

Convex instrumented hemiepiphysiodesis with concave distraction

Ozgur Dede, Muharrem Yazici, Ahmet Alanay
Hacettepe University, Ankara



Congenital spine deformities

- Challenging



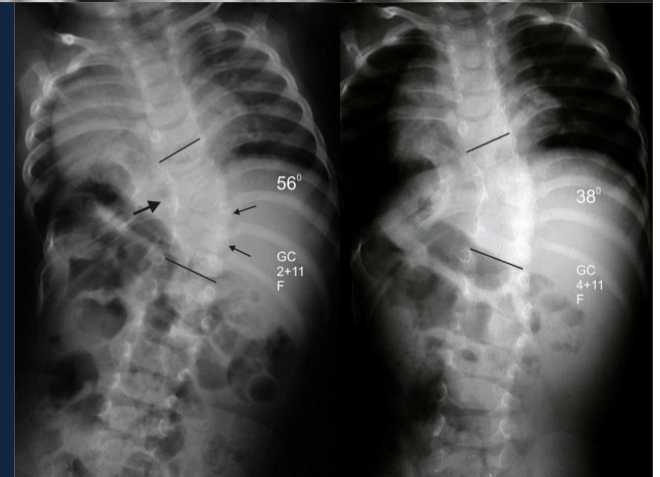
Congenital spine deformities and growing spine

- More challenging!



