Anterior instrumentation and correction of congenital spinal deformities under age of four without hemivertebrectomy. *A new alternative*

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Hemivertebra is the most frequent cause of congenital scoliosis.

Early surgery is the treatment for progressive cases.

The type and time of surgery depends on various factors:

Site, Type, Severity, Progression . McMaster et al JBJS 1982

A recent interest in posterior instrumentation with hemivertebra excision in the very young age (under 5 years) led to encouraging results:

-Anterior and posterior. Lazar and Hall Cl Orth and Rel Res 1999

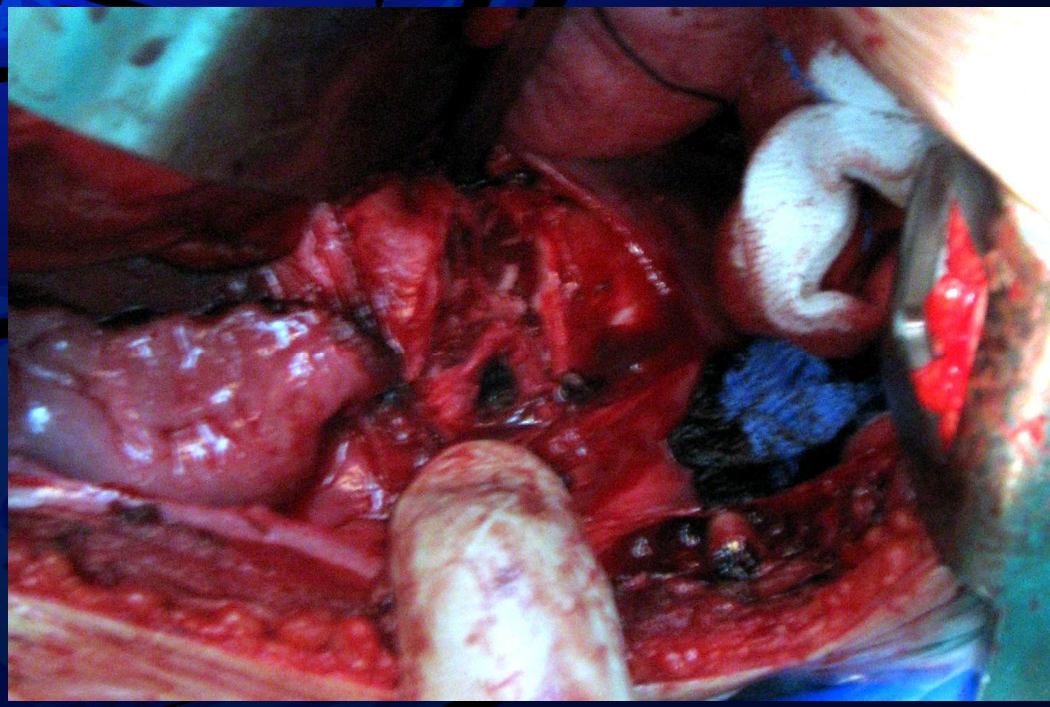
-Posterior only Ruf and Harms Spine 2003

The new alternative:

Anterior approach

-Partial anterior corpectomy of the hemivertebra leaving the posterior cortex, pedicle and without exposing the dura

