Convex hemiepiphysiodesis techniques

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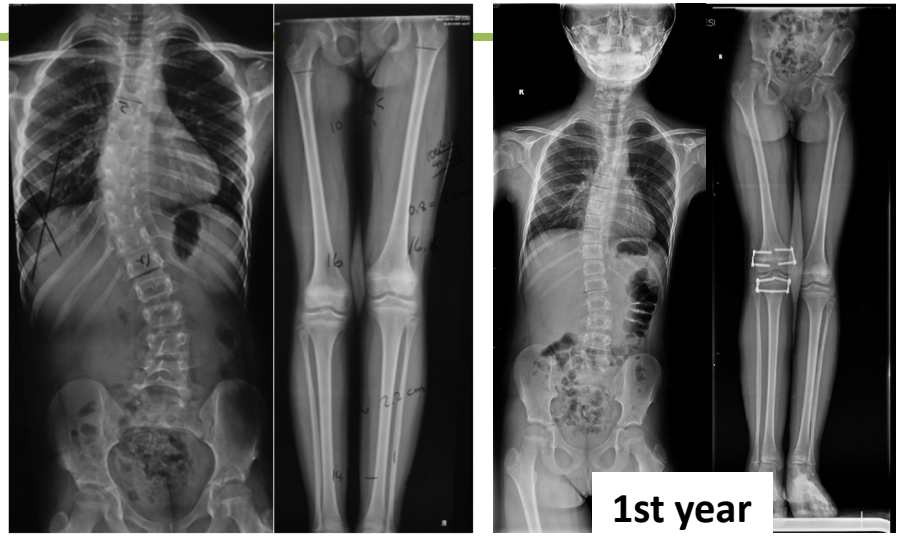
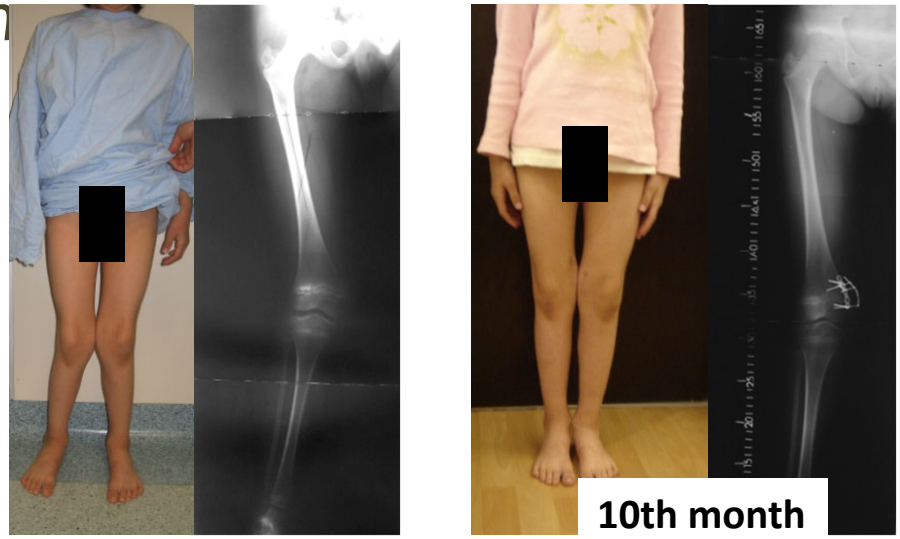
Hacettepe
Orthopaedics
Spine Group

Growth modulation

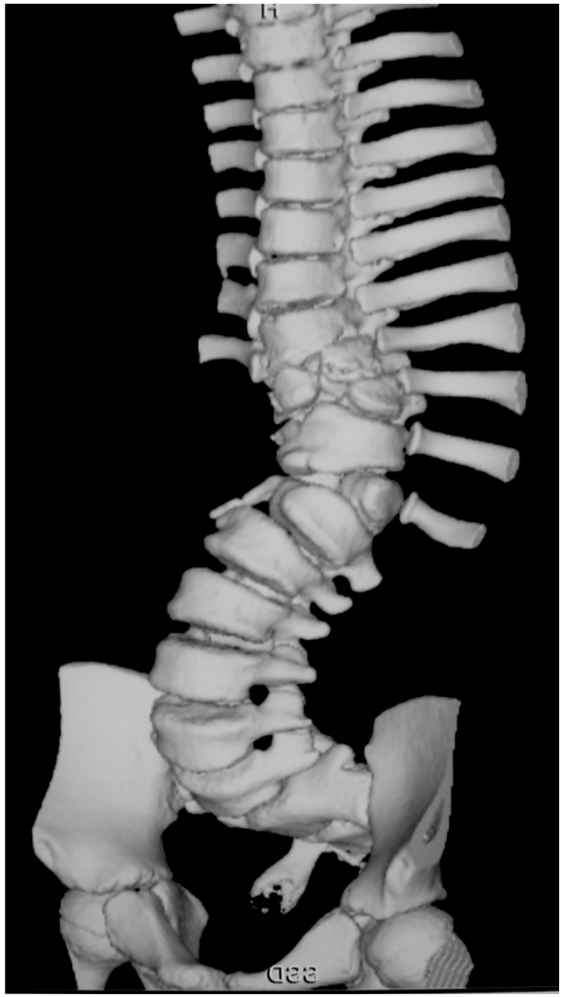
- *Physis*
  - *Longitudinal growth*
  - *Imbalances in the growth*
    - *Shortening*
    - *Angular deformity*
- *Interfering physeal growth*
  - *Epiphysiodesis*
    - *Total or partial*
    - *Temporary or permanent*





