ICEOS 2008
Case presentation

Spinal opening-wedge osteotomy:

A novel technique for correction of complex congenital scoliosis

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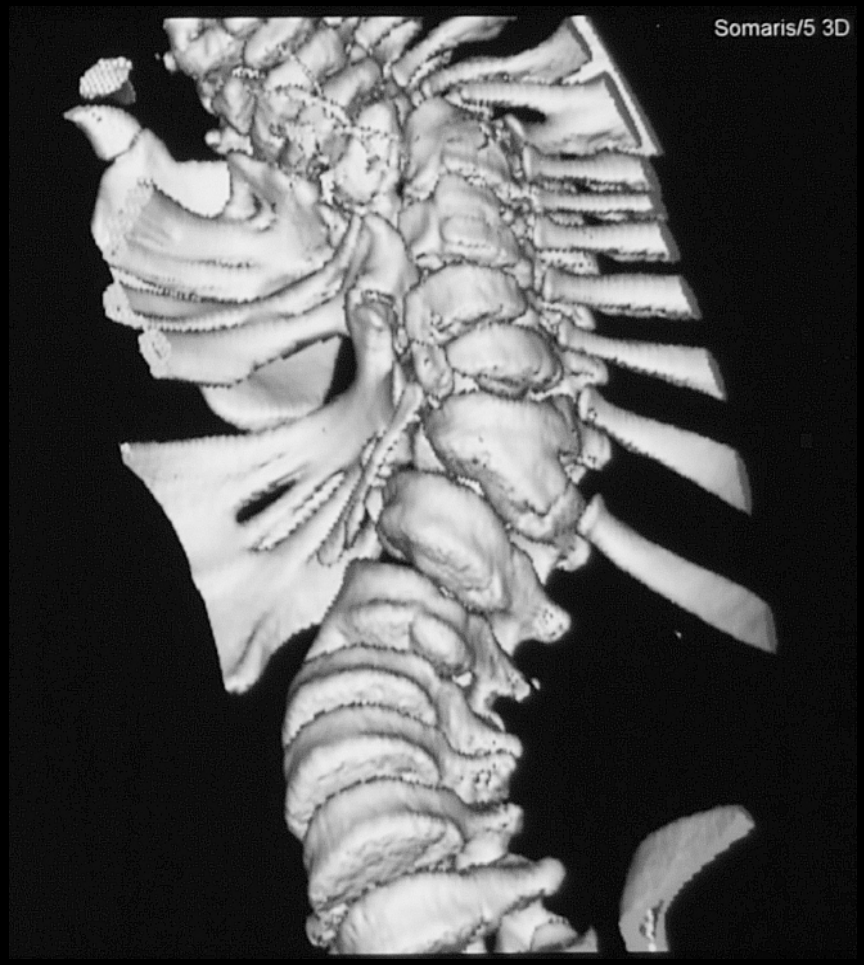
INTRODUCTION



- Severe congenital scoliosis
- Failure of
  - Segmentation
  - Formation
- Progression is expected
- Surgery is indicated
- Spine is shorter