-Anterior instrumentation

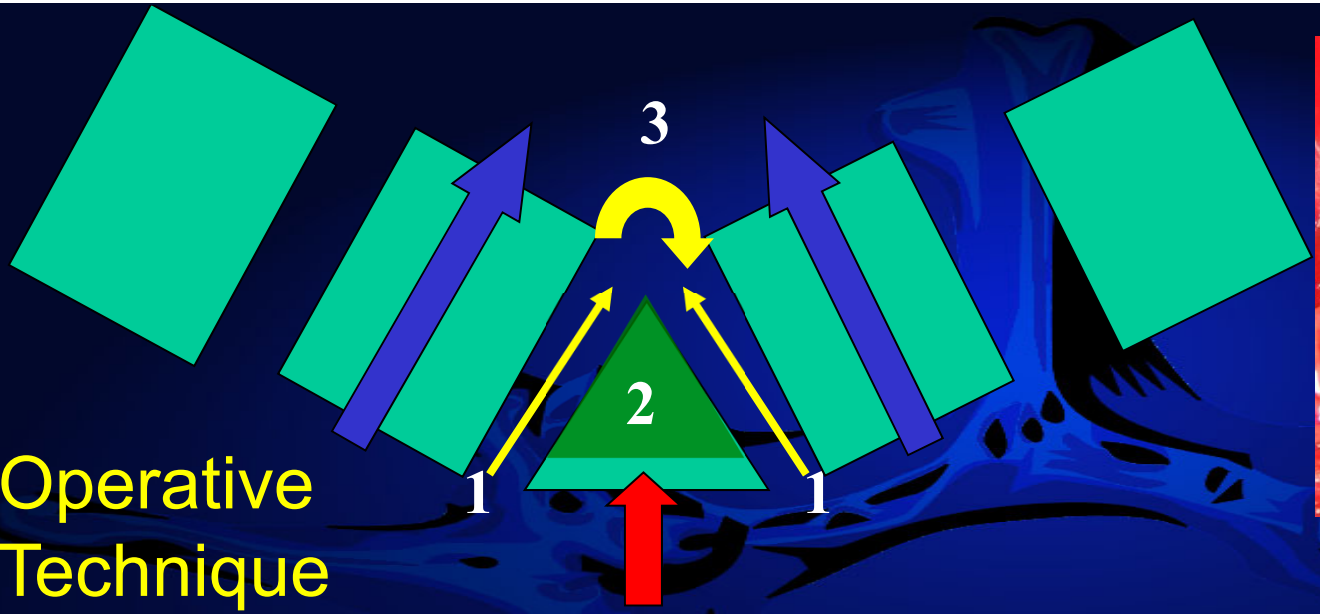


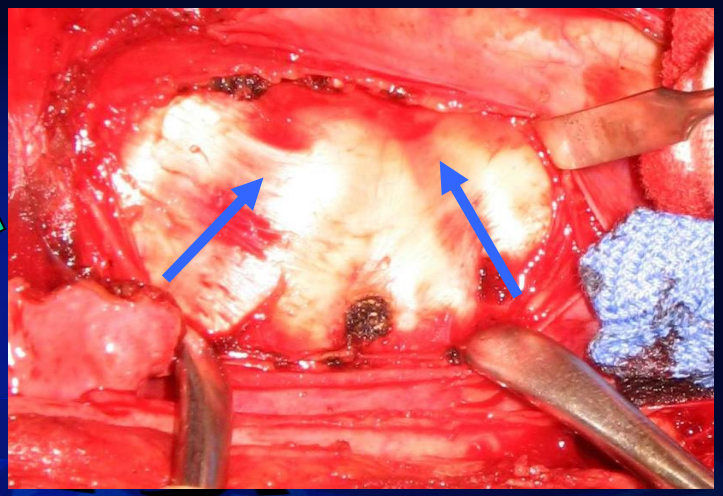
-Posterior approach

insitu fusion is done to achieve

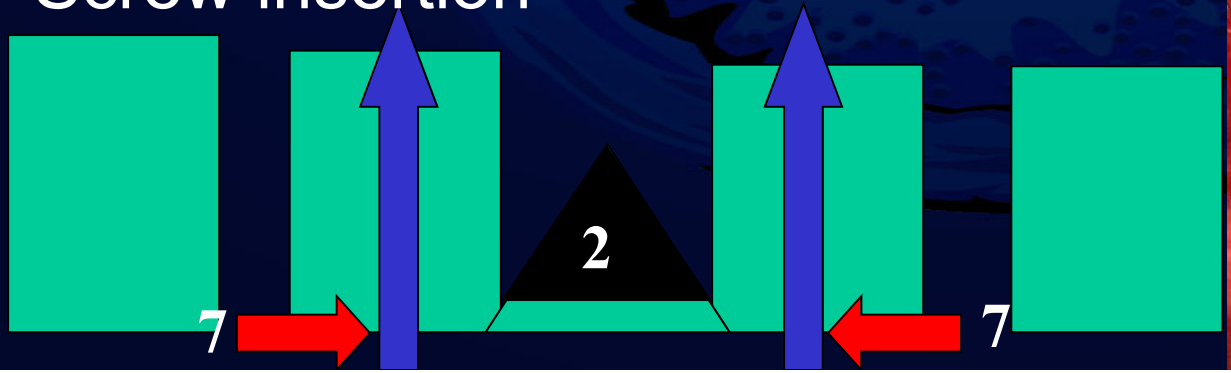
for circumferential fusion

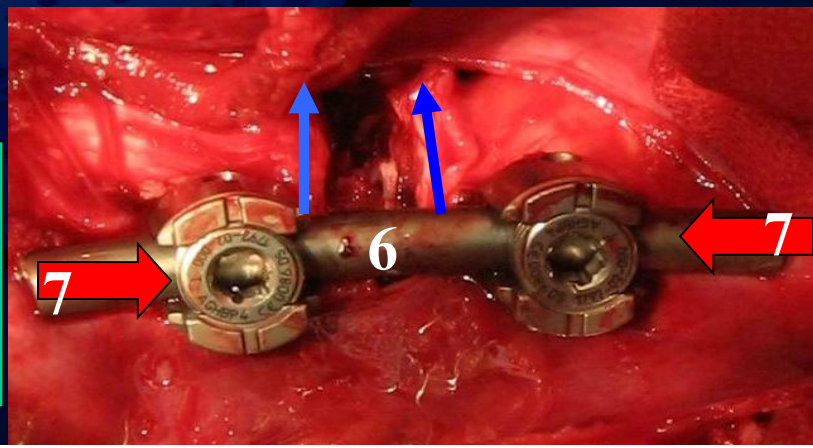
Operative Technique





1. Discectomies
2. Partial corpectomy
3. Aggressive release of concave tether
4. Screw insertion
5. Anterior manual push
6. Rod contouring, insertion rotation
7. Screws compression