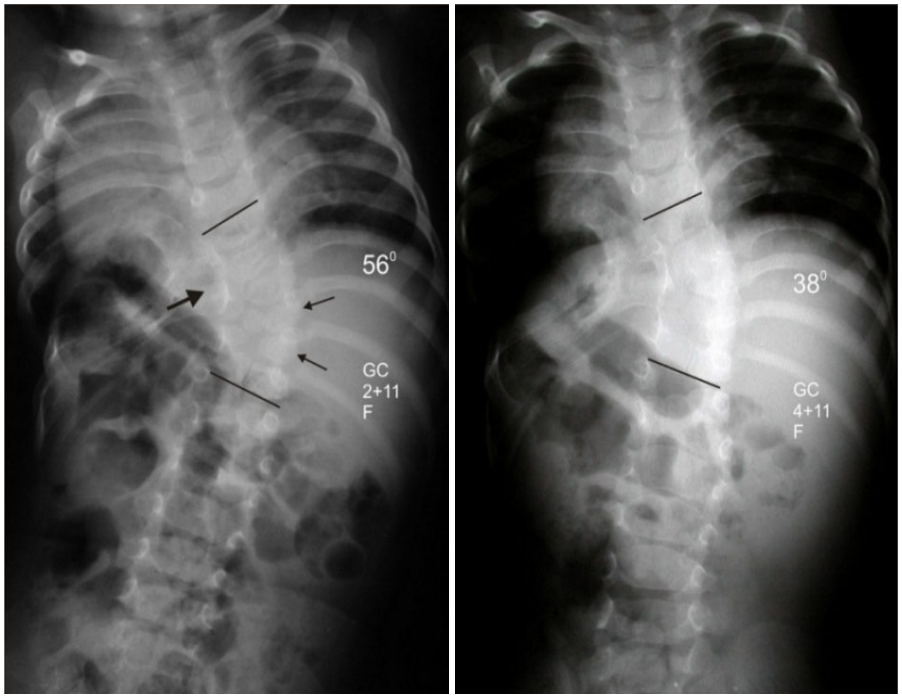
Congenital spinal deformities

- *Anomalous vertebrae*
- *Longitudinal growth imbalance*
  - *Qualitatively and quantitatively*
    - *Progressive deformity*
    - *Trunk imbalance*



Convex growth arrest -CGA-

- *Asymmetrical growth potential*
- *Control of growth of the convexity*
  - *Relatively longer*
- *Halt progression and lead to spontaneous correction with subsequent growth*
- *Safe, effective and simple*



CGA/Background

- *Stapling*
  - *Smith A, JBJS Am 1954*
- *CGA*
  - *Roaf R, JBJS Br 1963*

Indications

- *Progressive curve*
- *Patients younger than 5 years old*
- *Pure scoliotic deformity*
  - *Without major kyphosis or lordosis*
  - *≤ 70°*
  - *5 segments or less*
  - *No unsegmented bar*
  - *Intact posterior elements*

Technique

- *Anterior-posterior surgery*
  - *Sequential or staged*
- *Anterior*
  - *Convex half of the discs and endplates*
- *Posterior*
  - *Tip of SP to TP, including facet joints*
- *Limits for fusion*
  - *Formation defect*
    - *Cobb to Cobb*
  - *Segmentation defect*
    - *+ One above and one below*
- *Casting for 4-6 months*

Results

- *Epiphysiodesis*
- *Fusion*
- *Progression*

Author	E(%)	F(%)	P(%)
Winter	20	70	10
Andrew	46	46	8
Winter	38	54	8
Keller	37	42	21
Thompson	77	17	6
Dubousset	30	70	0
Kieffer	50	33	17
Wallhout	20	60	20
Hacettepe	41	47	12

Hacettepe experience

The Efficacy of Conv
With Iatrogenic Post
from Diastematomy

Akin Uzumcugil, MD,* Akin Cil, M
Ahmet Alanay, MD,* Nejat Akalar

Conclusions. Convex epiphysiodesis is an effective method for patients with midline laminectomy defect as those with intact posterior elements. Because the facet joints and transverse processes usually are unaffected, the presence of midline defect does not diminish the efficacy of the technique.