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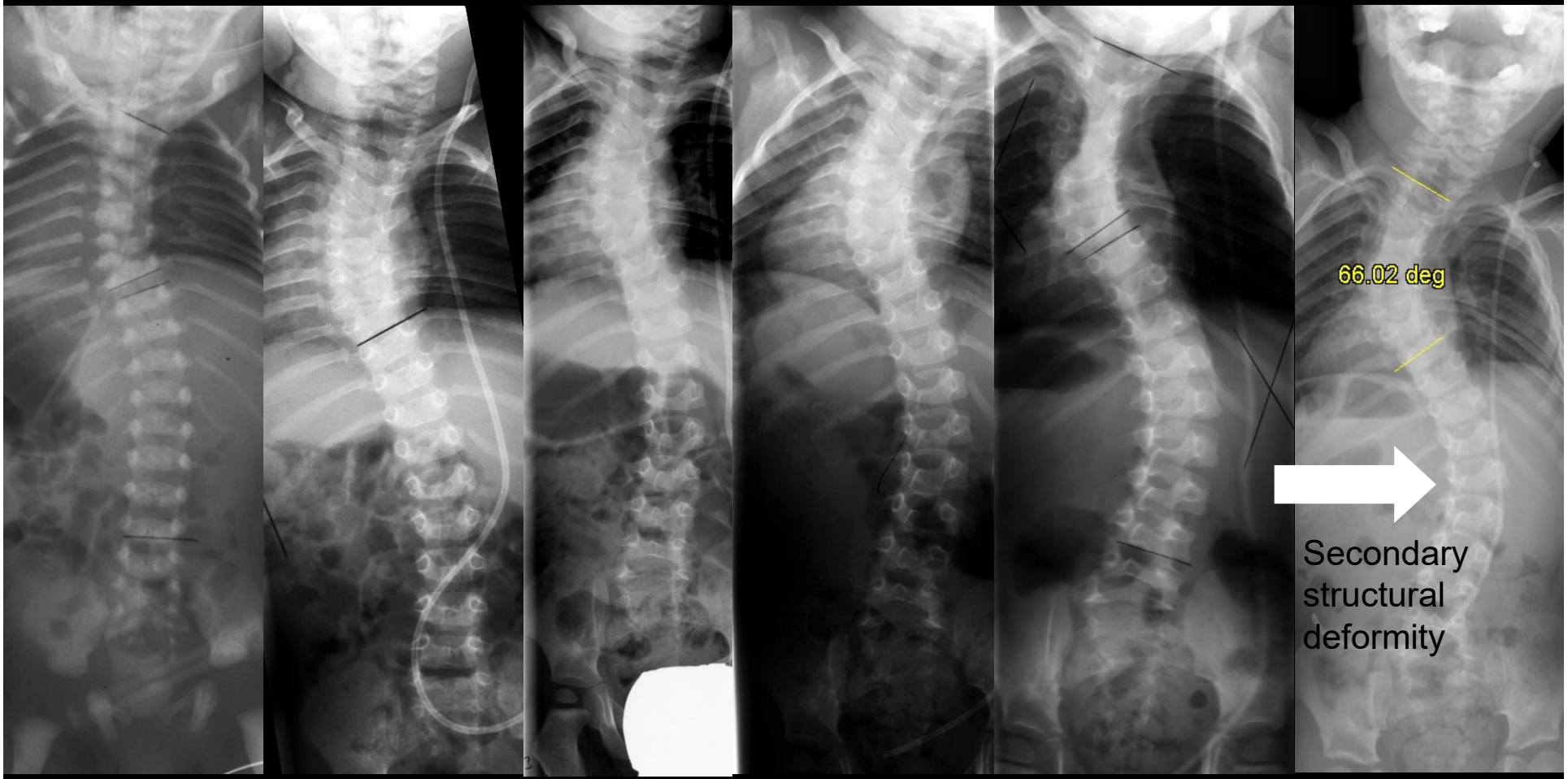
INTRODUCTION

- Distraction of the spine may cause neurological damage
- Deformity correction with distraction is usually:
  - avoided or
  - performed slowly through growing rods or an indirect distraction method (e.g. VEPTR)
- A surgical method to correct spinal deformity by osteotomy and distraction in congenital scoliosis has not been reported before

Methods

- 3 patients treated for mixed congenital scoliosis
- Surgical technique:
  - posterior approach
  - concave side exposure of the bar to the anterior aspect
  - near circumferential osteotomy around the dural sac
  - opening up of the osteotomized segment to correct the curve by distraction under continuous intraoperative spinal cord monitoring
  - stabilization without fusion on one side only using pedicle screws, rods and special (low profile) rib hooks

