

3rd International Congress on Early Onset Scoliosis and Growing Spine (ICEOS)

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Istanbul ,Turkey

Vertebral Resection and Short Fusion
is Better than Nonfusion Techniques
in Short Congenital Deformity

Rubens Jensen, MD

Vertebral Resection and Short Fusion
is Better than Nonfusion Techniques

in Short Congenital Deformity

Myth vs. Truth

28 Cases Hemivertebrae and 13 complex cong. deformities
15 years experience

**secure confirm
It is truth**

Congenital Scoliosis

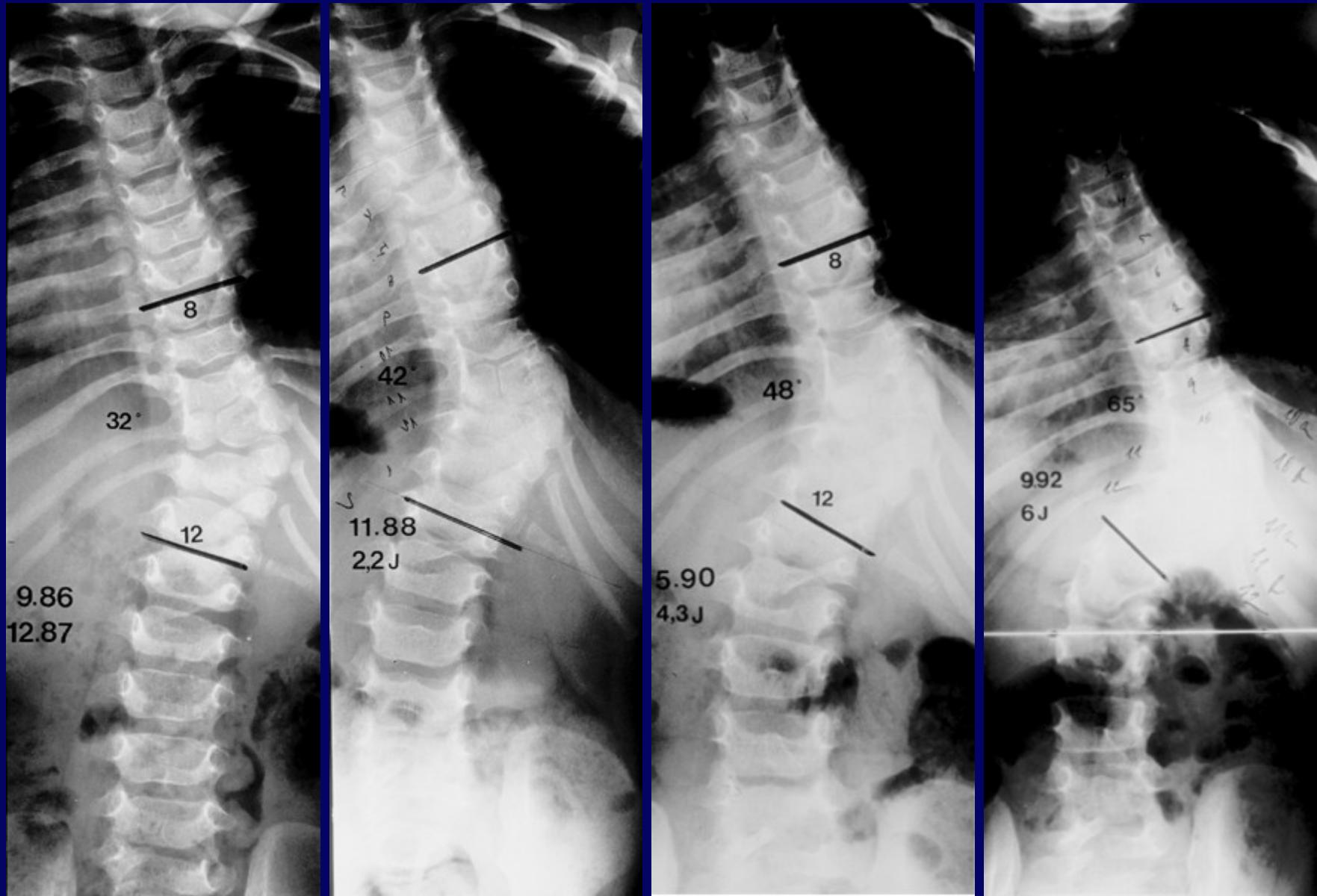
- Prognosis -

- Winter et al. (J.B.J.S., 1968)
- Nasca et al. (J.B.J.S., 1975)
- Mc Master et al (J.B.J.S., 1982)

Hemivertebra  $1^\circ - 5^\circ$ a year

Hemivertebra with bar  $5^\circ - 10^\circ$ a year

Non surgical treatment results in a not acceptable deformity

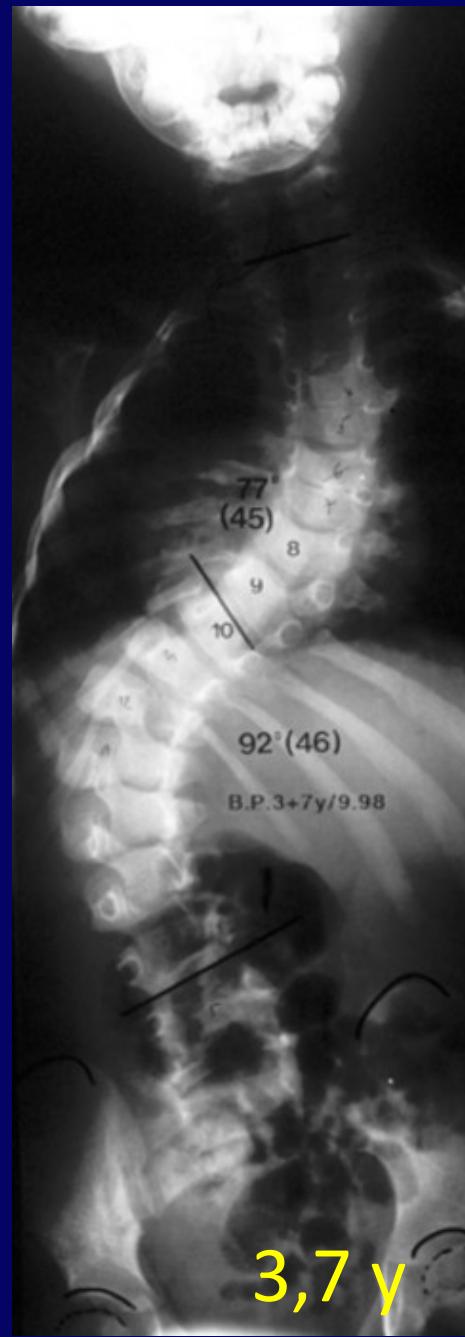


1 y: 32°

2 ys: 42°

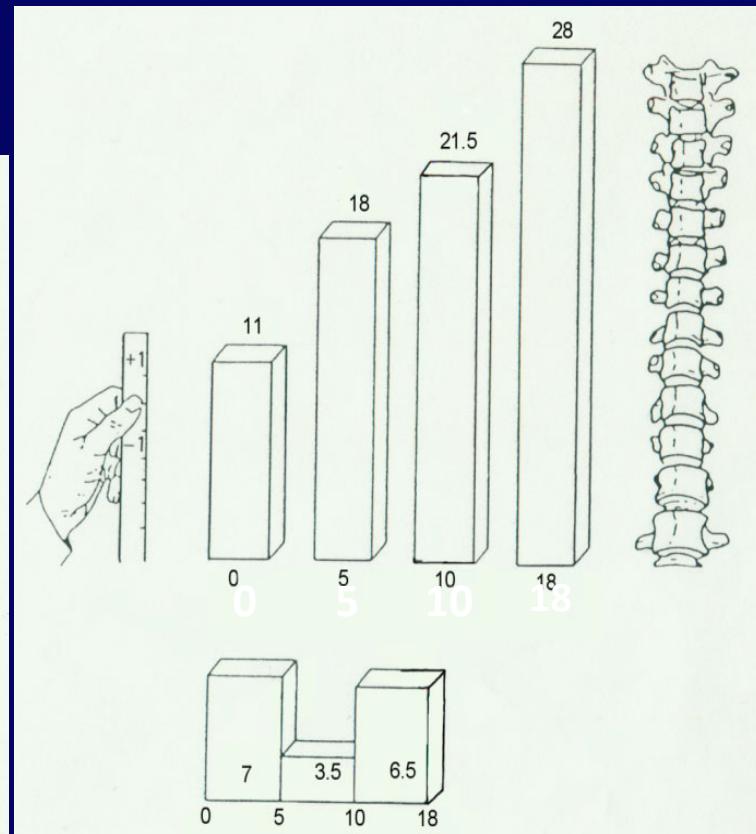
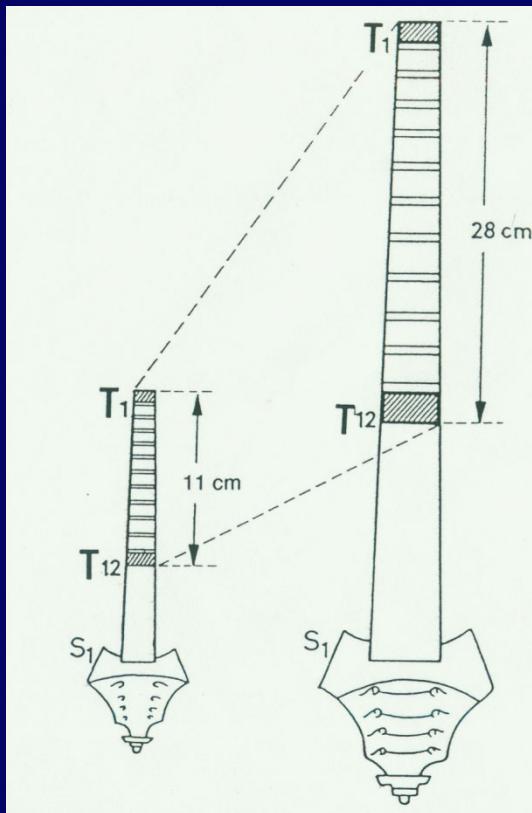
4 ys: 48°

6 ys: 65°



Objectives of Surgery:

- Correction of the deformity
- Allows for normal growth of the unaffected parts of the spine
- 2 years old



5+3y



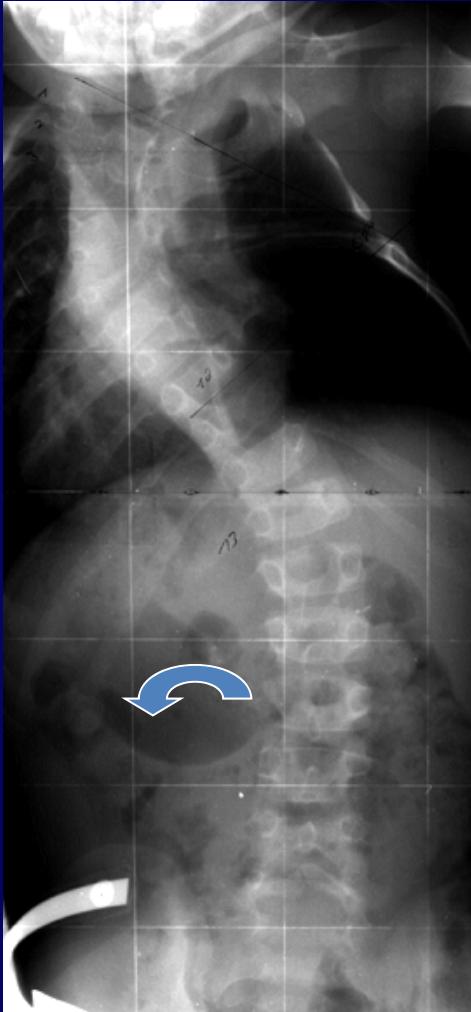
PATIENTS PRE-OP EVALUATION

- X-ray film
local and long films
- Bending films
- Conventional
tomography
- Myelography
- CT-Myelography
- CT-Reconstruction-3D
- MRT

X-ray film

AP

Lateral

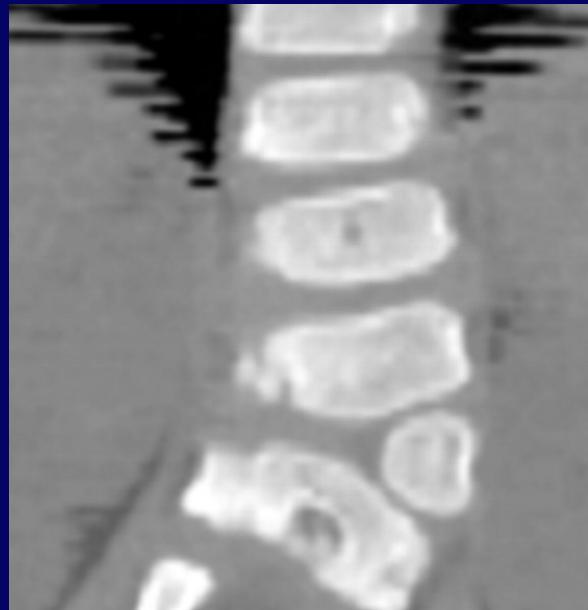


Bending



Bending





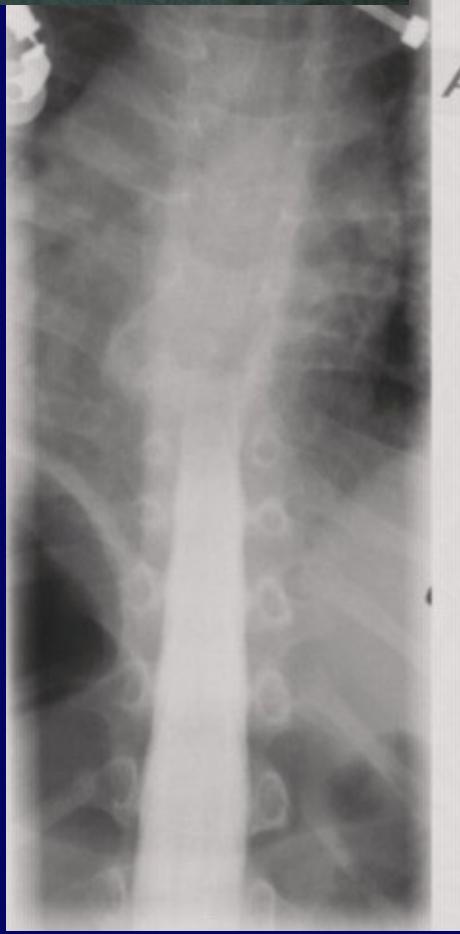
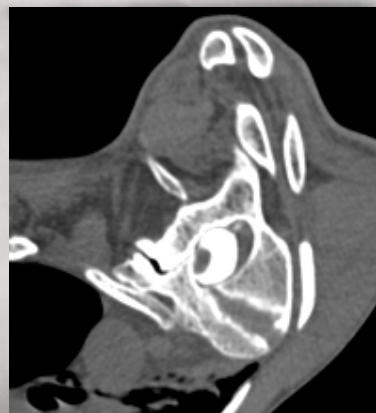
S.G., f., HV T14a