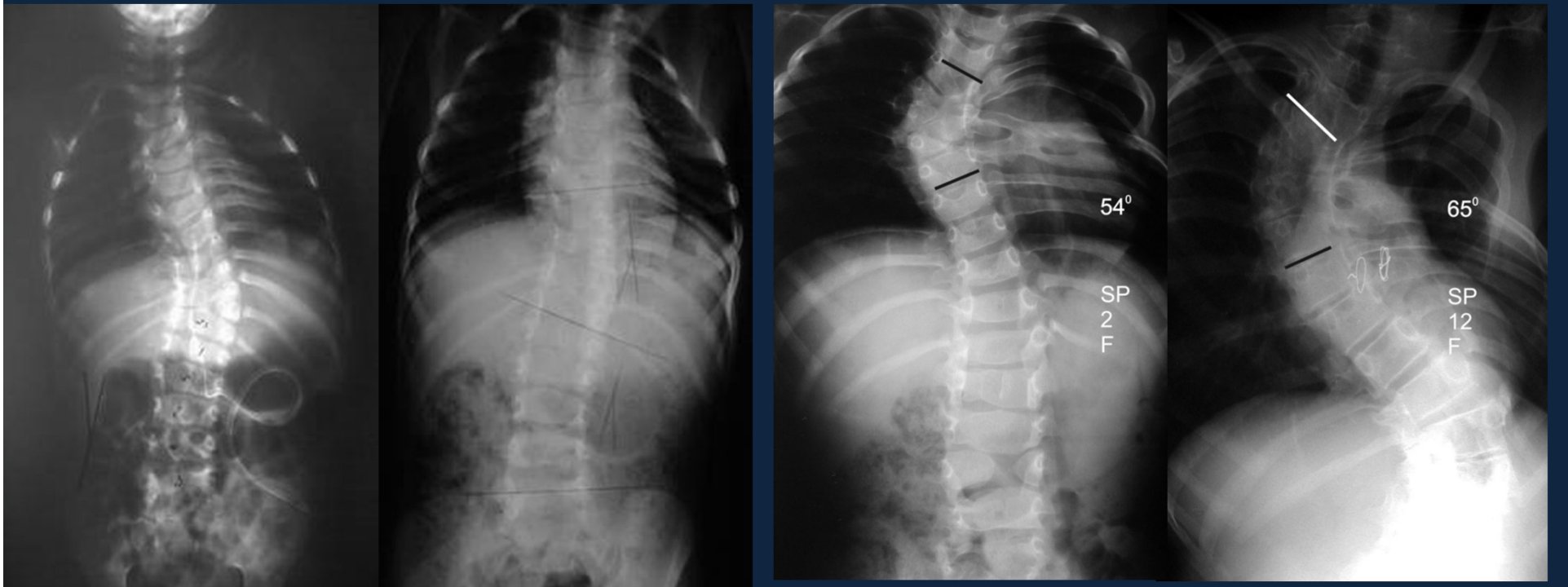
Long and flexible deformity

Long and rigid deformity



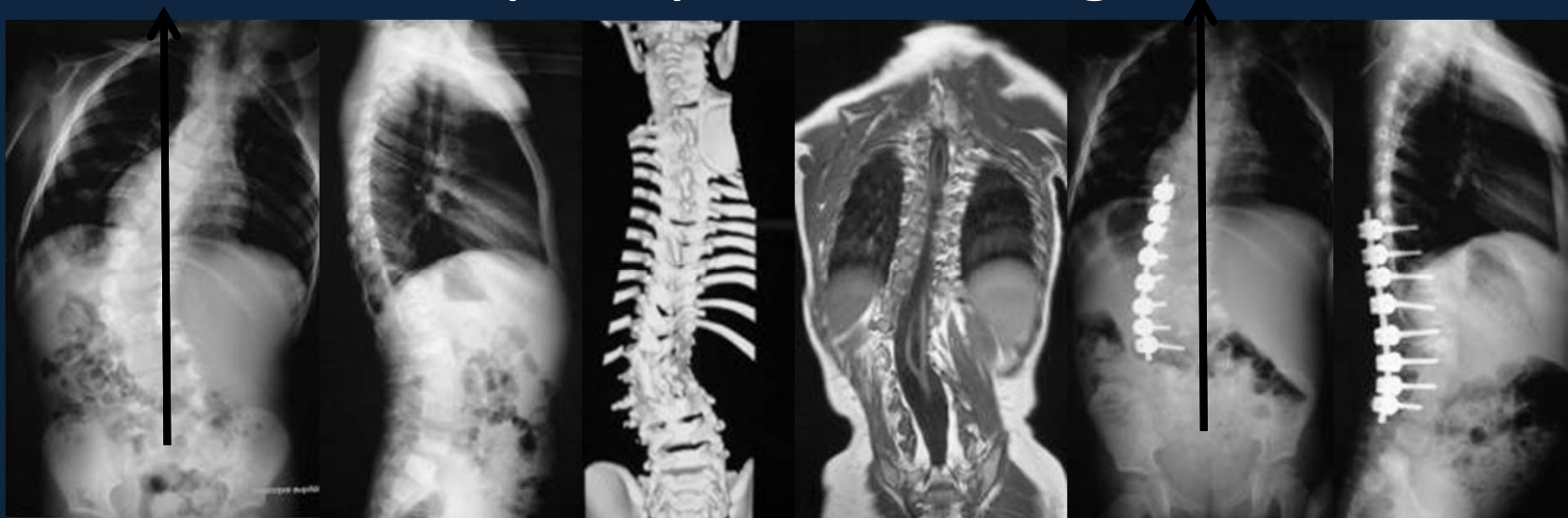
Conventional CGA

- No correction of imbalance
- Unpredictability
- Morbidity



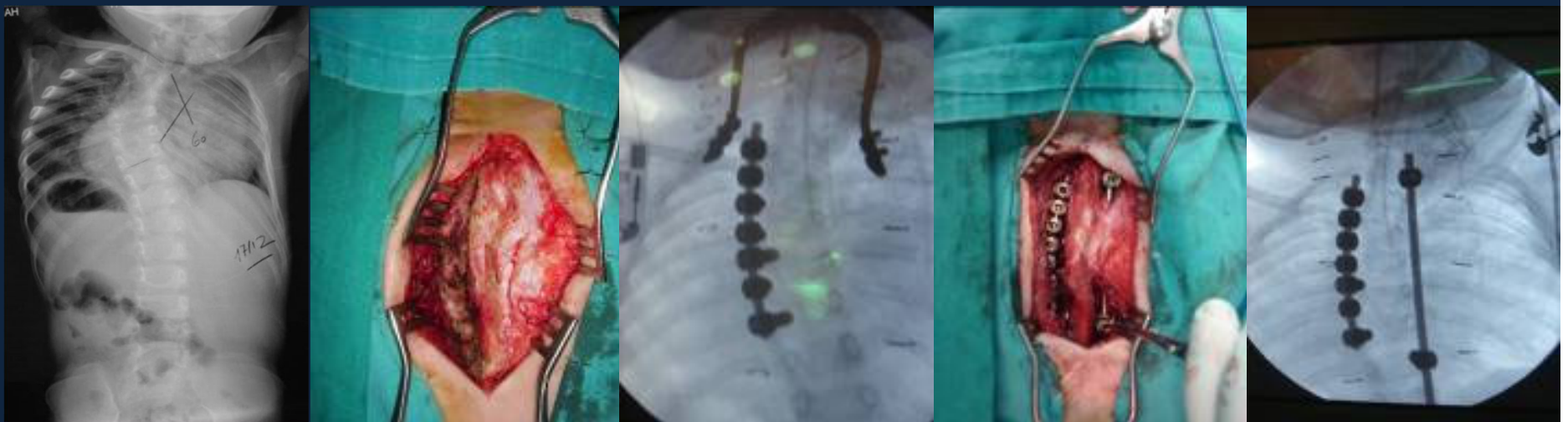
Instrumented CGA

- Acute correction
- Less morbidity
 - anterior hemiepiphysiodesis effect via pedicle screws
- But, limited capacity on restoring balance



Modified Technique

- Instrumented CGA on the convex side
- Distraction on the concave side
- Spanning from the upper to the lower end vertebra
- Longer than the hemiepiphysiodesis levels
- Pedicle screw-rod construct, without fusion at the anchor points



Aim

- To investigate the safety and efficacy of instrumented CGA plus concave growing rod

Materials and Methods

- Five female patients
- Mean age at index 40 months (17-55)
- Concave distractions every six months
- Mean FU 24.8 months (18-30 months)
- Mixed type multi-level anomalies