Illustrative case 1



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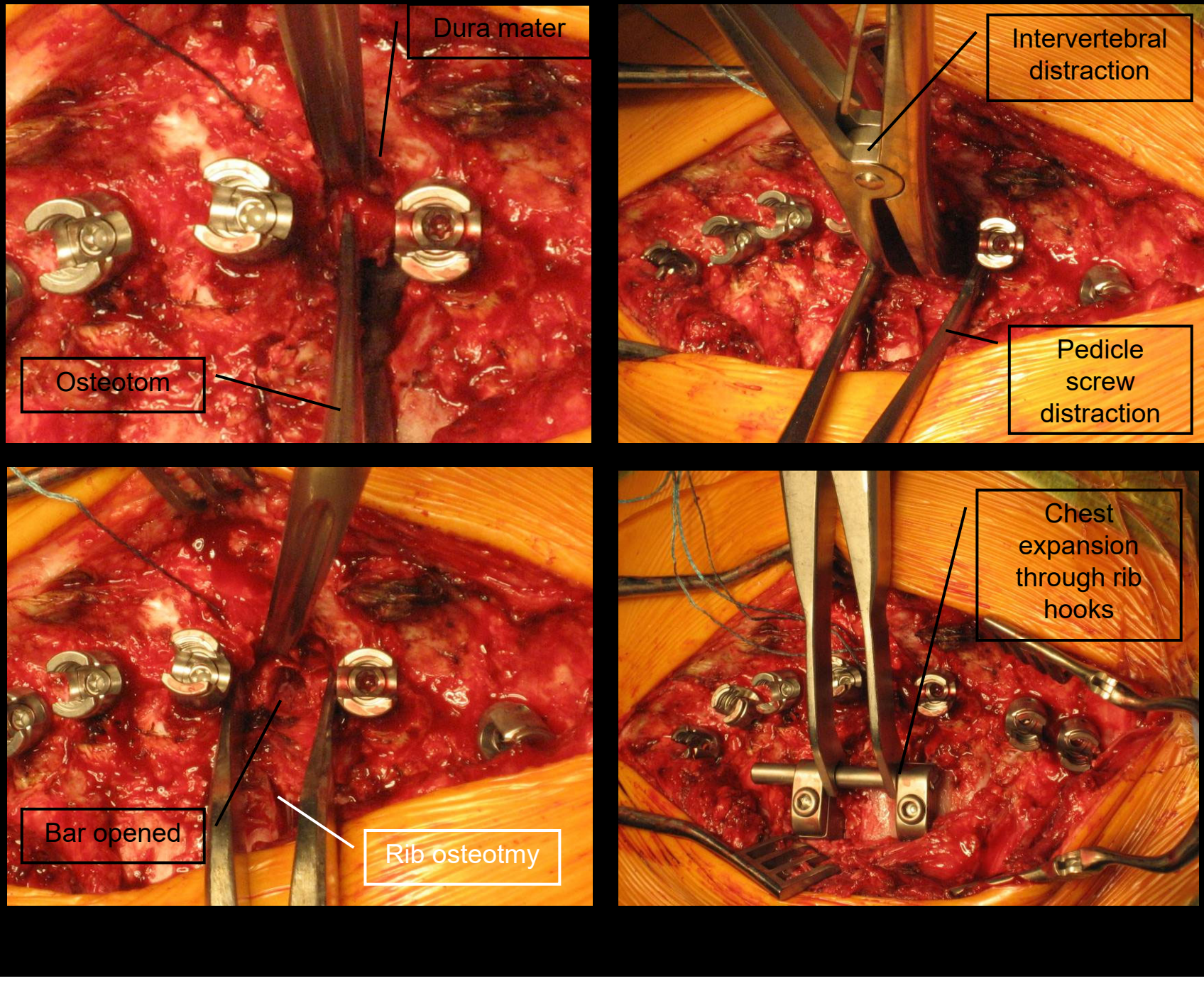
Dura mater
Osteotom
Intervertebral distraction
Pedicle screw distraction
Bar opened
Rib osteotmy
Chest expansion through rib hooks