4/00 (22m):

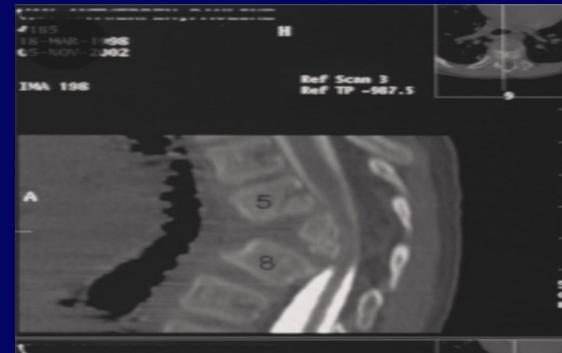
37°

28°

9



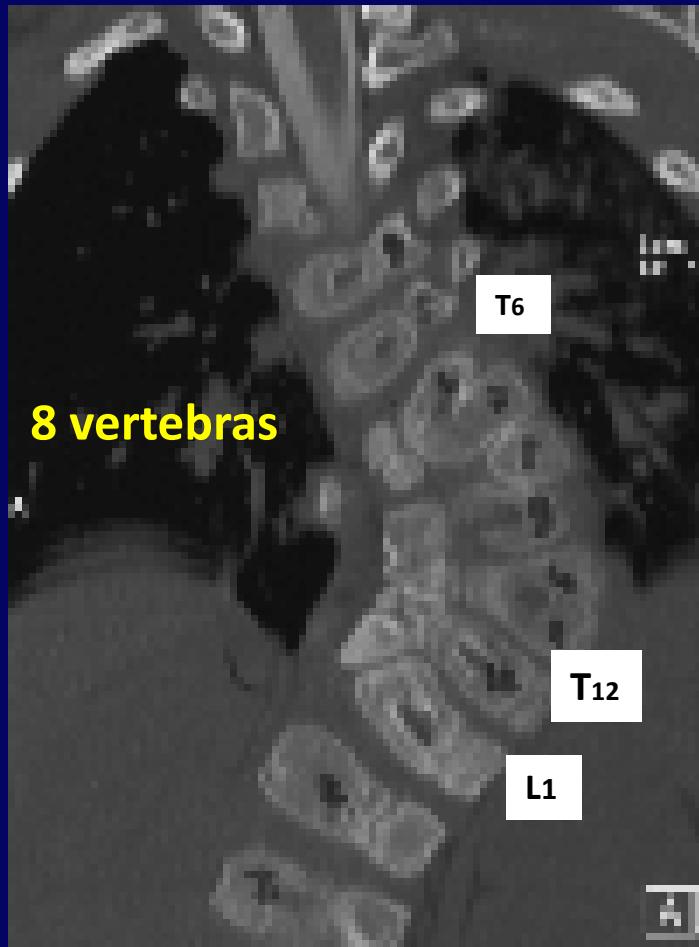
A.P. 4Y
10/02



Mixed failures

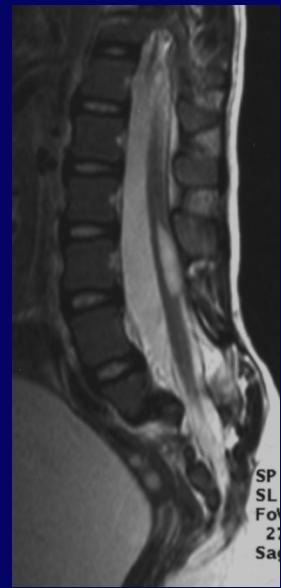
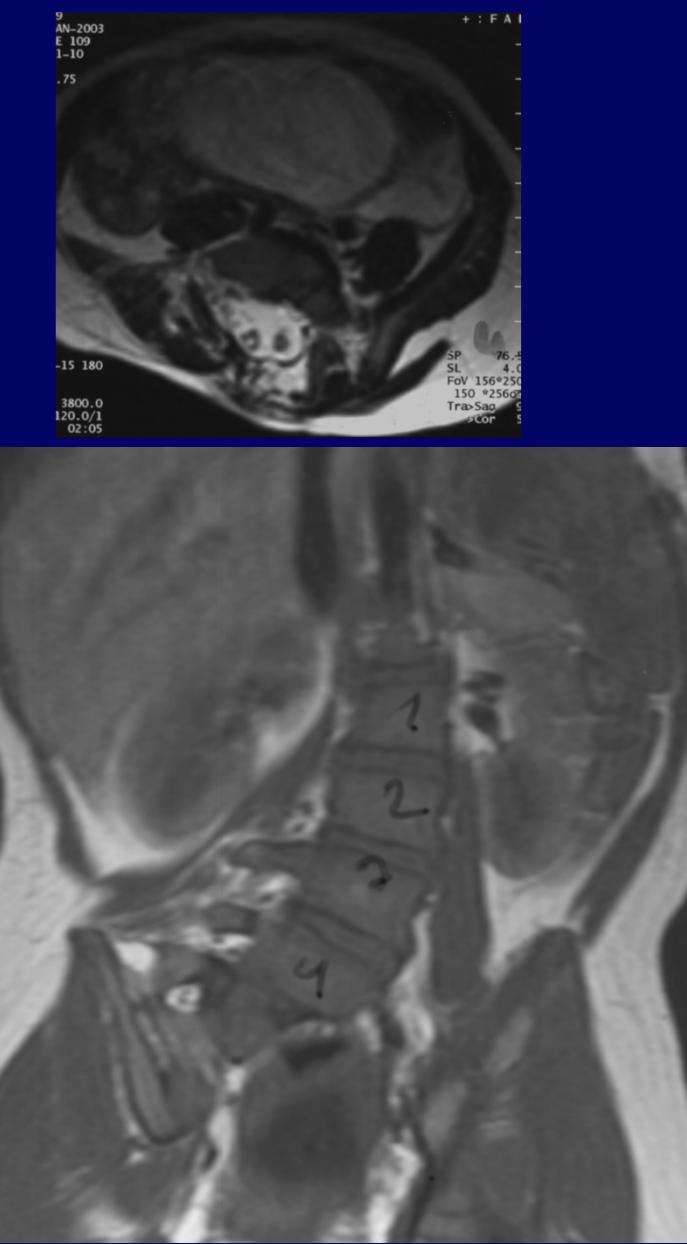
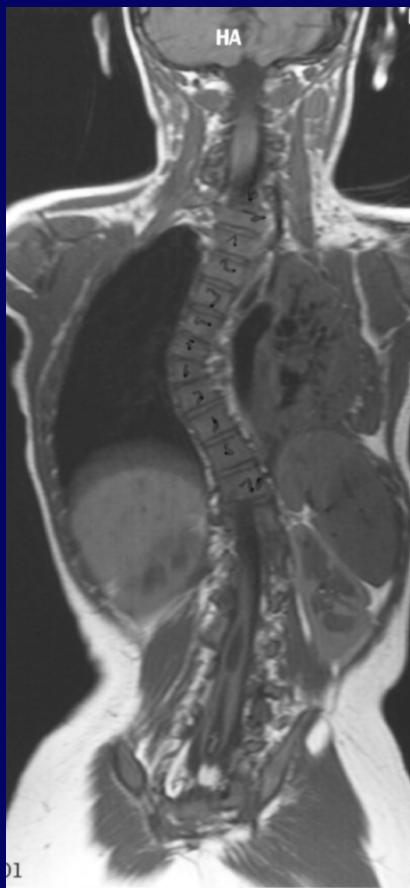
- Defect of formation
- Defect of segmentation

Unilateral unsegmented bar with hemivertebra **T6 to L1**



D.V. 1y+7m





MRI

Congenital Scoliosis

- Hemivertebra Resection -

Early operative intervention

(Harms 1991)

- less invasive approach (posterior only)
- short and rigid instrumentation (transpedicular)

Ruf M, Harms J. Spine 2002;27:1116-23.

Spine 2003;28(18):2132-38.

Ruf M., Rubens J. Spine 2009;34(17):1791-1799.

Treatment of Multi-level Congenital Deformity

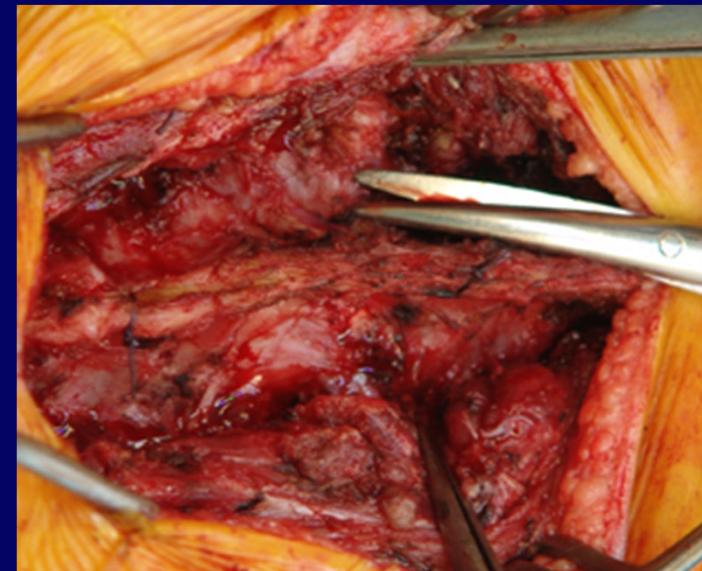
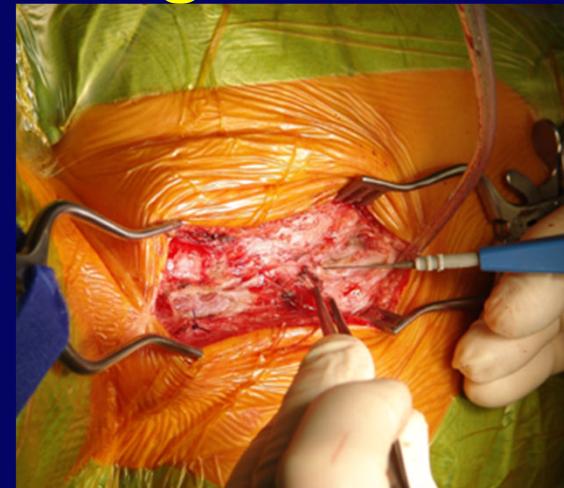
Principles of the technique

- epiperiosteal dissection – handling the soft tissues
- fusionless surgery
- segmental transpedicular fixation 2.7, 3.5 or 4 mm screw,
3mm rod
- corrective resection osteotomy
 1. Convex side - shortening
 2. Concave side - slight lengthening