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The Course of Sagit
Patients With Cong
Convex Growth Ar

Akin Cil, MD, Muharrem Yazici,
Adil Surat, MD

Conclusion. Sagittal segmental abnormality does not have a negative effect on the control of scoliosis in the majority of the patients (11 of 13). If the coronal curvesta- bilizes or improves, then sagittal segmental abnormality could also be stabilized (in 7 of 11 patients). [Key words:

ORIGINAL ARTICLE

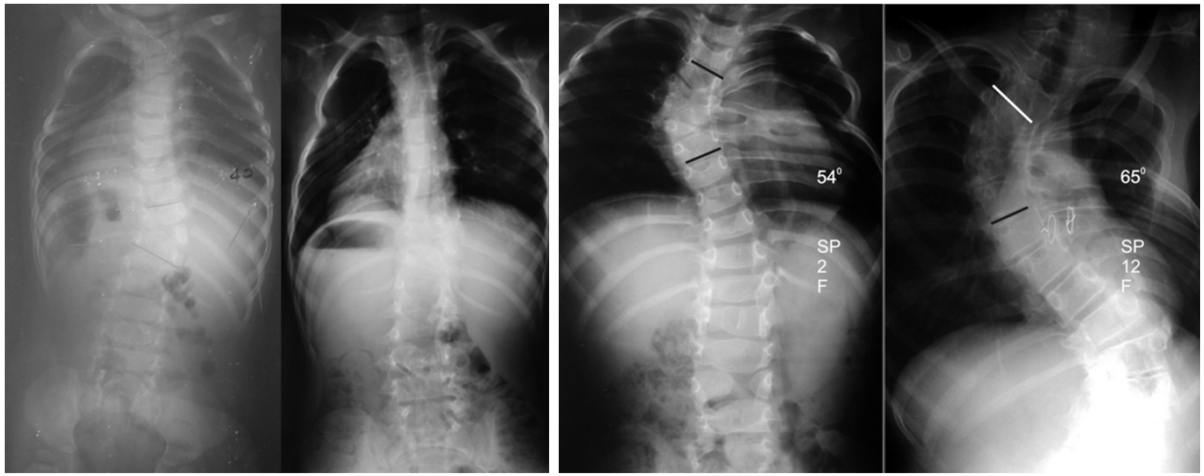
Convex Growth Ar
Spinal

Akin Uzumcugil, MD, Akin Cil, MD
Cemal

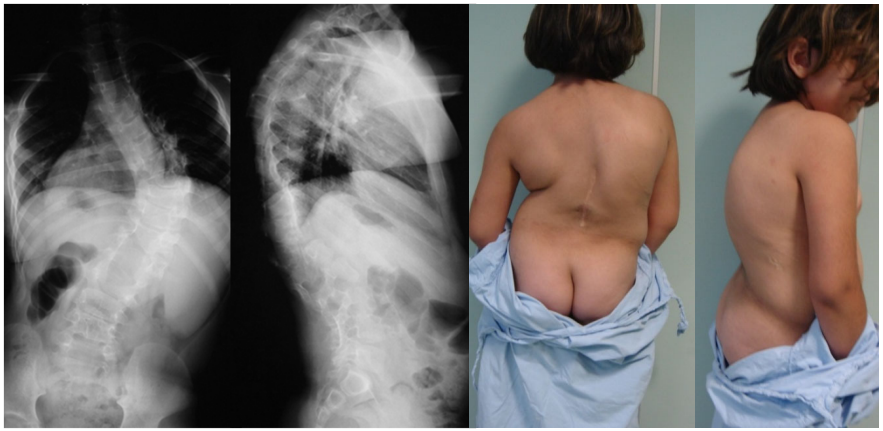
progression. The age at surgery, magnitude, length and location of the curve, presence of intraspinal anomaly, and presence of sagittal plane or rib deformity were investigated in terms of the outcome, but none of these parameters was found to have an effect on the outcome. In conclusion, convex growth arrest is a safe and effective method in the management of the young patients with congenital spinal deformities.