Chest expansion through rib hooks

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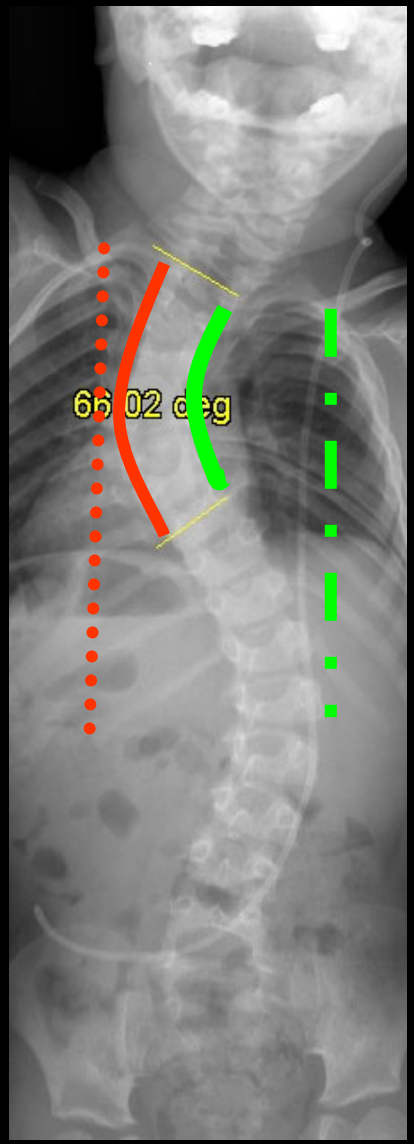
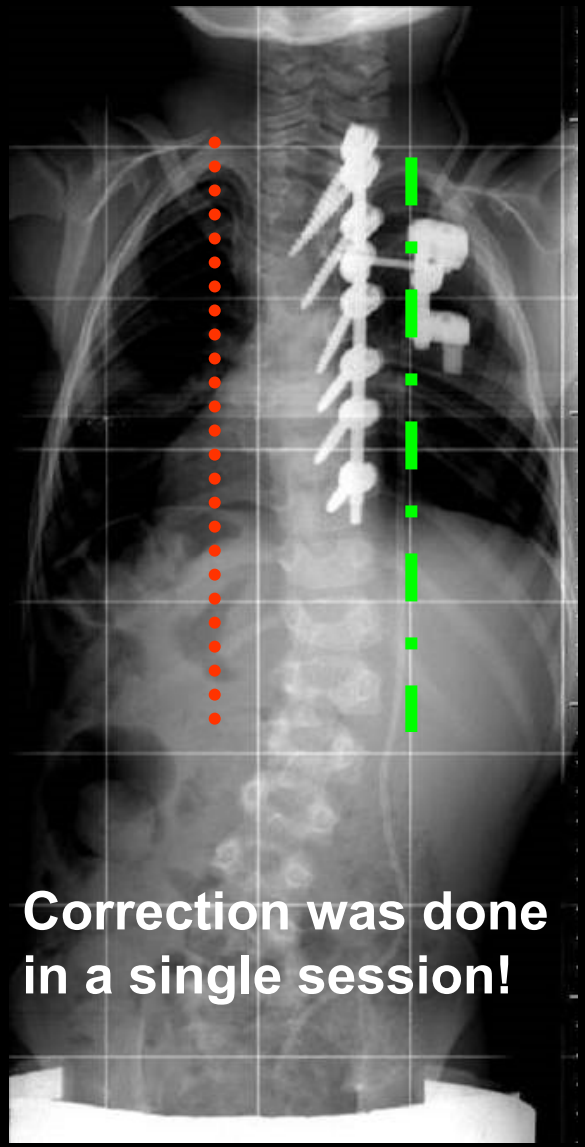
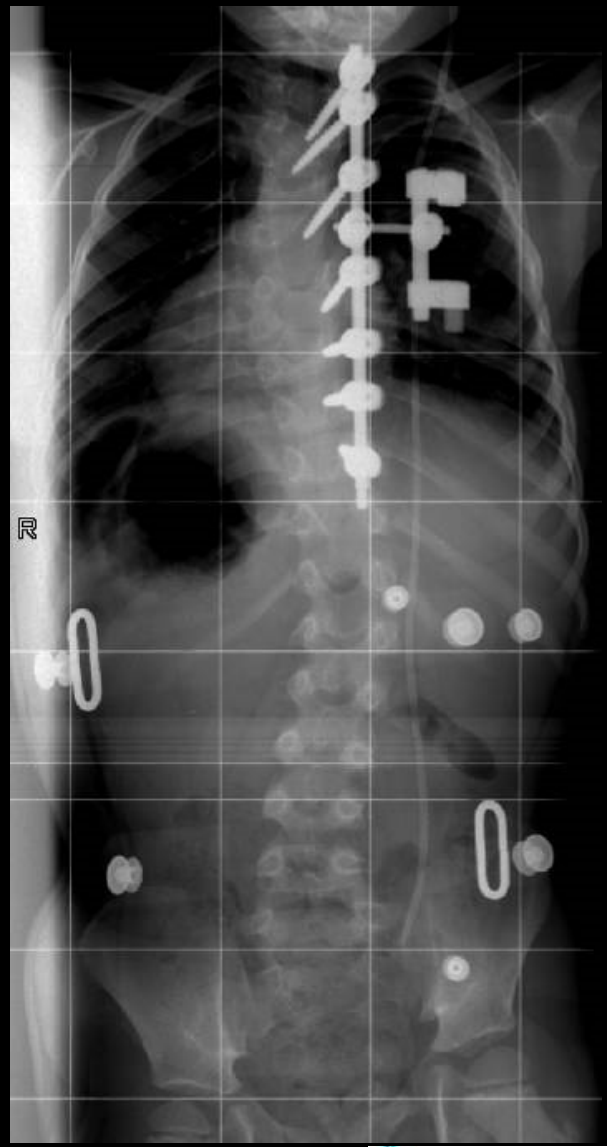
Reversal of progression