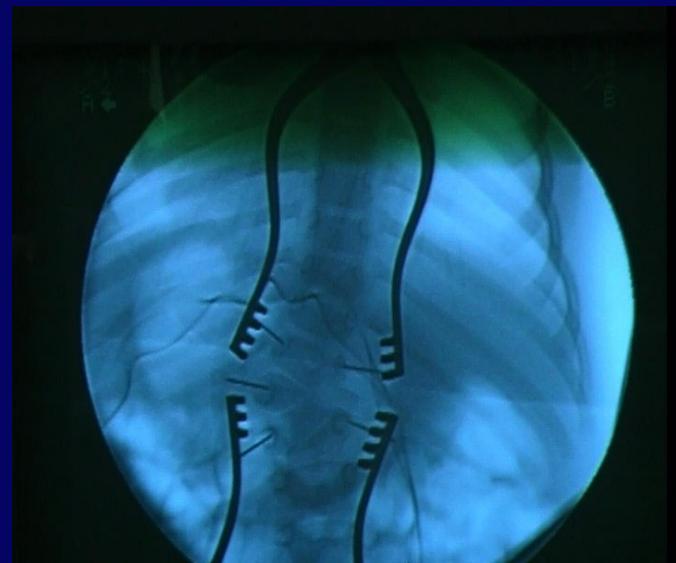
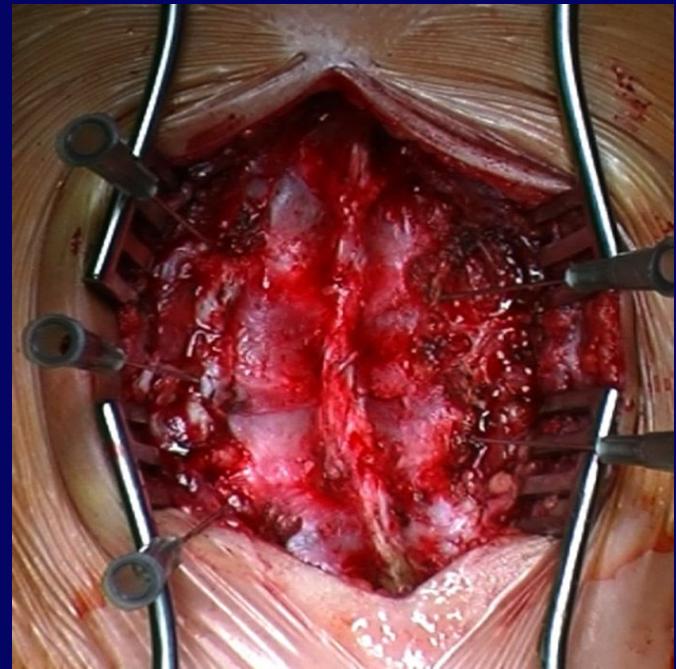
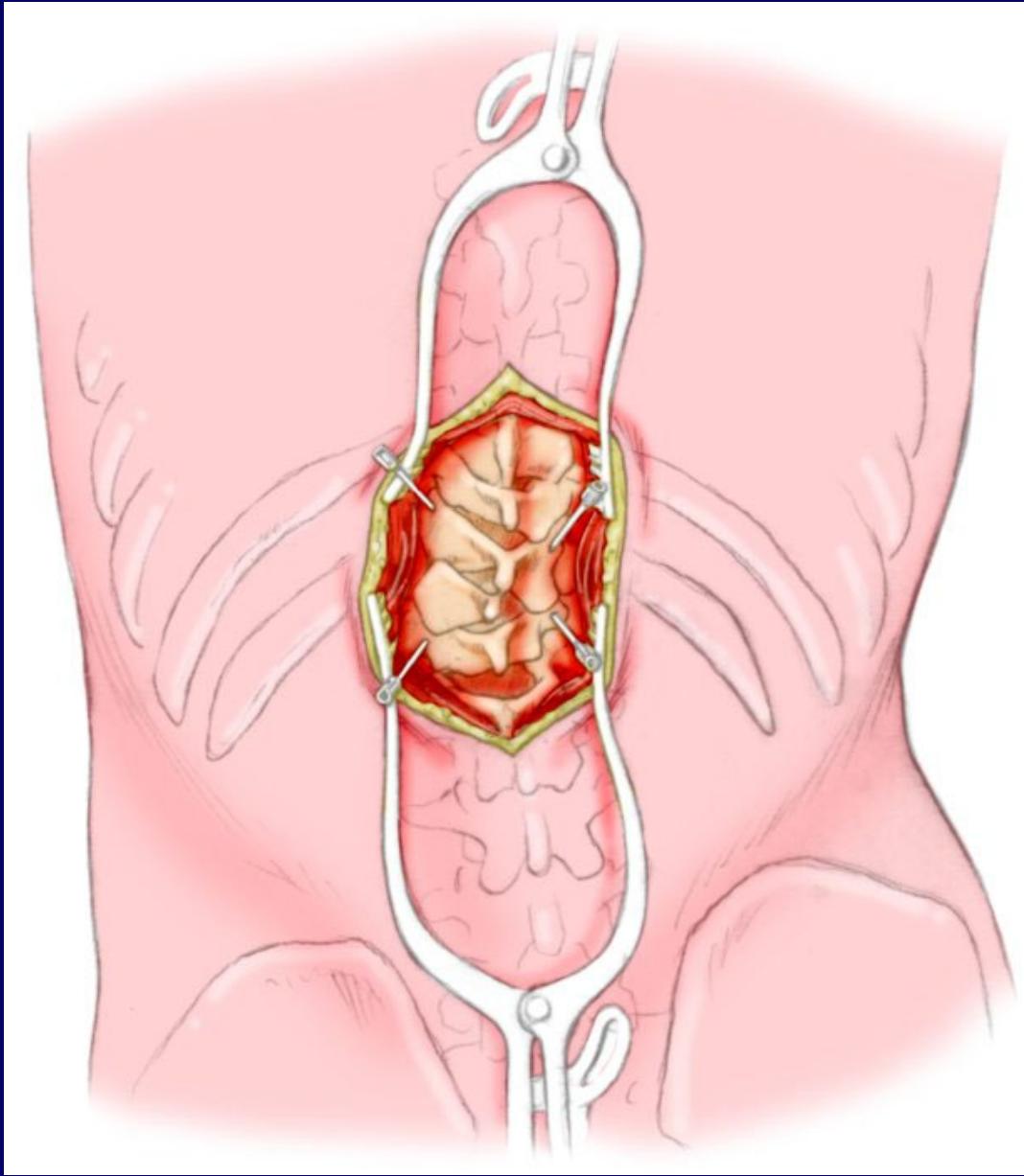
fusion

Soft Tissue Handling

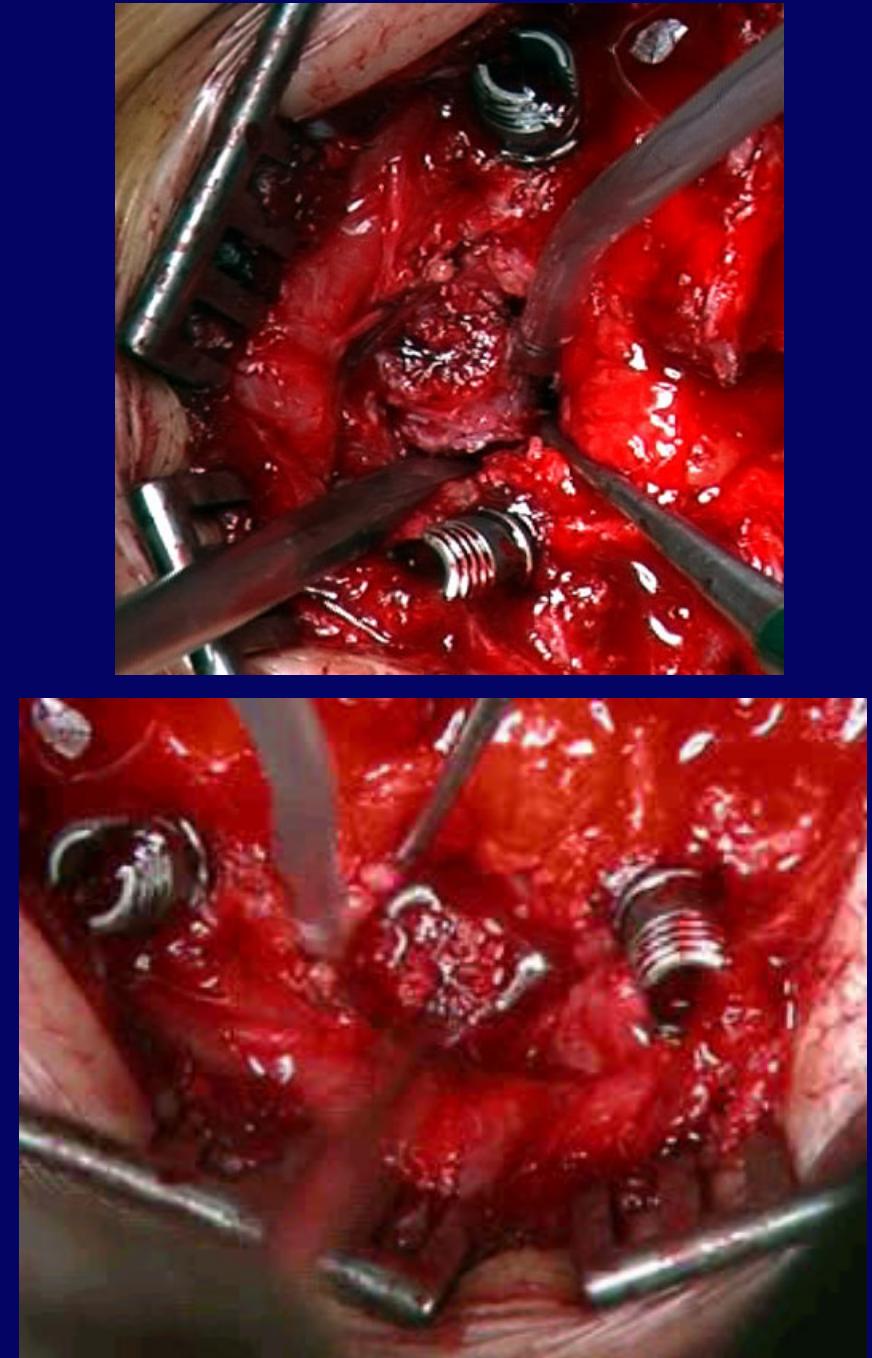
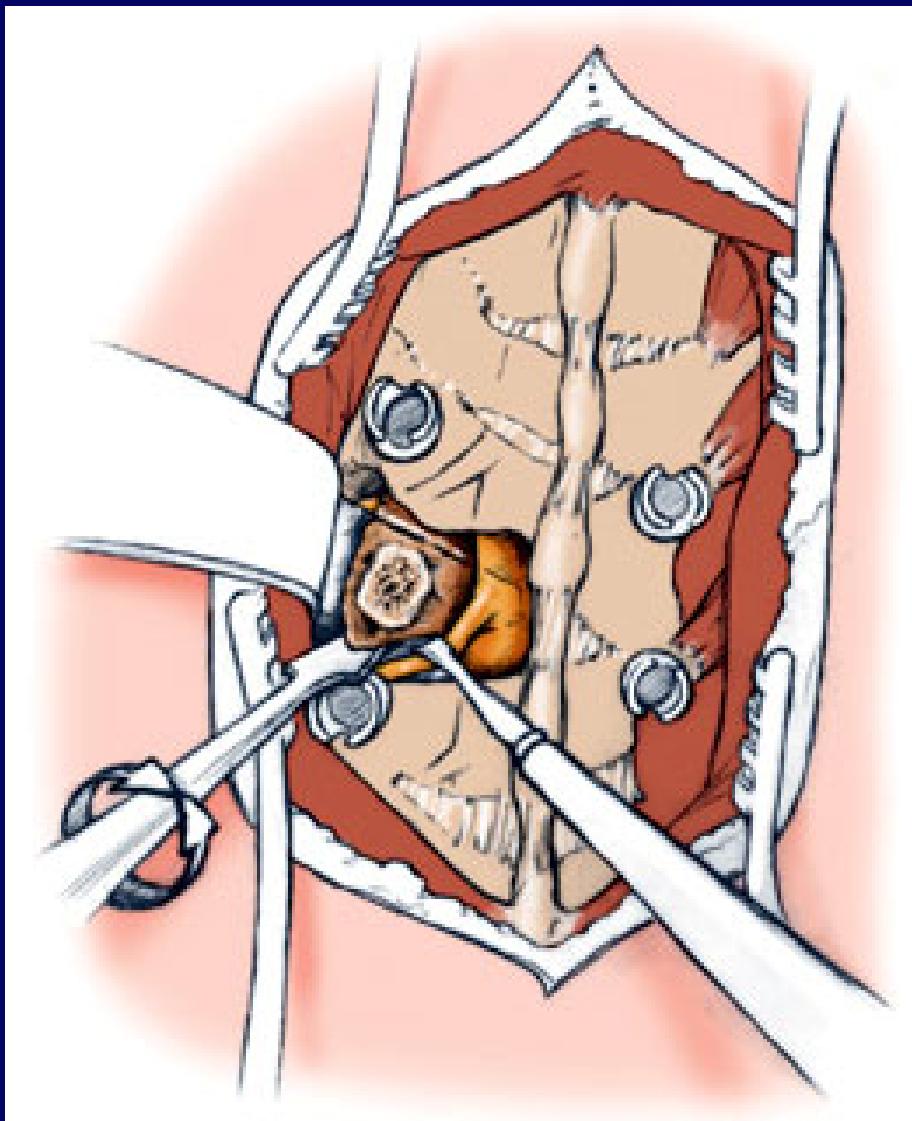
**fusionless surgery:
epiperiosteal dissection**



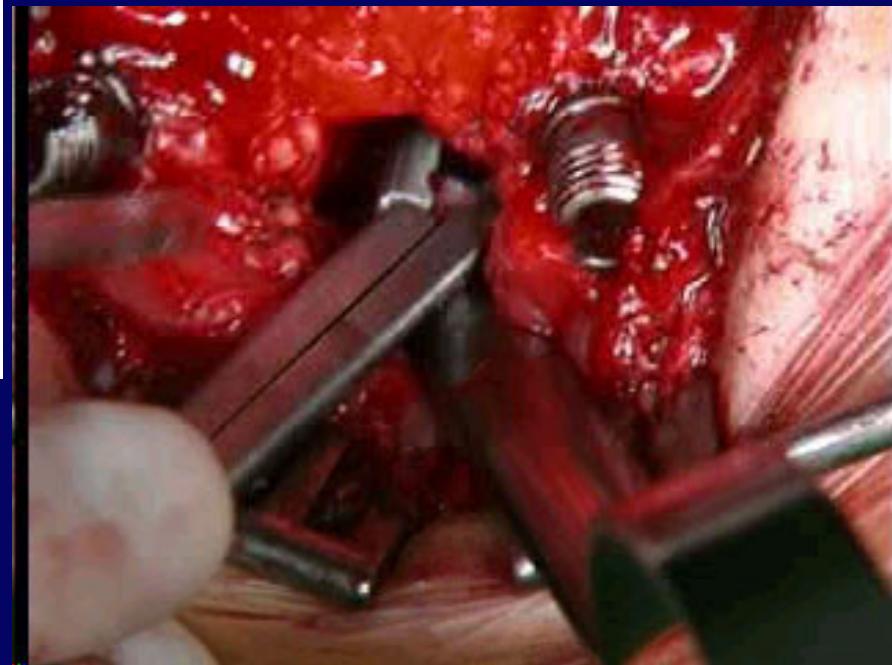
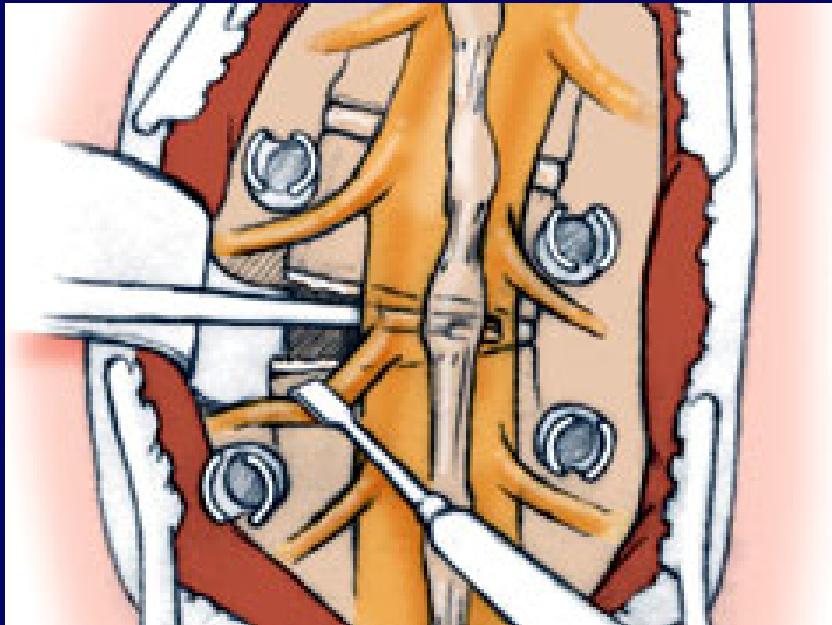
Identification of pedicles