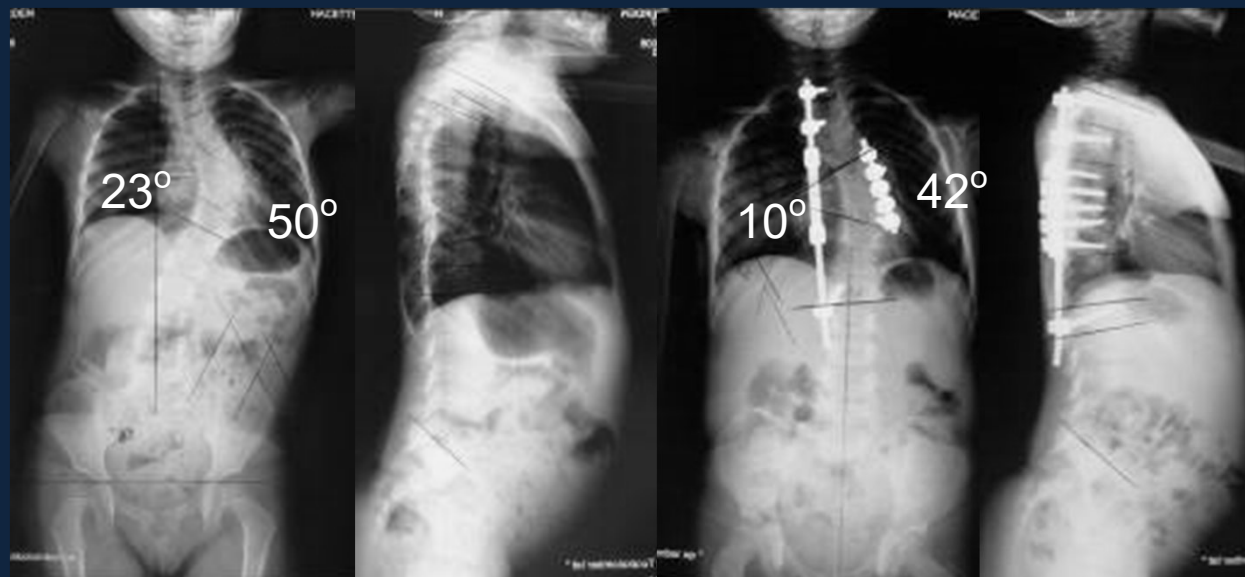
Materials and Methods

- Radiographic analysis
 - Coronal plane
 - Convex instrumented segment
 - Concave distracted segment
 - Sagittal plane
 - Convex instrumented segment
 - Concave distracted segment
 - Global thoracic kyphosis
- Hospital charts
 - Complications

Results

Coronal

| | Preop. | Immediate Postop. | Amount of Correction | Final follow-up | Amount of Correction |
|---------------------------|--------|-------------------|----------------------|-----------------|----------------------|
| Concave distracted curve | 35.2 | 16.4 | 18.8 (53%) | 12.4 | 22.8 (64%) |
| Convex instrumented curve | 48.4 | 34.4 | 14 (29%) | 30.2 | 18.4 (38%) |

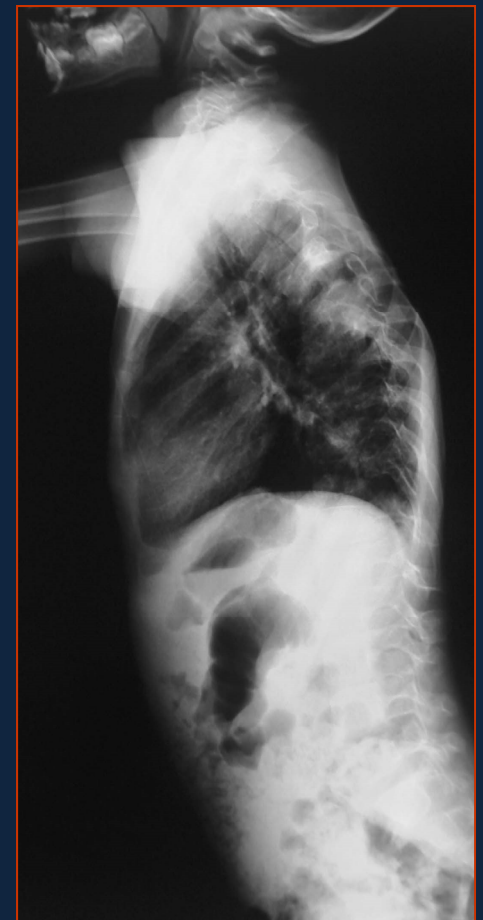
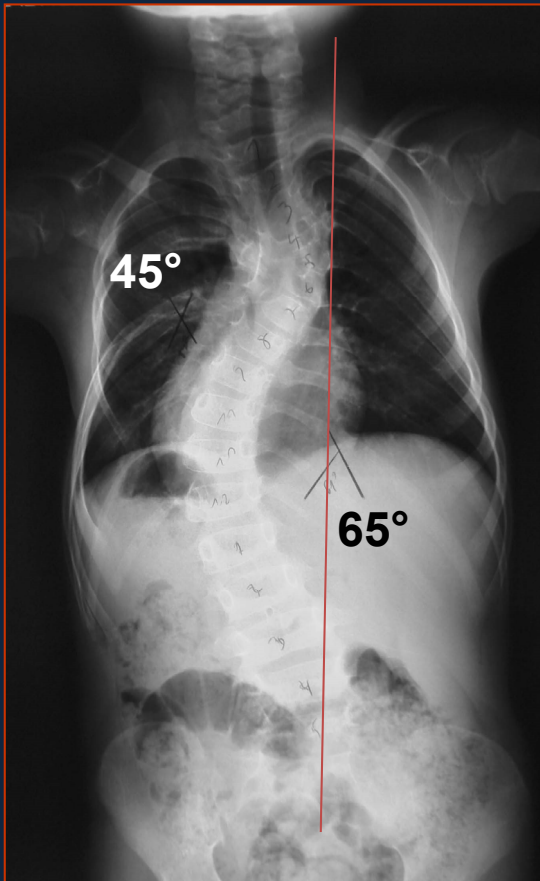