Age: 5 yrs

6 yrs

6 ½ yrs

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Illustrative case 2

3 yr-old girl with defect of segmentation and formation

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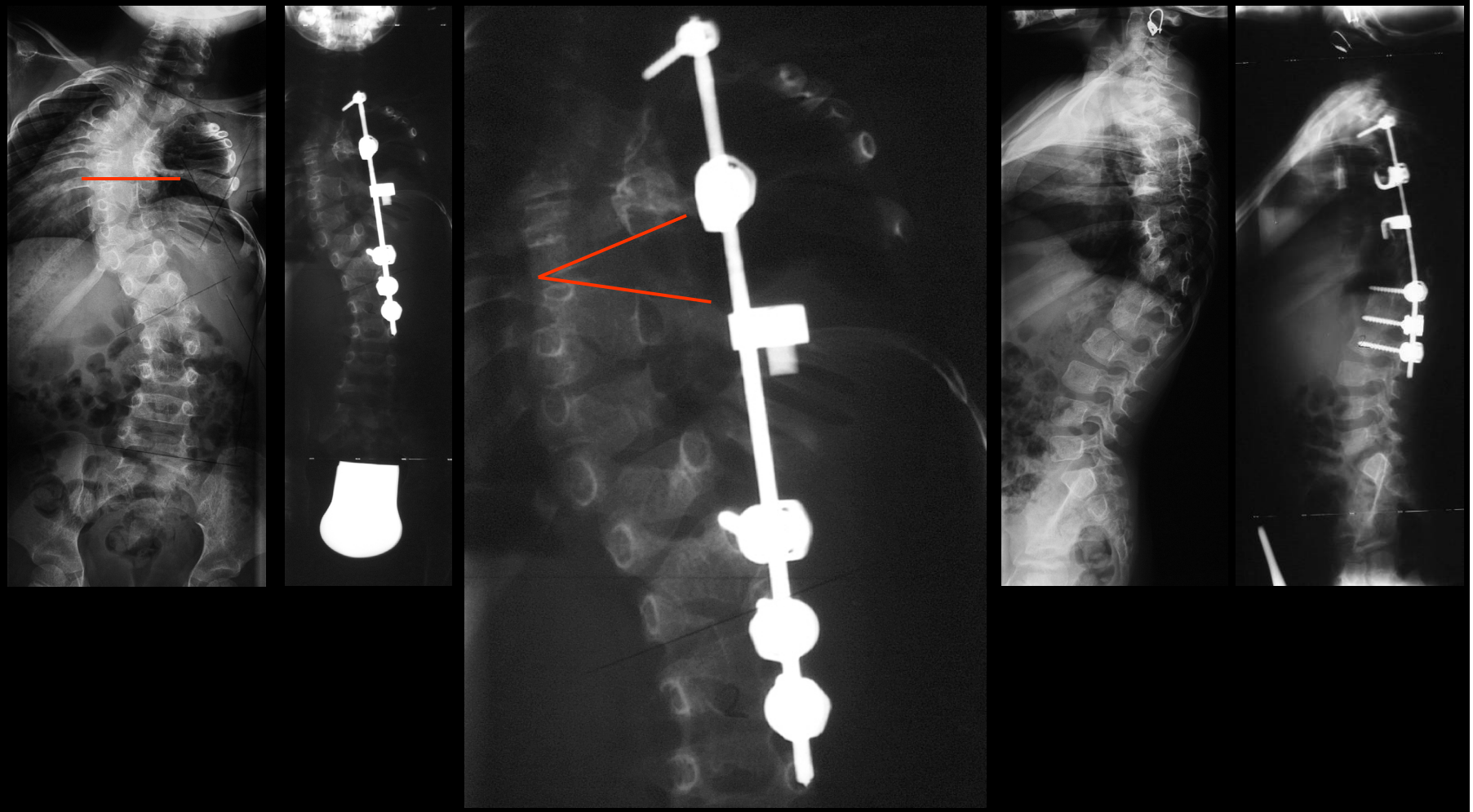
Illustrative case 2



