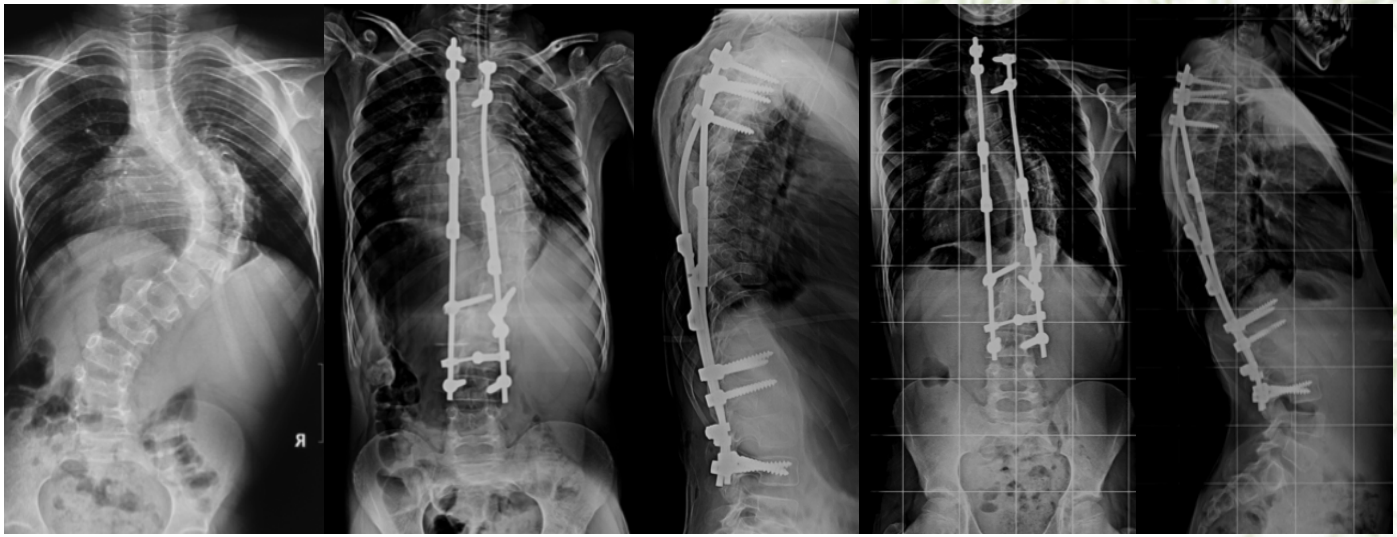
- Twenty-one patients (out of 96) (21.8 %)
  - Age @ index surgery
    - 5.5 (3 to 8)
  - FU time
    - 50.4 months (64 to 85)
  - # lengthenings
    - 8.1 (range, 4 -13)
- Spinal canal enchroachment by CT
  - 11 patients (52%)

7 YO, M

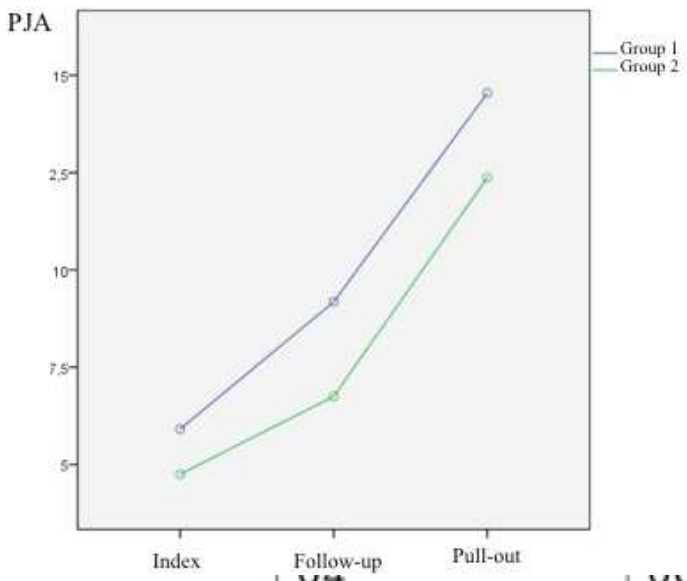


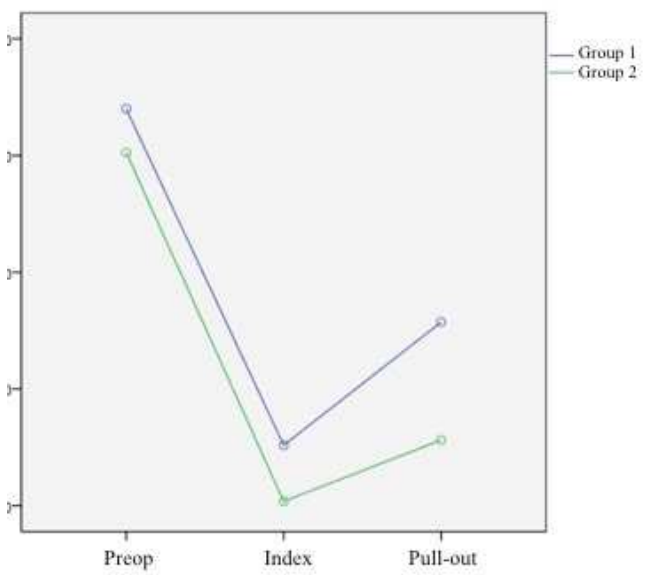


5 YO, M



Results





Parameter			
Age (years)			
Follow-up (months)			
Lenghtening proced			
Major deformity mag			
Preop	[illegible]	[illegible]	[illegible]
Postop	35.2	30.3	0.260
At screw pull-out	45.7	35.6	0.002*
T2-12 kyphosis (°)			
Preop	45	50.8	0.528
Postop	34.4	31.4	0.389
At pull-out	44.2	46.7	0.551
Kyphosis correction (%)	23.9	32.2	0.287
PJA (°)			
Postop	5.9	4.9	0.331
Last f/u before pull-out	9.2	7	0.189
At screw pull-out	14.5	12.3	0.449

Results

- There was no abnormal signal during intraoperative neurological monitoring
- No postoperative neurological deficit in the index surgery or following revision of pulled out screws

Conclusion

- Pedicle screws may constitute a risk for spinal cord injury during follow-up in GR even though insertion is safe
- A well-placed pedicle screw can migrate medially in case of pull-out

Conclusion

- If pullout is associated with significant deformity increase
  - Be careful!
  - Extra attention!
- Preoperative CT scanning is recommended
  - Plain X-rays are not reliable!
- Neuromonitorization during the revision procedure for GR patients with proximal pedicle screw pullout
  - Mandatory!