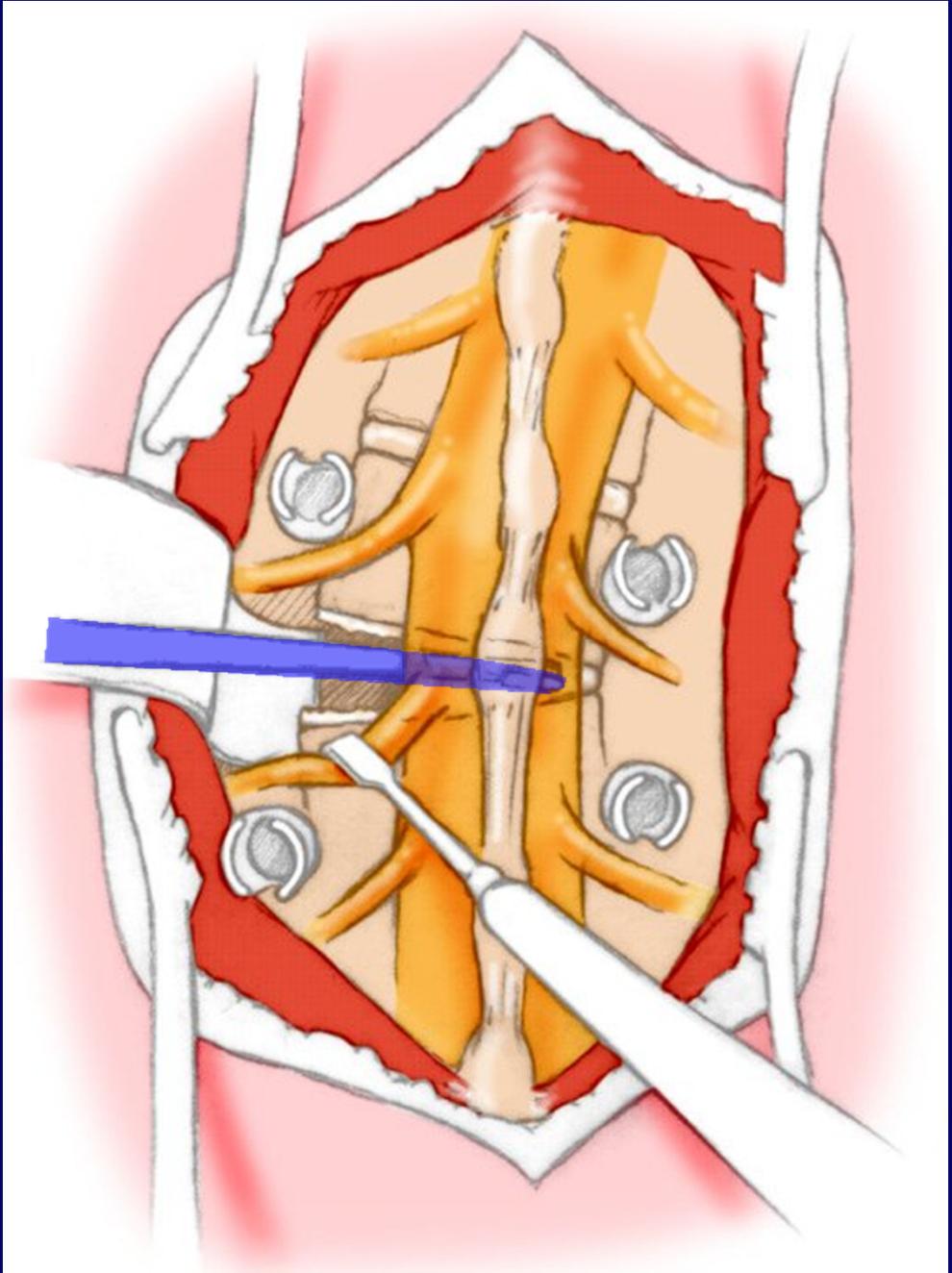
Resection of the body of the hemivertebra



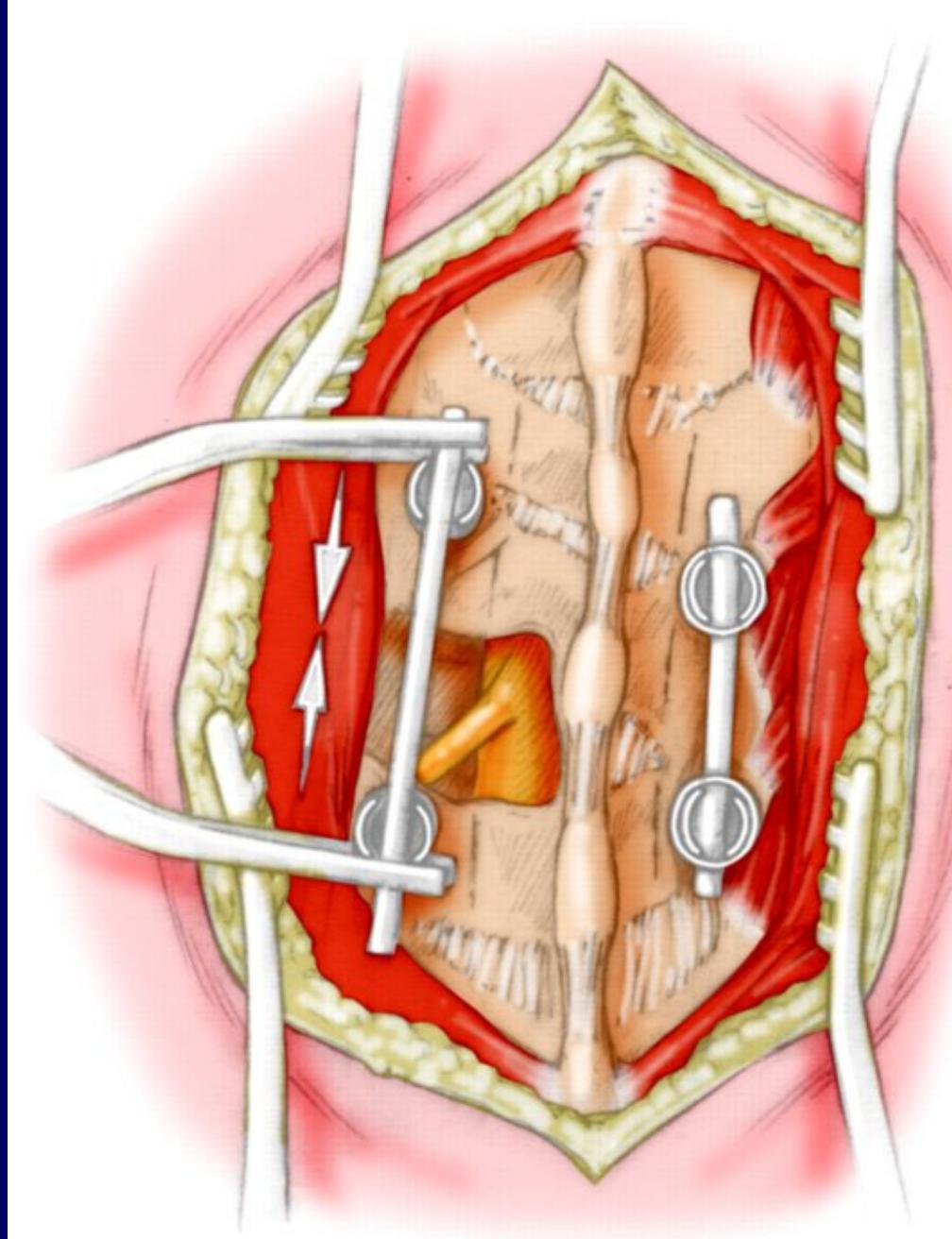
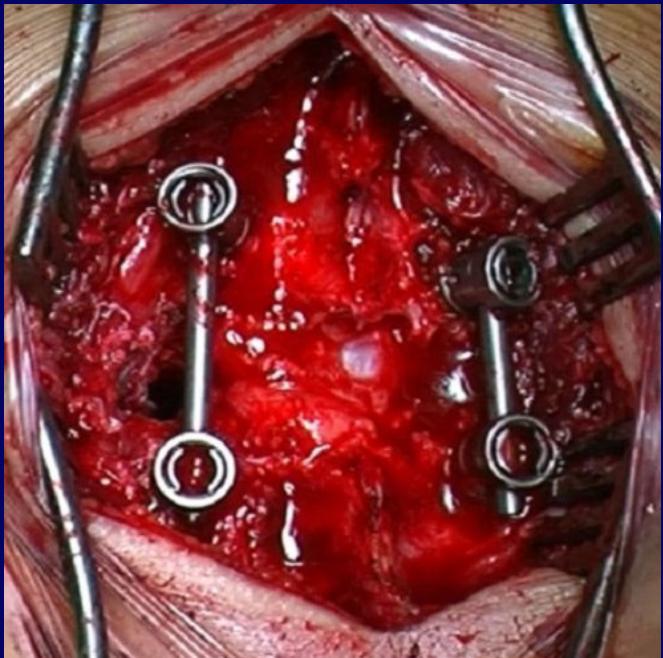
Removal of the adjacent discs