Results

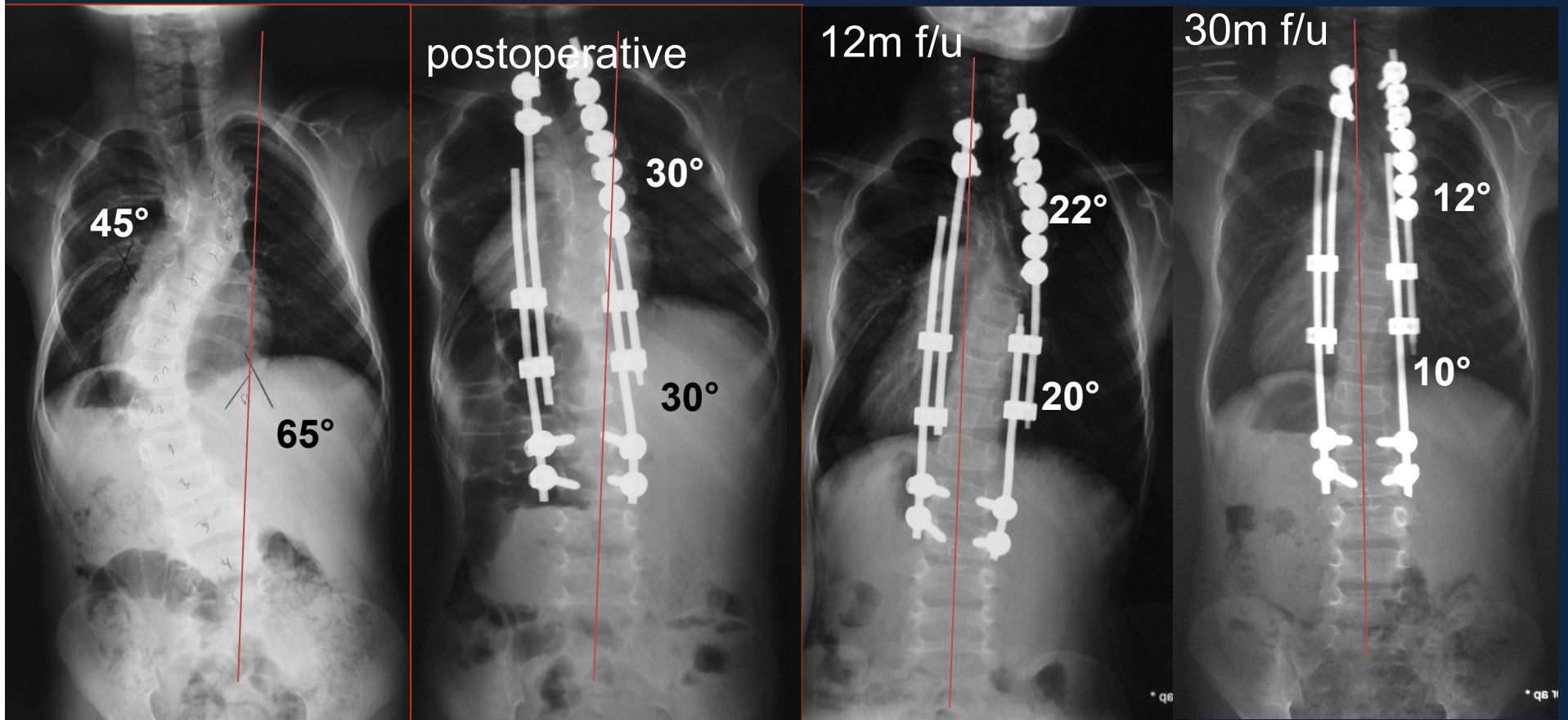
Sagittal

| | Normative data (Cil et al.) | Preop. | Immediate postop. | Final follow- up |
|---------------------------|--------------------------------|--------|----------------------|------------------------|
| Concave distracted curve | | | | |
| T1-8 | 30 | 25 | 23 | 30 |
| T1-L1 | 44.5 | 31 | 30 | 32 |
| T1-L1 | 44.5 | 38 | 30 | 46 |
| T1-10 | 37.1 | 19 | 20 | 20 |
| T4-10 | 27.8 | 16 | 30 | 30 |
| Convex instrumented curve | | | | |
| T1-6 | 19.7 | 23 | 26 | 30 |
| T6-10 | 17.4 | 18 | 19 | 19 |