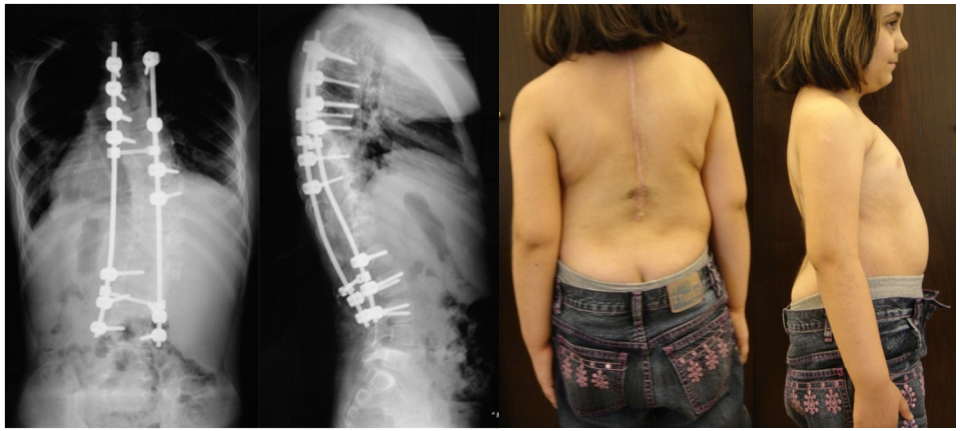
Hacettepe experience

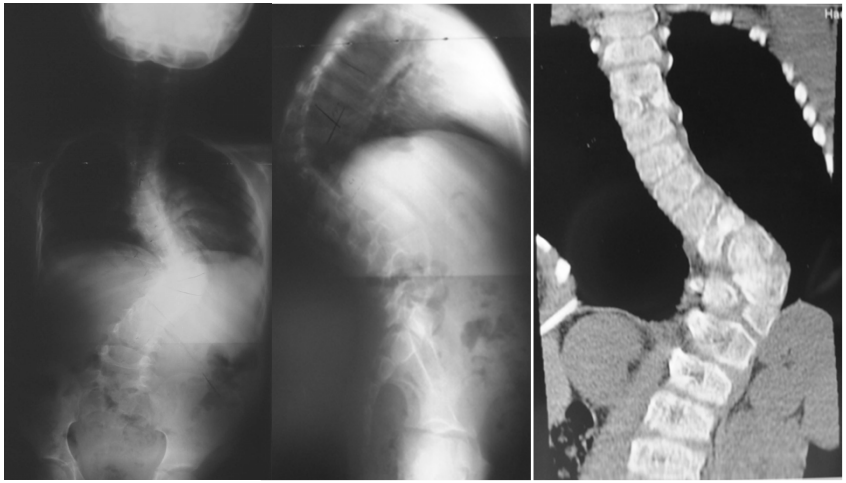
- Problems
  - Complications
    - All minor
    - All related to anterior
  - Behavior of the curve after CGA
    - Unpredictable!

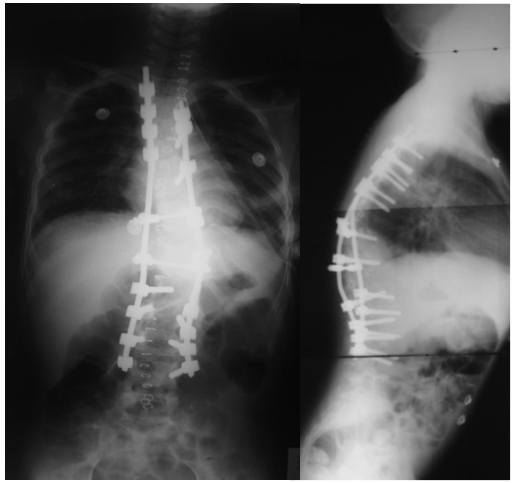


Failure of Classical CGA









Modifications

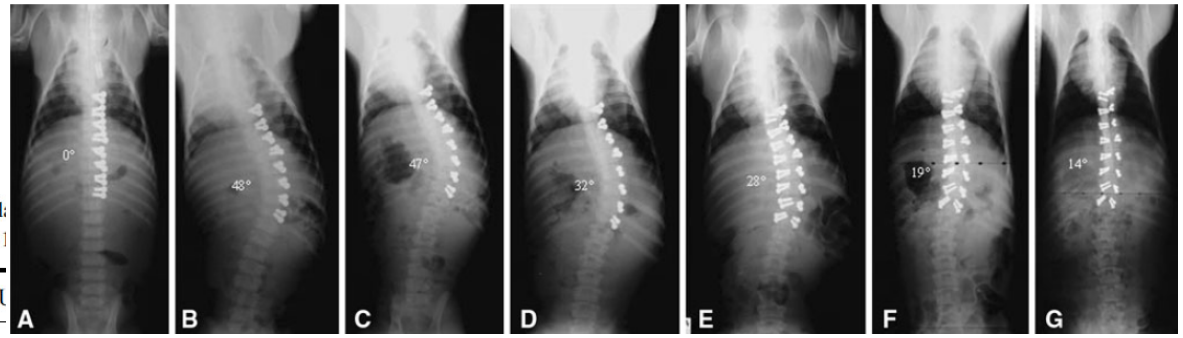
- *Mater artium necessitas**

Apuleius

**necessity is the mother of invention..*

Modifications

Experimental



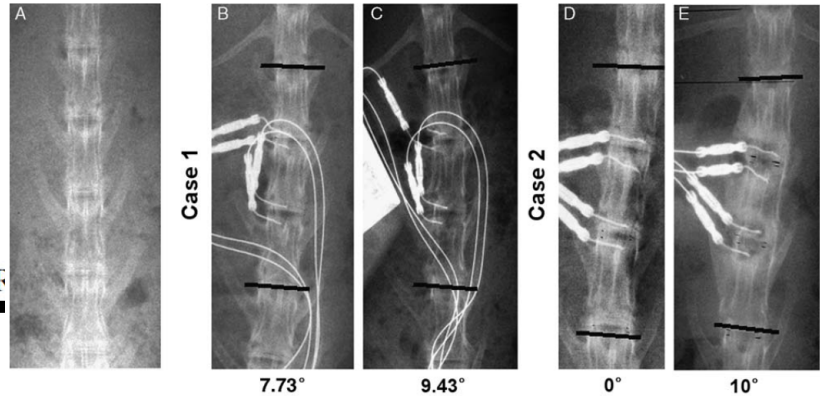
Clin Orthop Rel
DOI 10.1007/s1
SYMPOSIU

Neurocentral Synchondrosis Screws to Create and Correct Experimental Deformity

A Pilot Study

Hong Zhang MD, Daniel J. Sucato MD, MS

- *Growth inhibition on*
  - *NCC*
  - *Ring Apophysis*



Vertebral Growth Modulation by Electrical Current in an Animal Model: Potential Treatment for Scoliosis