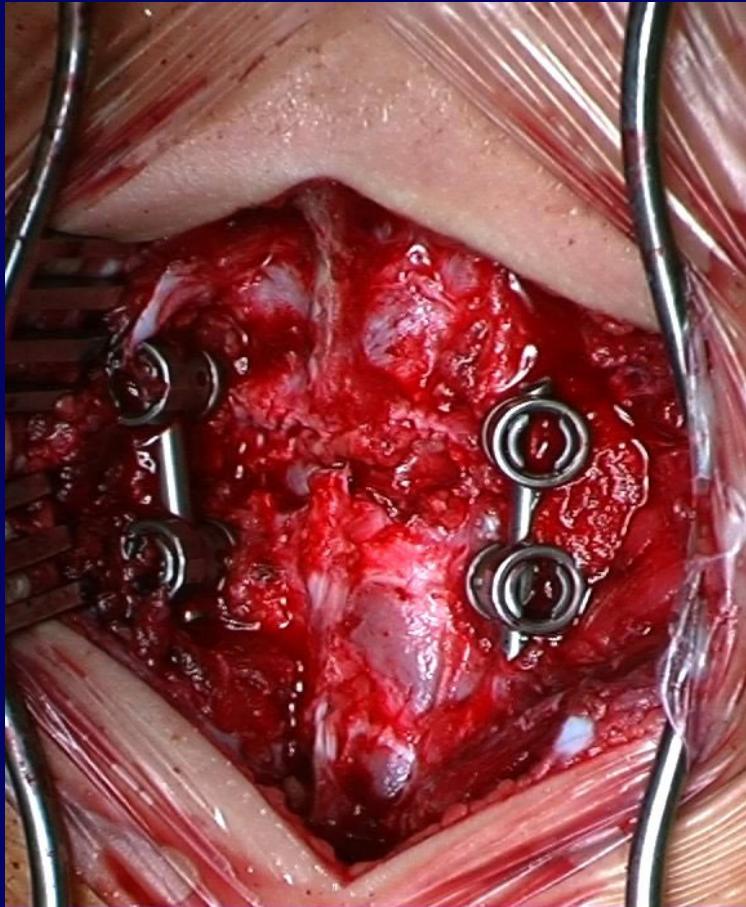


Resection completed
by cutting
opposite side
(concavity)
by chissel

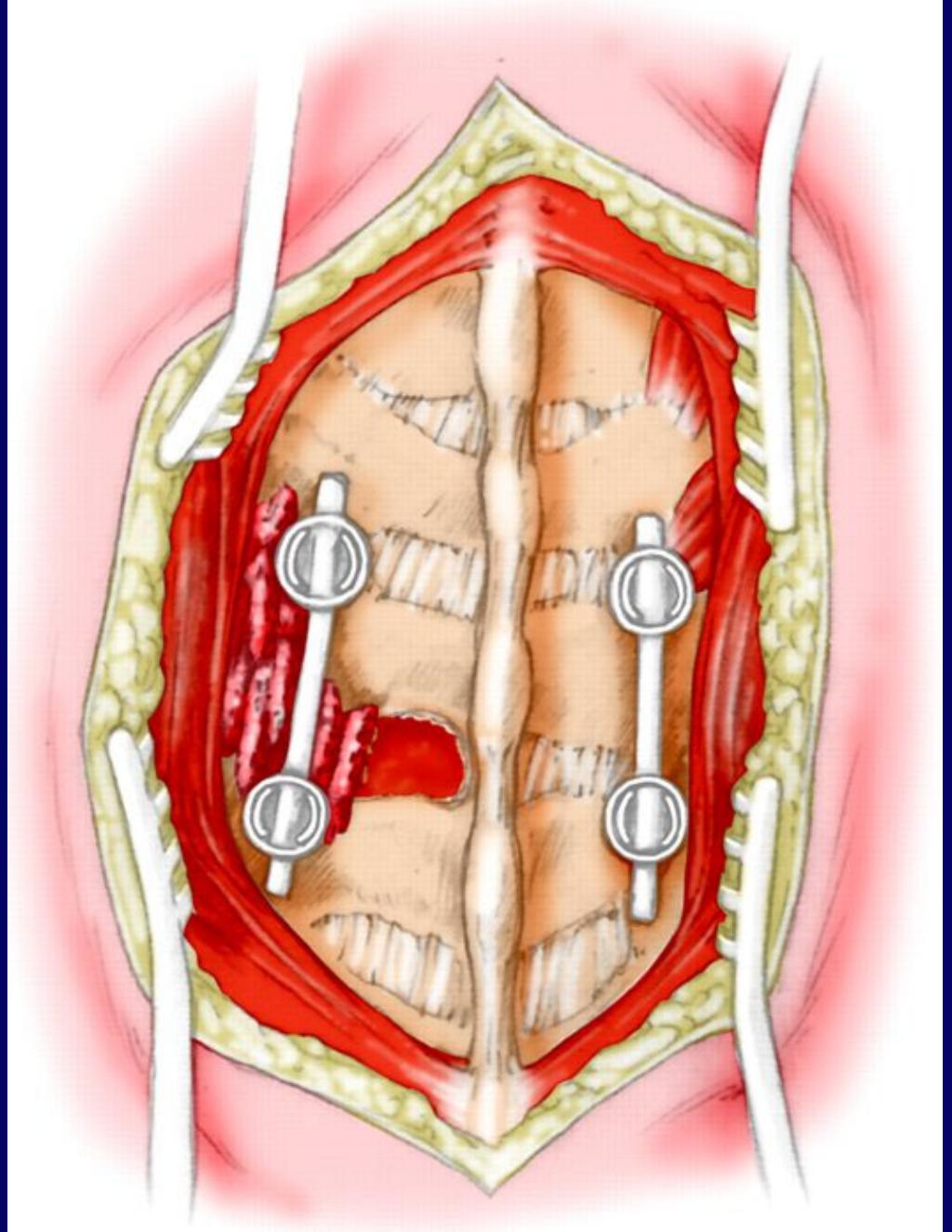


Application of rods into screw heads

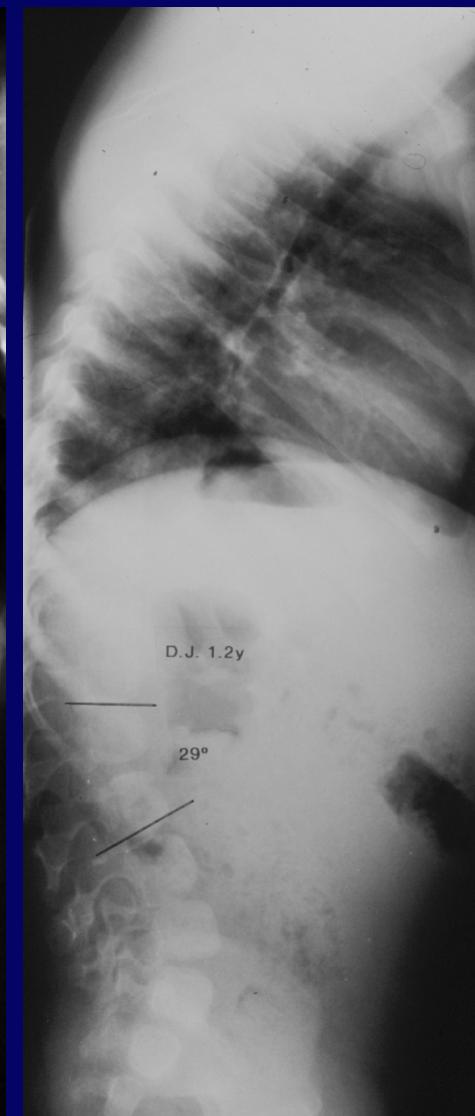
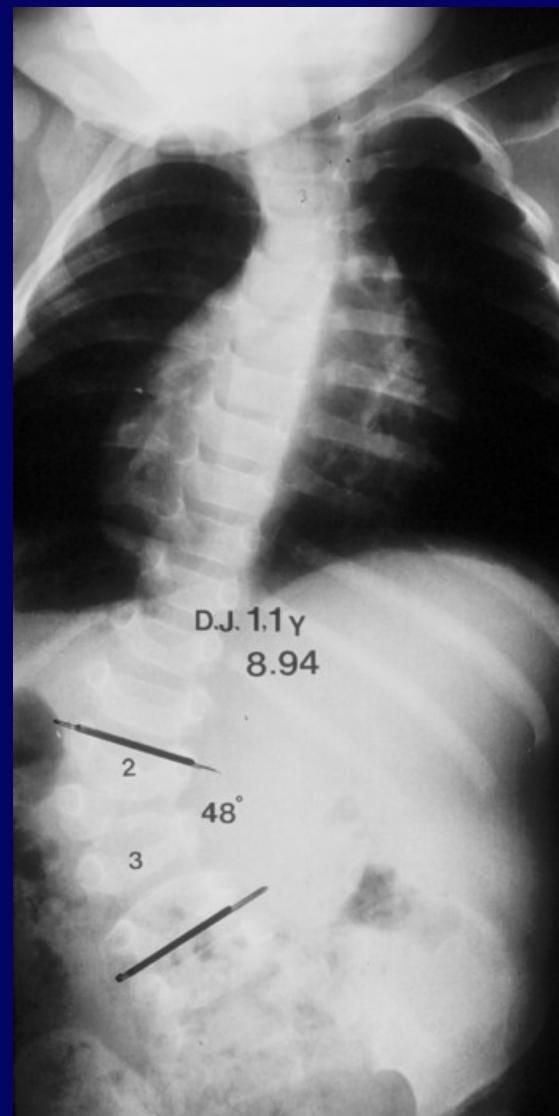
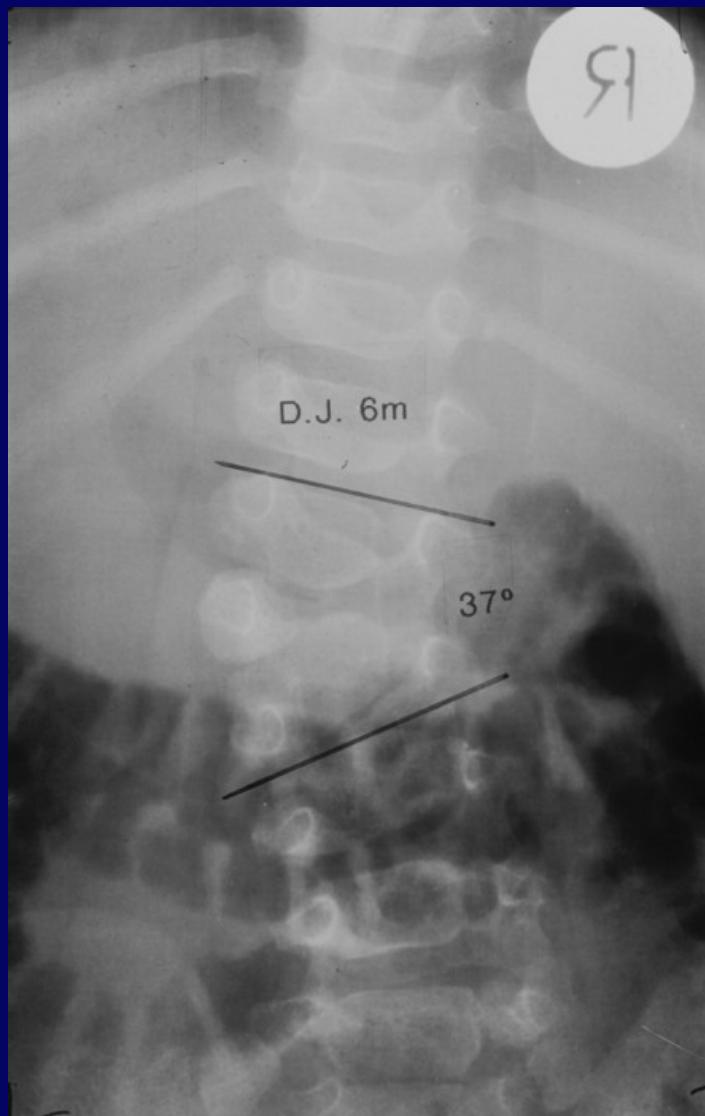