| T6-10 | 17.4 | 13 | 12 | 15 |
| T4-8 | 20.7 | 15 | 14 | 14 |
| T5-9 | 20.4 | 14 | 28 | 28 |

4y female

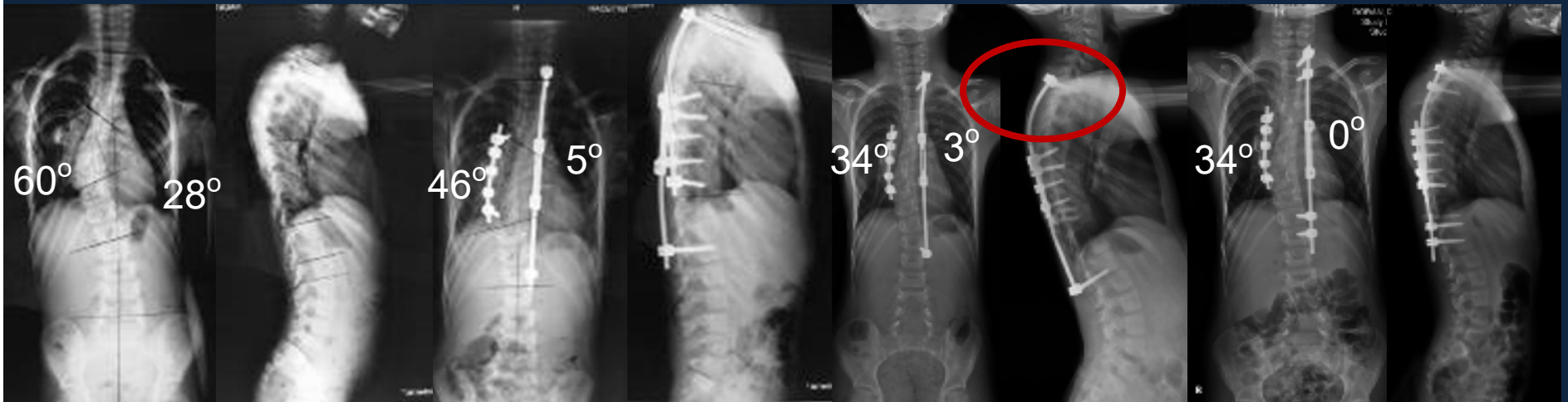


Instrumented CGA + Growing rod



Complications

- No neurologic complications
- No rod breakages
- Pulled-out pedicle screws 4/5 at concave side (GR)



Conclusion

- May obviate
 - anterior surgery
 - multiple osteotomies
 - longer thoracic fusions
- Indications
 - Young children
 - thoracic deformities
 - long sweeping curves
 - multiple anomalous vertebrae
- Implant related problem at concave side
 - Two pedicle screws