George R. Dodge, PhD,† ‡ J. Richard Bowen, MD,*† and Changhoon Jeong, MD*†*

Modifications

Clinical

- *King, Spine 1992 and Keller, Spine 1994*
  - *Transpedicular approach for anterior hemiepiphysiodesis*
    - *(+) One-stage surgery*
    - *(-) Incomplete epiphysiodesis*
- *Cheung, Spine 2002*
  - *With concave distraction*
    - *Immediate improvement in the coronal balance*
    - *No need to wait uncertain growth –mediated correction*
- *Ginsburg, JPO 2007*
  - *Short posterior instrumention*
    - *No immobilization postoperatively*

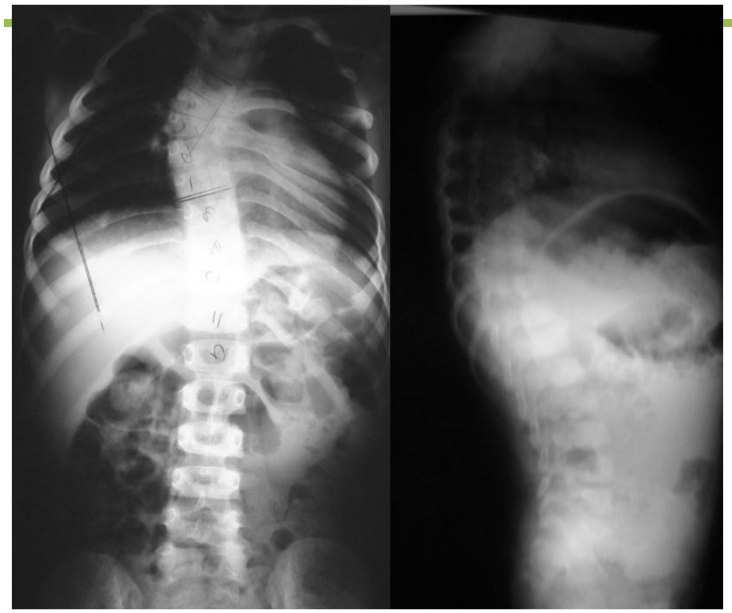
Modifications

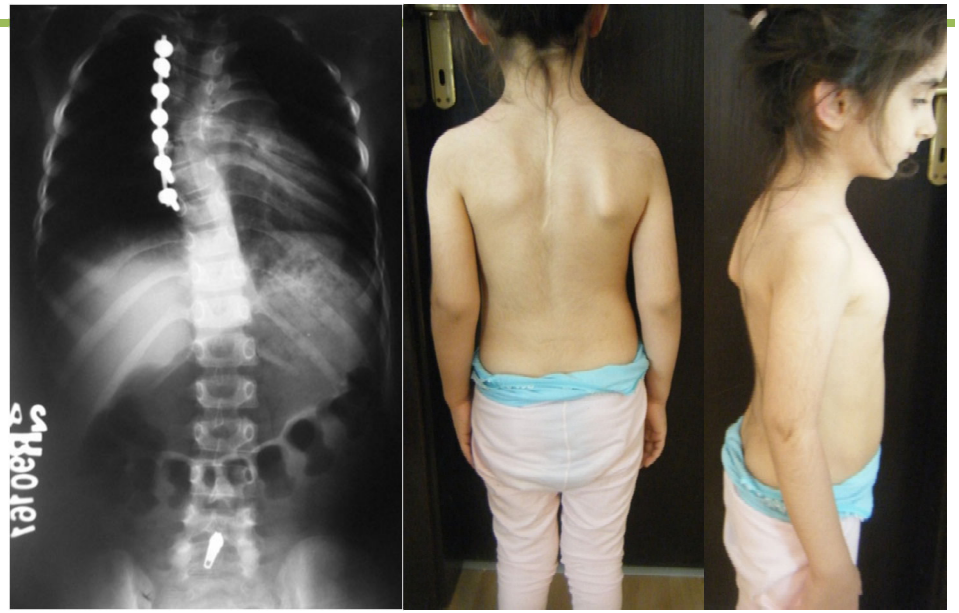
Clinical

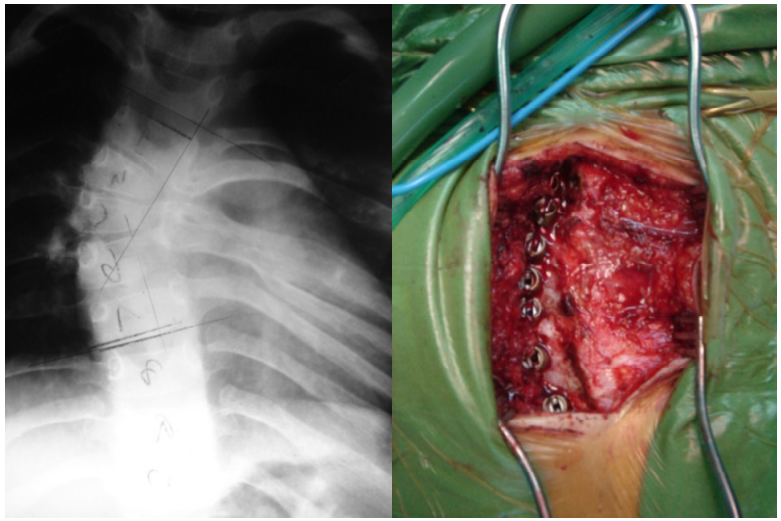
- *Hacettepe, 1st ICEOS in Madrid, JCO 2007*
  - *Transpedicular screws in all fused levels*
    - *Acute correction*
    - *Less morbidity*
      - *Anterior hemiepiphysiodesis effect via pedicle screws*
    - *But, limited capacity on restoring balance*