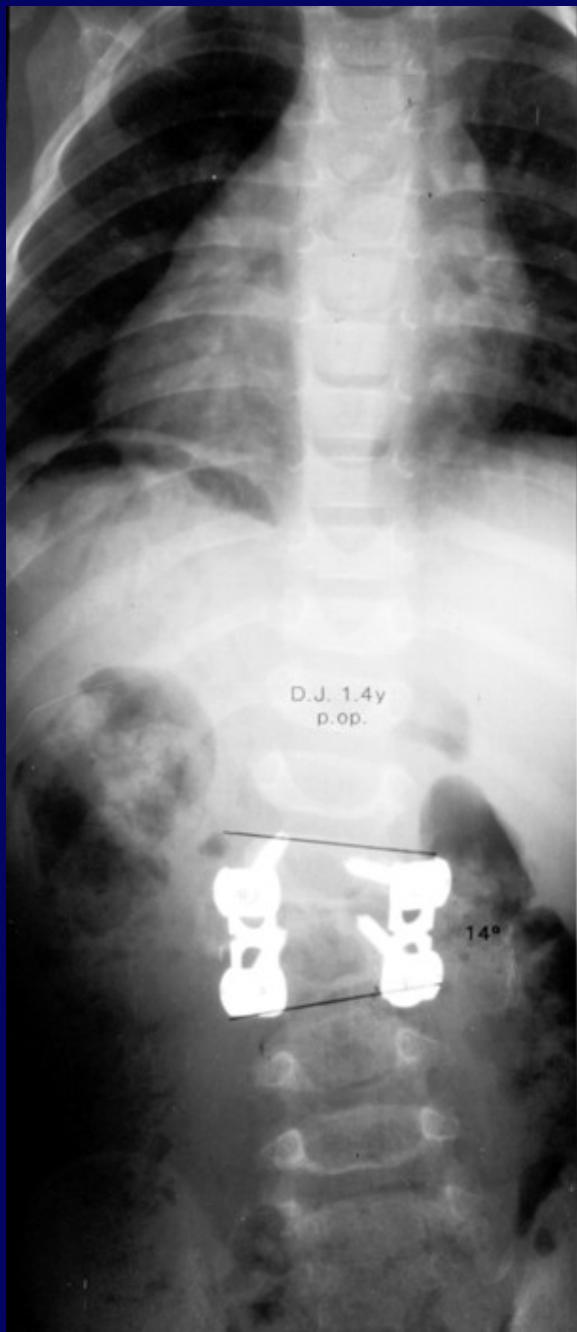


Application of
compress. forces +
additional post. lat. fusion

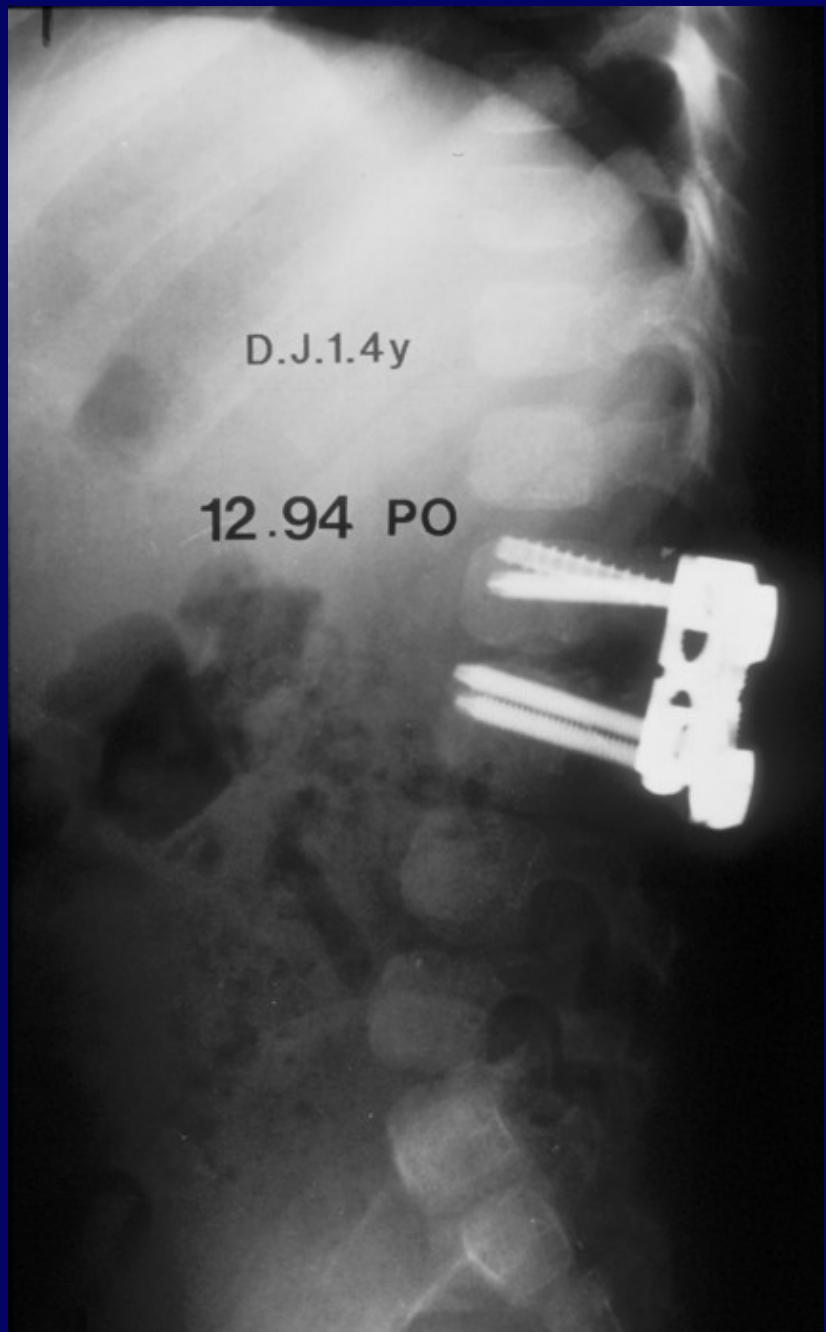


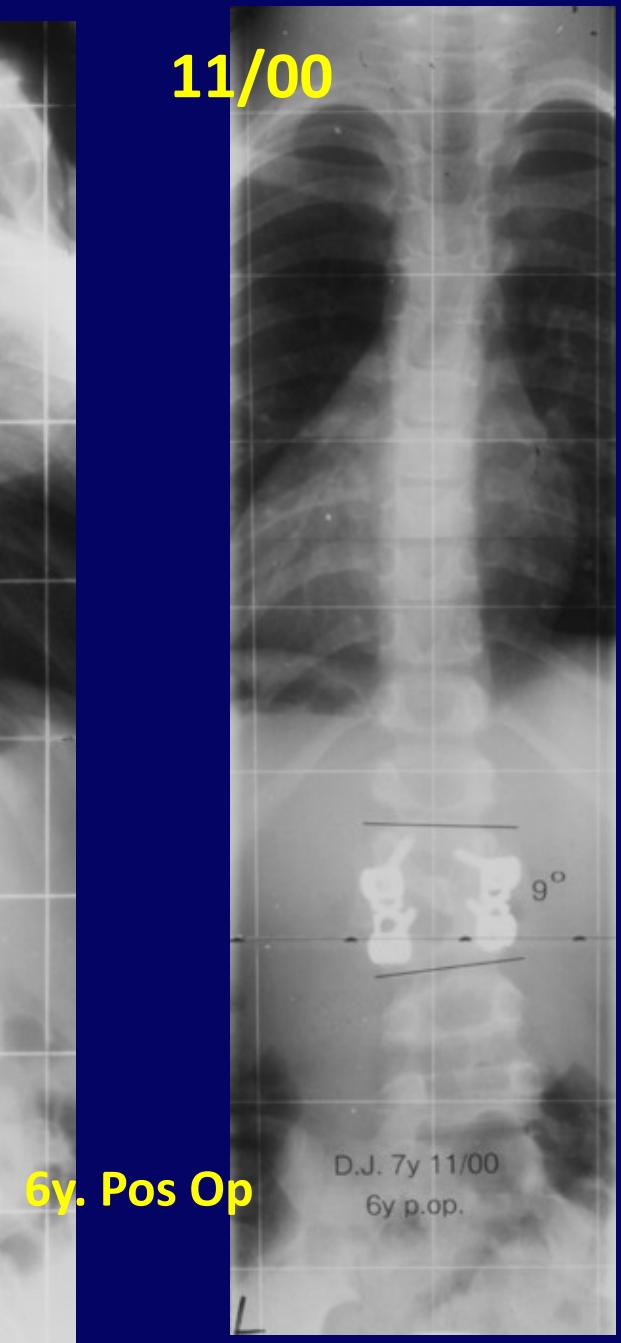
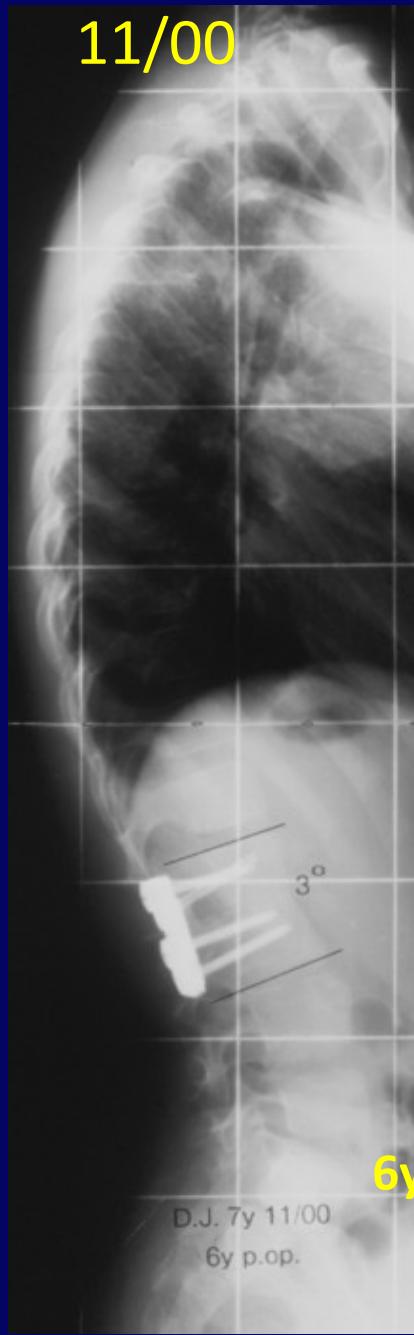
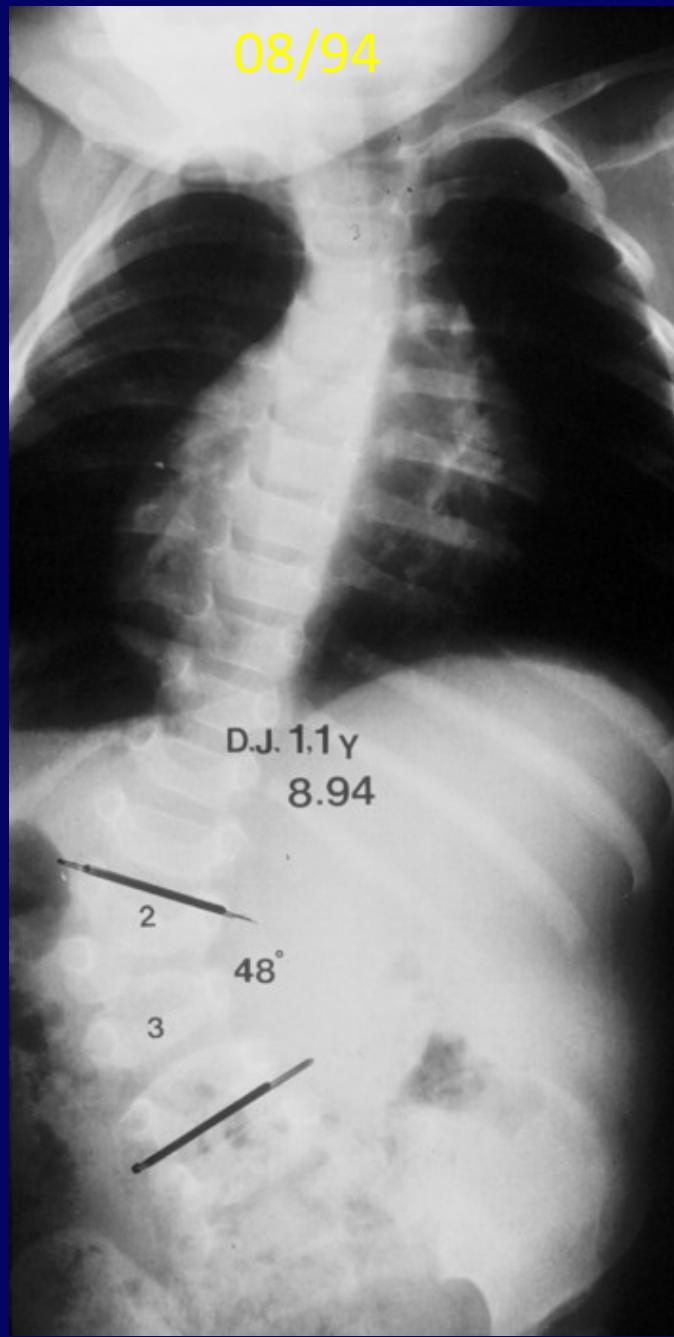
1,2 y - 1994

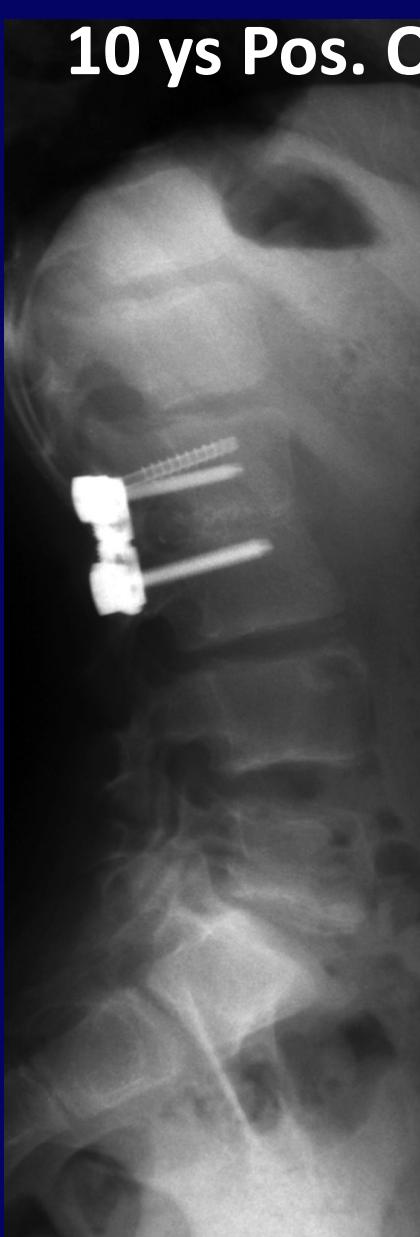




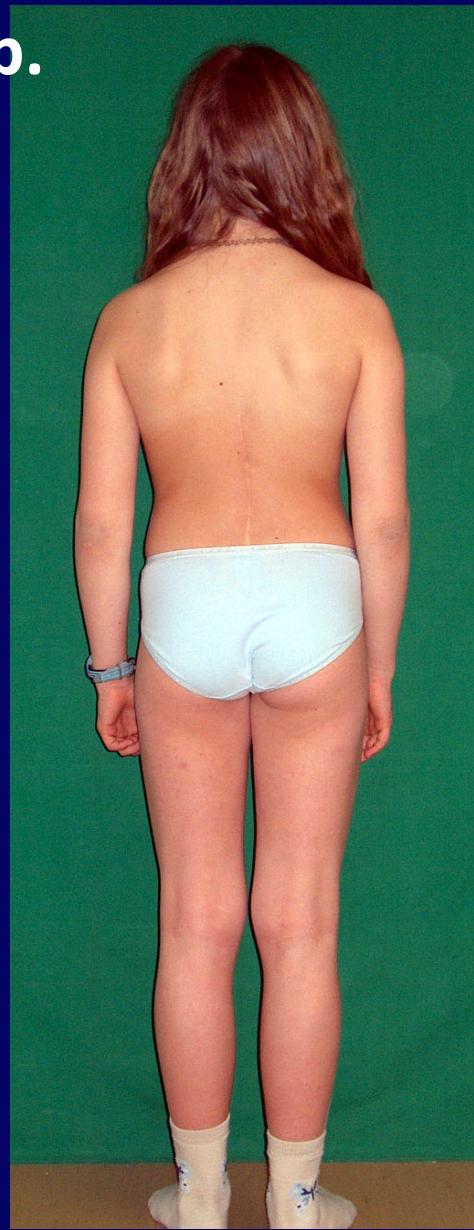
pos Op
12/1994





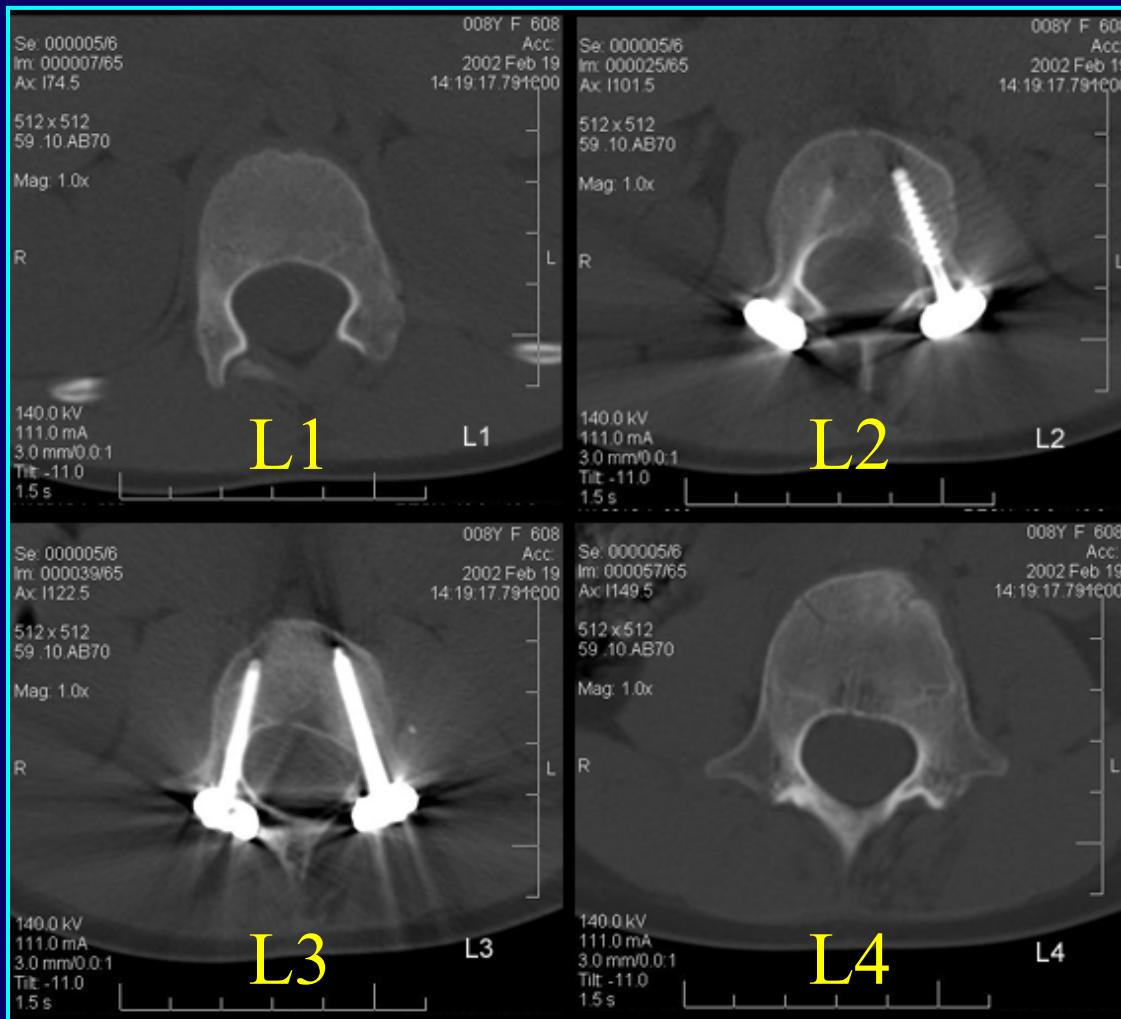


10 ys Pos. Op.