The red line indicates the site of osteotomy and the opening-wedge

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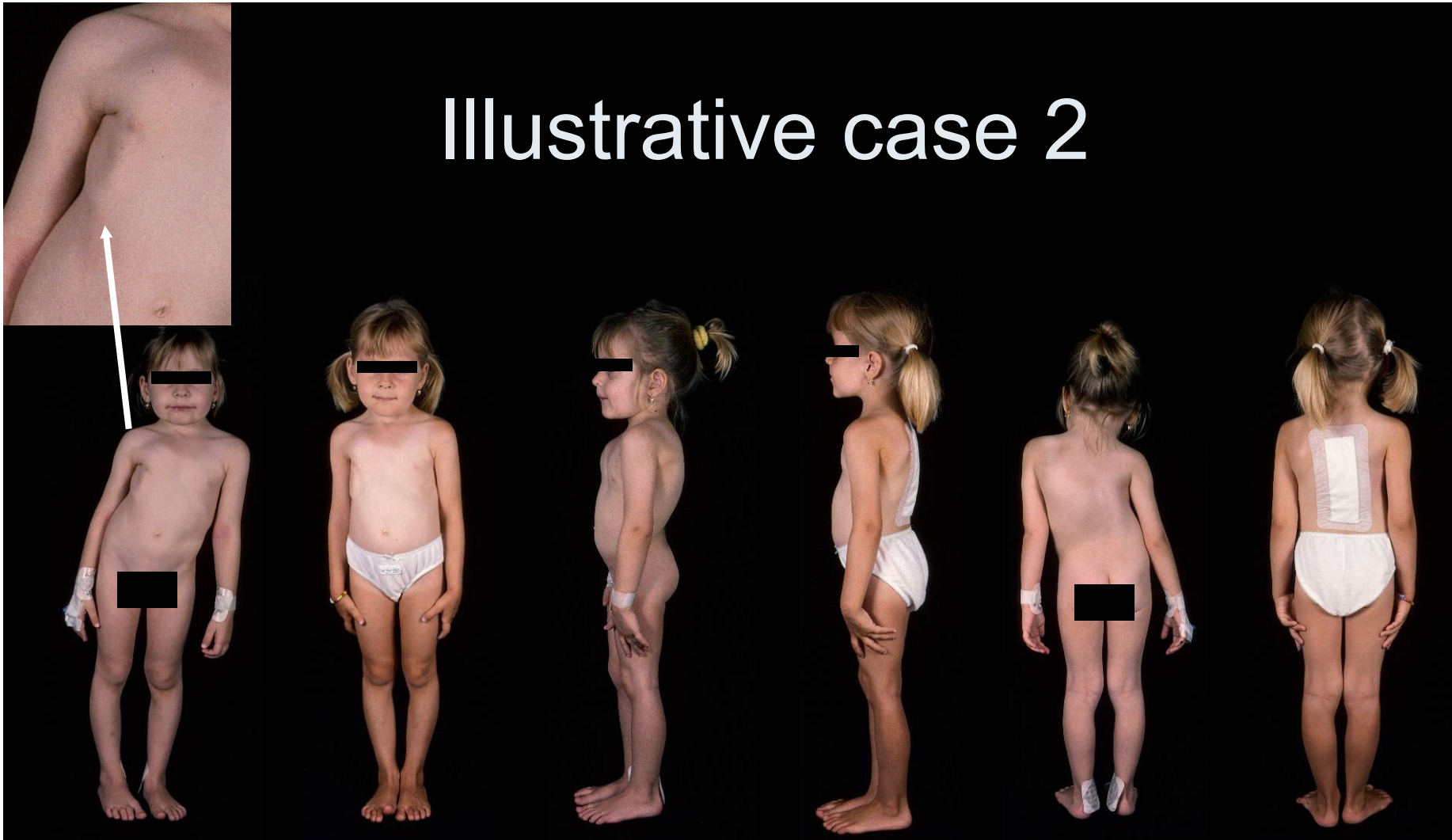
Illustrative case 2



Immediate postoperative images:

note the improved spinal balance and the improved chest configuration

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Results

- Age at surgery: 4 (2.4 – 5.25) years
- Follow-up time, 3.0 (1.5 – 5.5) years
- Average scoliotic curve:
  - 65 (60 – 71) degrees pre-implant
  - 27 (18 – 40) degrees post-implant
- Correction, 38 degrees (58 %)
- Multimodal monitoring of the spinal cord during surgery revealed in two cases potential damage of the spinal cord immediately after the correction; the final correction was hence delayed in both cases for one week
- Ultimately, no postoperative neurological complications were detected

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Conclusions

- Spinal opening-wedge osteotomy is an effective surgical technique for the correction of congenital scoliosis
- Surgery is performed only at the most affected region of the spine. All other regions (secondary curves, convex side) of the spine are left intact
- The goal of surgery is to achieve the greatest correction possible at this site
- The surgery should be performed as early as possible, so that all the intact spinal regions can grow normally
- The use of intraoperative spinal cord monitoring is essential

Thank you!

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