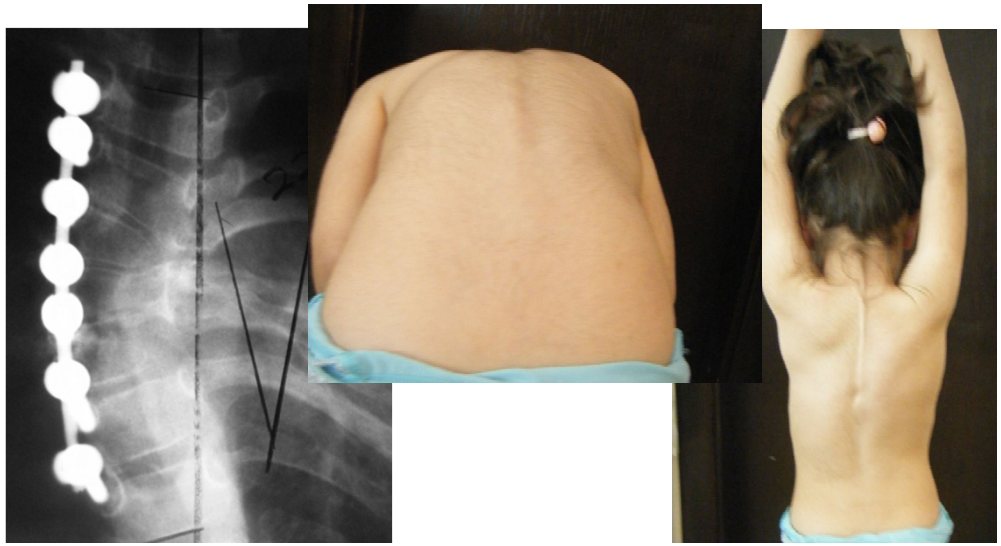
Modifications

Clinical





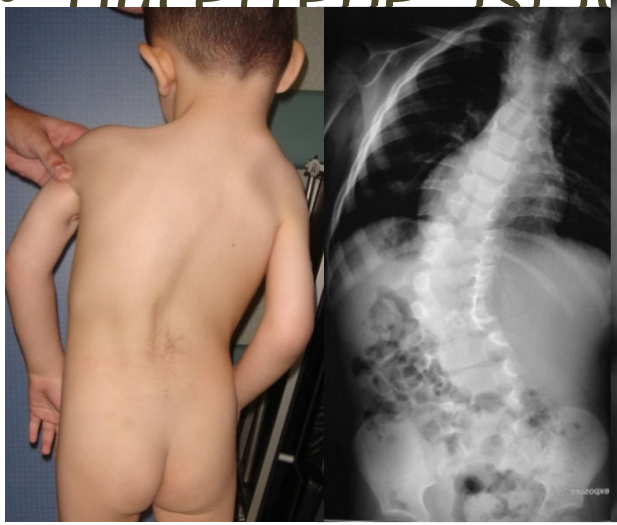


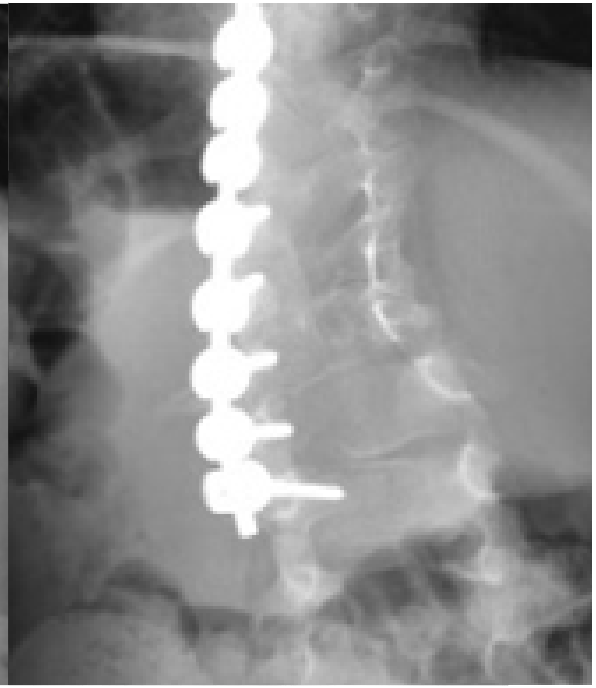


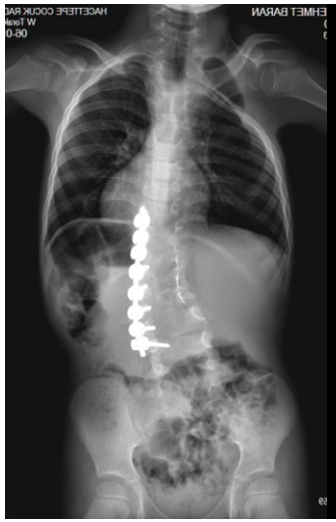
Modifications

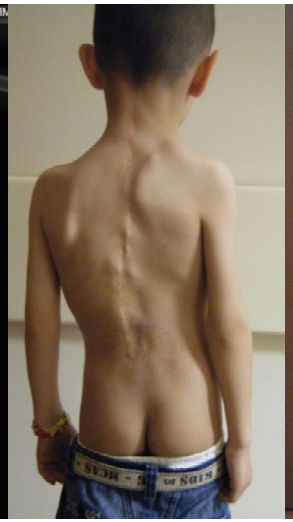
Clinical

- Hacettepe 1st l








Hacettepe Orthopaedics

Failure of Instrumented CGA