5/04 (11y):

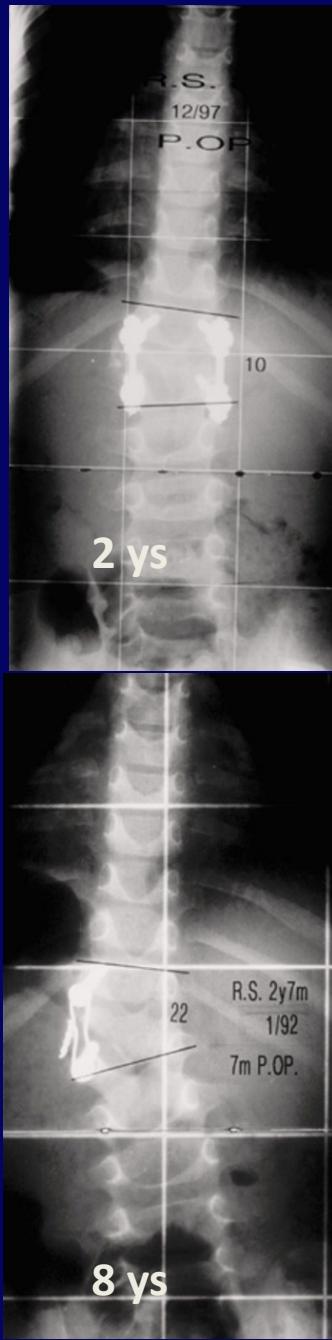
Vertebral growth after transpedicular instrumentation



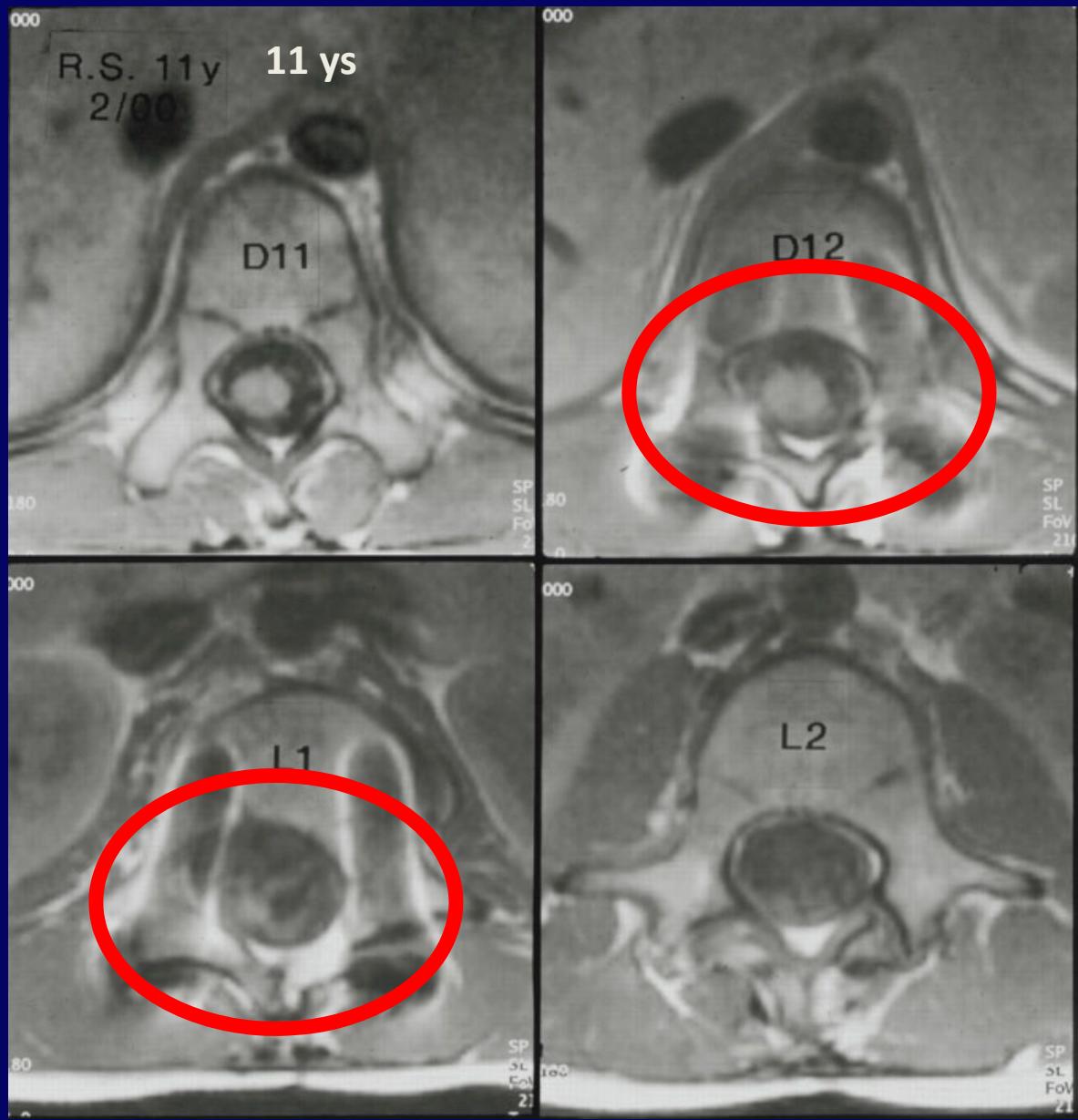
D.J. 8y
transpedicular
instrumentation
at the age of
16 months

Ruf M, Harms J.

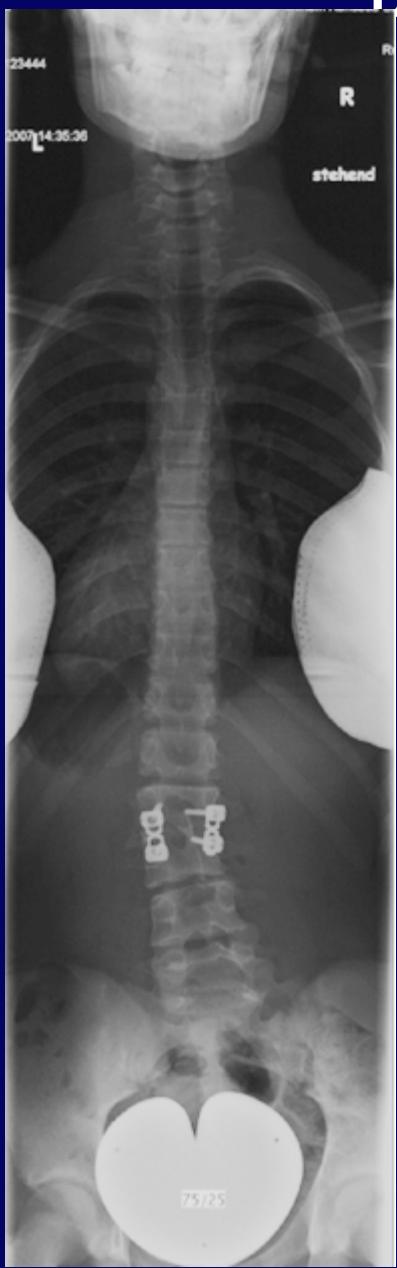
Spine 2002;27:E460-66.



Growth of pedicles



D.J.15y 07.08



14y pos OP.

Hemivertebra Resection

- Results -

28 Patients : **31 nonincarcerated hemivertebrae**
(19 fully segmented and 12 semisegmented)

location

thoracic spine (T1 -T9)	7
thoracolumbar region (T10 -L2)	18
lumbar spine (L3 - L4)	6

13 Patients with complex deformities (HV + Bar formations)

Hemivertebra Resection

- Results -

Fusion segment

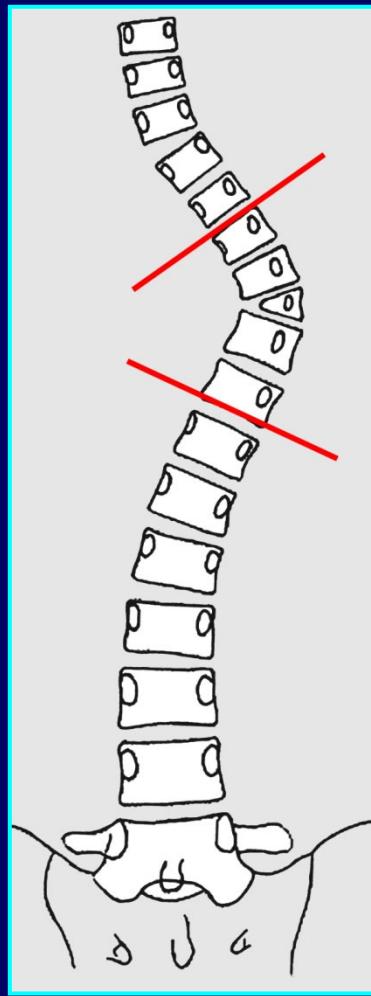
1.5 segments (1-4)

23 cases monosegmental

8 cases 2 to 4 segments fused

Hemivertebra Resection

- Results -



main curve (n=31)

preop : $36,1^\circ$ (16° - 50°)

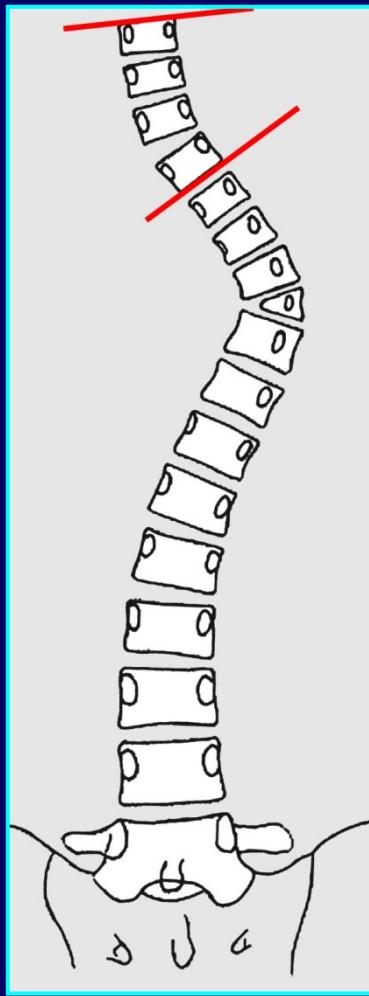
postop : $7,1^\circ$ (-3° - 16°)

follow-up : $6,8^\circ$ (-5° - 36°)

correction : $29,3^\circ$ i.e. 81%

Hemivertebra Resection

- Results -



compensatory cranial curve

preop : $14,6^\circ$ (2° - 37°)

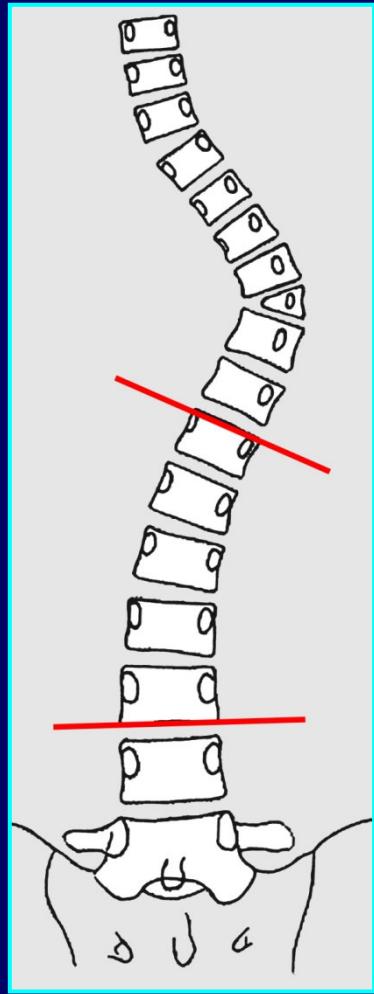
postop : $2,7^\circ$ (-3° - 16°)

follow-up : $2,8^\circ$ (-7° - 15°)

correction : i.e. 81%

Hemivertebra Resection

- Results -



compensatory caudal curve (n=33)

preop : 17.3° (5° - 46°)

postop : 6.7° (-8° - 19°)

follow-up : 2.7° (-14° - 13°)

correction : 84%

Hemivertebra Resection

- Results -

Sagittal plane
(n=28)

preop : 21.7° (2° - 41°)

postop : 8.9° (-4° - 21°)

follow-up : 4,6° (-9° - 21°)

correction : 79%

Hemivertebra Resection

- Results -

Complications

- 3 screw dislocation/ + inclusion 1 segment
- 1 infection
- **no neurological deficit**
- **no spinal stenosis**

Hemivertebra Resection

- Results -

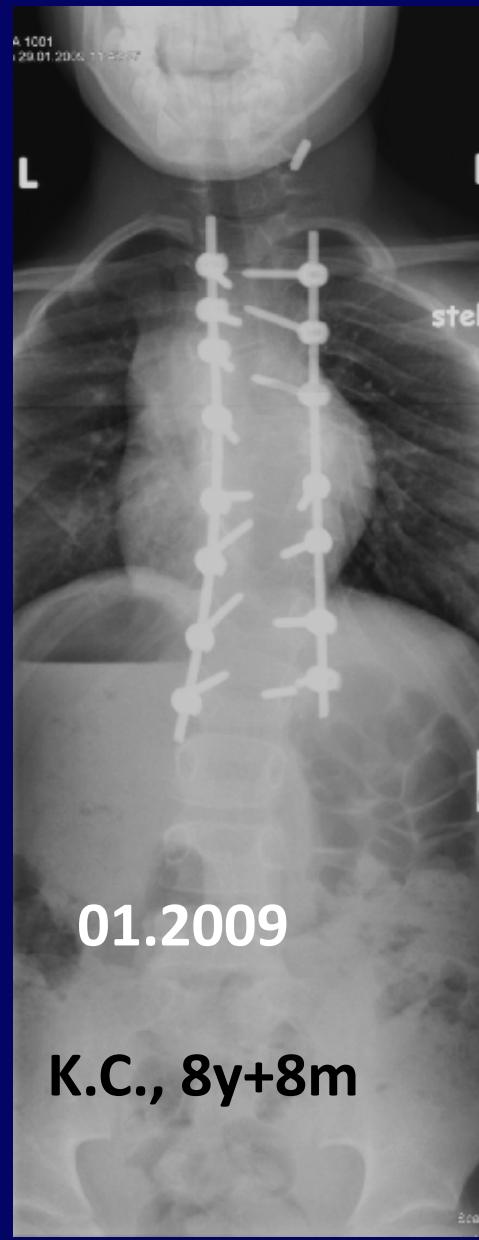
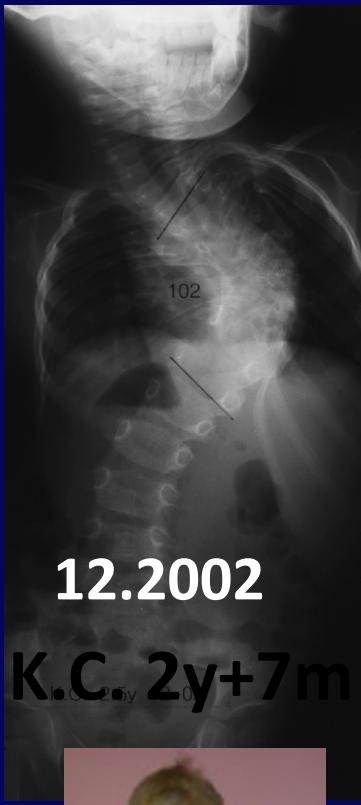
**Group 2 – Complex deformities
with hemivertebra and bar formations**

13 Patients

location

thoracic spine (T1 –T10)	10
thoracolumbar region (T11 –L1)	2
lumbar spine (L3 - L4)	1





p. 3 Ops. 6 ys



p. 3 Ops. 6ys

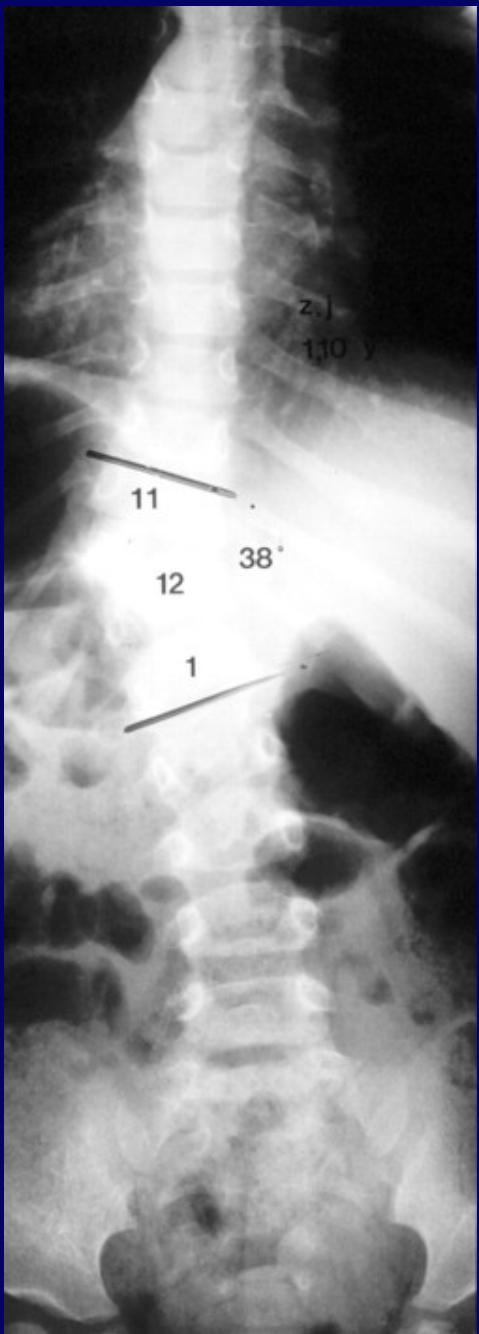


K.C., 8y+8m,
01.2009

Hemivertebra resection and Osteotomies with pedicle instrumentation

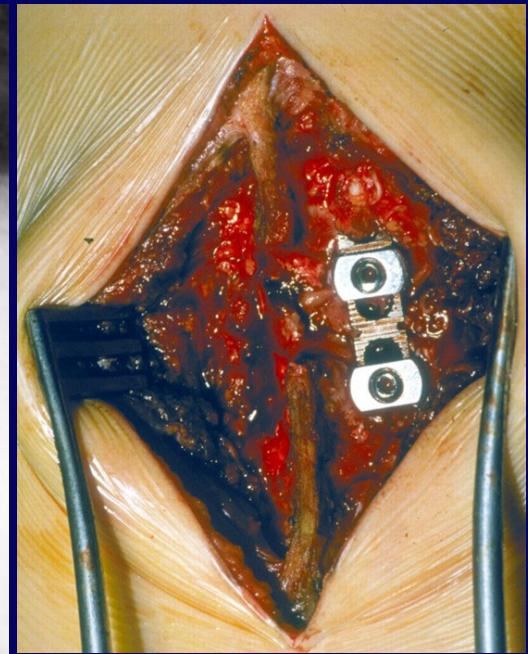
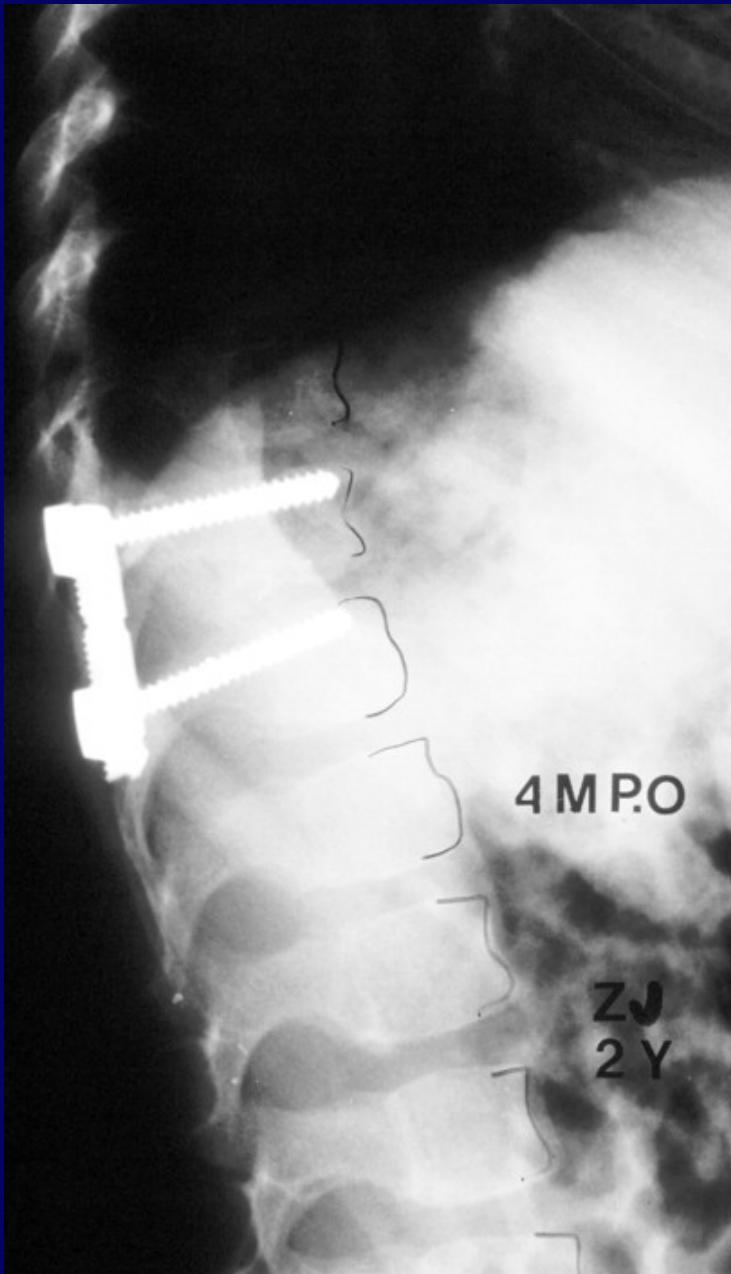
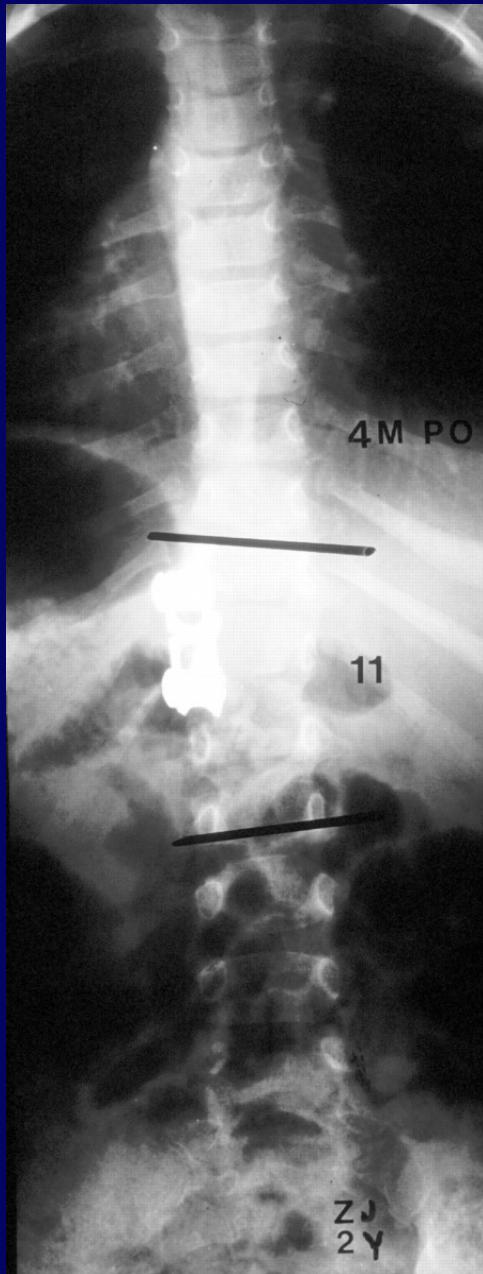
Conclusion

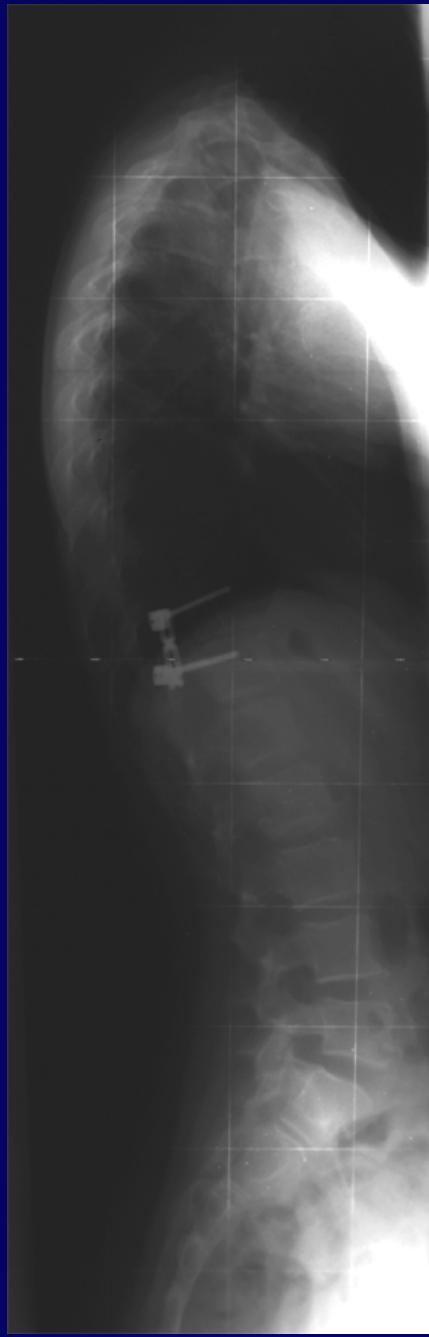
- Should be performed early in very young children
- Provides complete correction with short fusion
- Provides excellent outcomes
- Secondary curves will correct spontaneously
- Allows for normal growth of the unaffected parts of the spine



Z.J. 1 y, HV T11
fully segmented







12 ys postop

13 y. old



Dankeschön

Thank you

Merci

Obrigado

Muchas Gracias