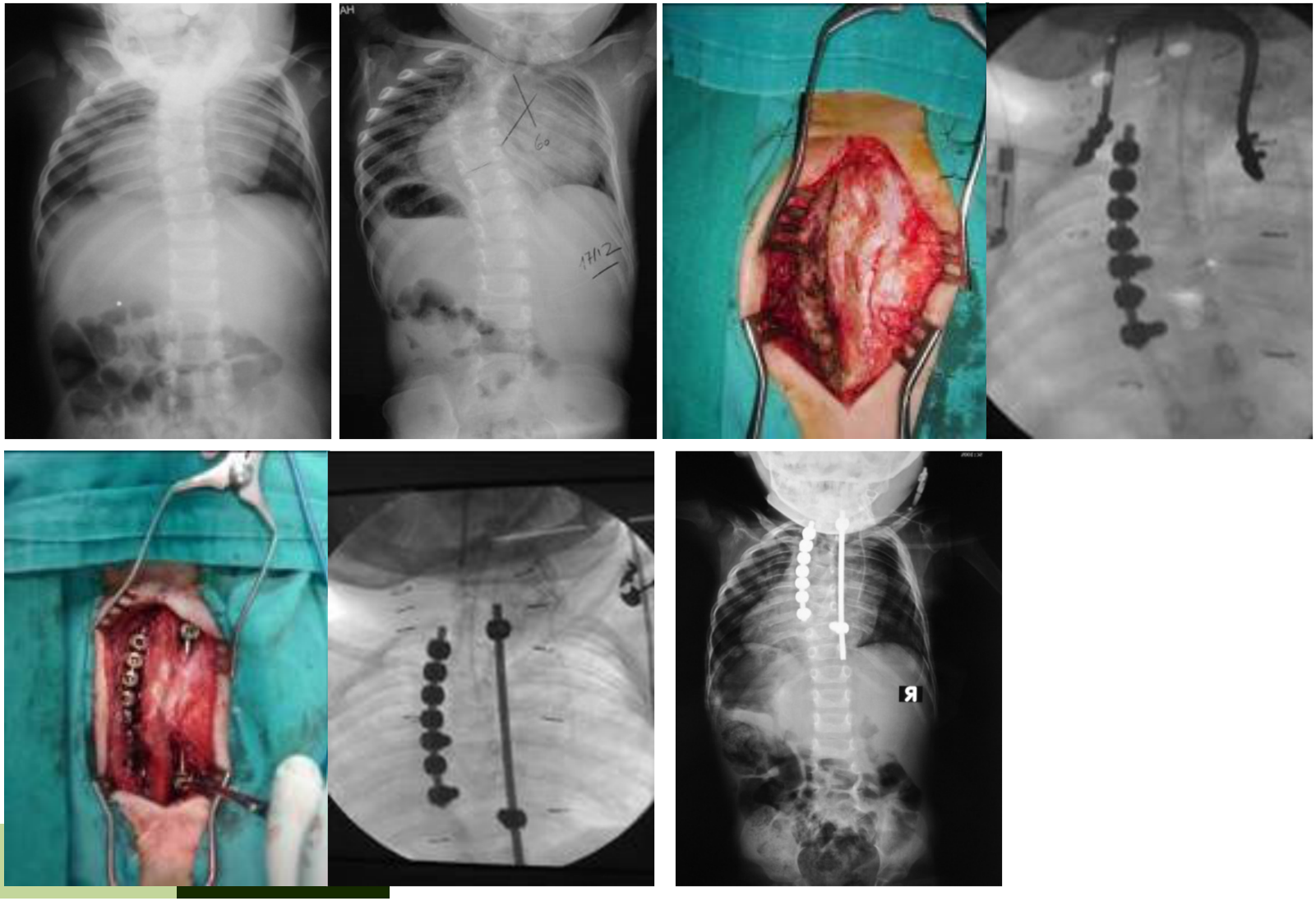
Modifications

Clinical

- *Alanay et.al., CORR, will be published*
  - *Concave distraction without fusion in addition to convex instrumented compression and fusion*
    - » *Increase the correction effect and correction rate by stimulating the growth at concave side*
    - » *Provide immediate trunk balance.*

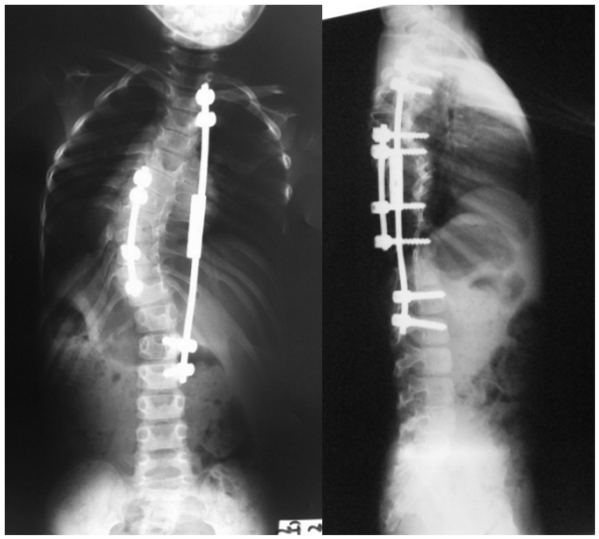
Modifications

Clinical



Modifications

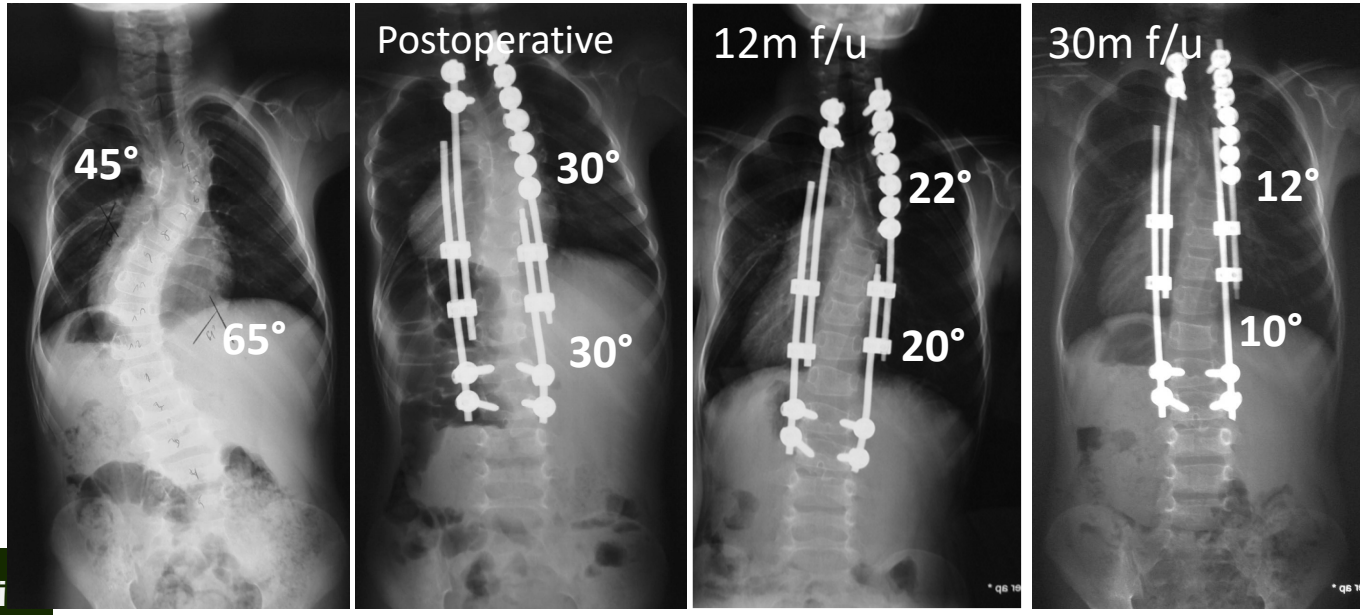
Clinical



Modifications

Clinical

- *Alanay et.al., CORR, will be published*
  - *Curve magnitude*
    - *Convex instrumented*
      - *Preop* 45°
      - *Immediate postop* 36° (25%)
      - *Final FU* 27°(44%)
    - *Concave distracted*
      - *Preop* 35°
      - *Immediate postop* 16° (5%)
      - *Final FU* 8°(77%)



Courtesy
Ahmet Alanay, MD

Conclusion

- CGA
  - Classical technique
    - Indication?
  - Instrumented CGA
    - Pure lumbar or upper/lower thoracic deformity without compensatory curve
    - Balanced spine
  - Instrumented CGA & GR
    - Long sweeping curve
    - Big compensatory curve
    - Significant trunk imbalance