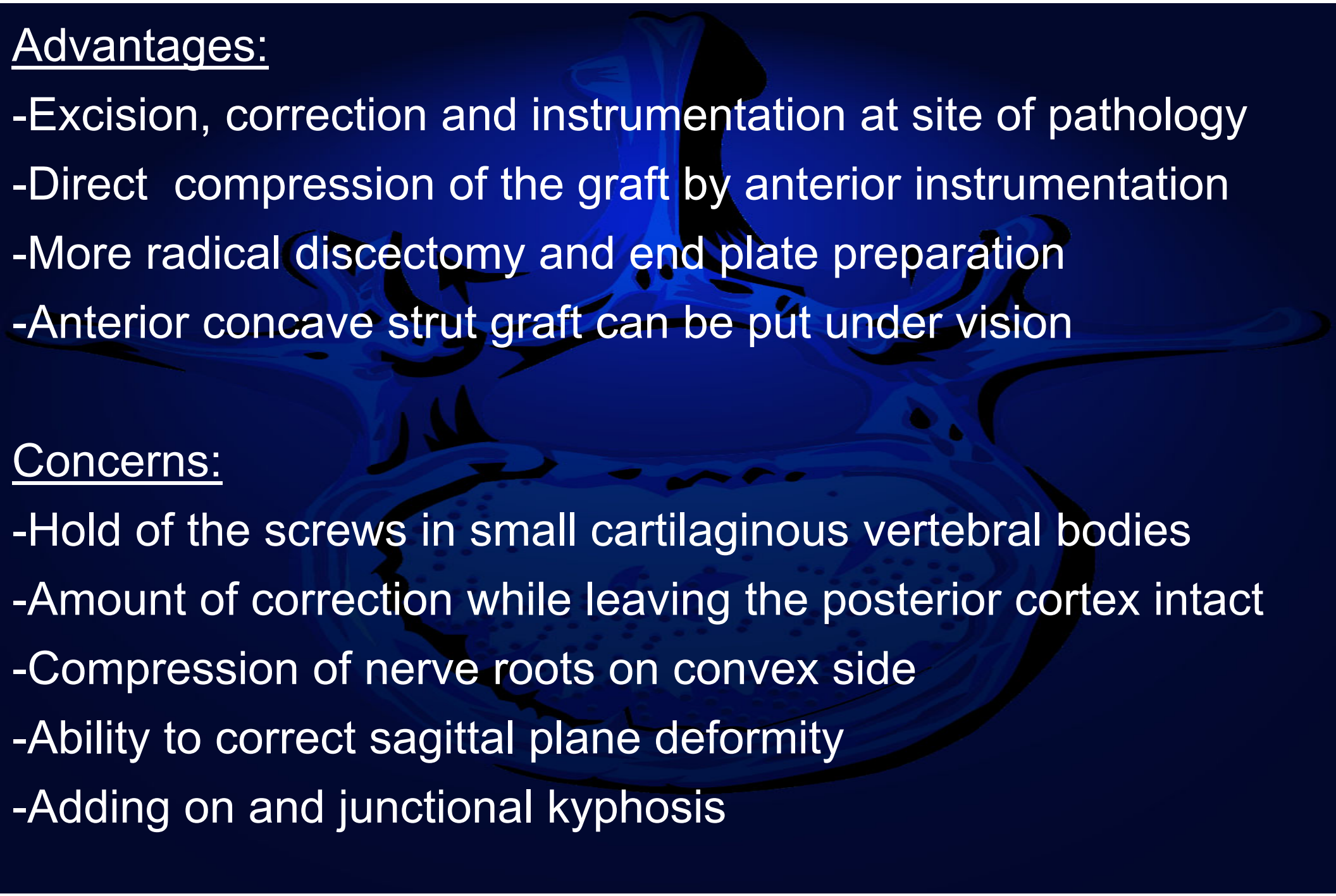
Rationale:

*Avoids epidural bleeding (*opening the spinal canal)*

*Decrease incidence neurological complications (*exposing dura, posterior instrumentation)*

*Avoids problems related to pedicle screws in very young:

- technically demanding
- time consuming
- some implant failures
- prominence of posterior constructs
- effect on spinal canal !!



Advantages:

-Excision, correction and instrumentation at site of pathology

-Direct compression of the graft by anterior instrumentation

-More radical discectomy and end plate preparation

-Anterior concave strut graft can be put under vision

Concerns:

-Hold of the screws in small cartilaginous vertebral bodies

-Amount of correction while leaving the posterior cortex intact

-Compression of nerve roots on convex side

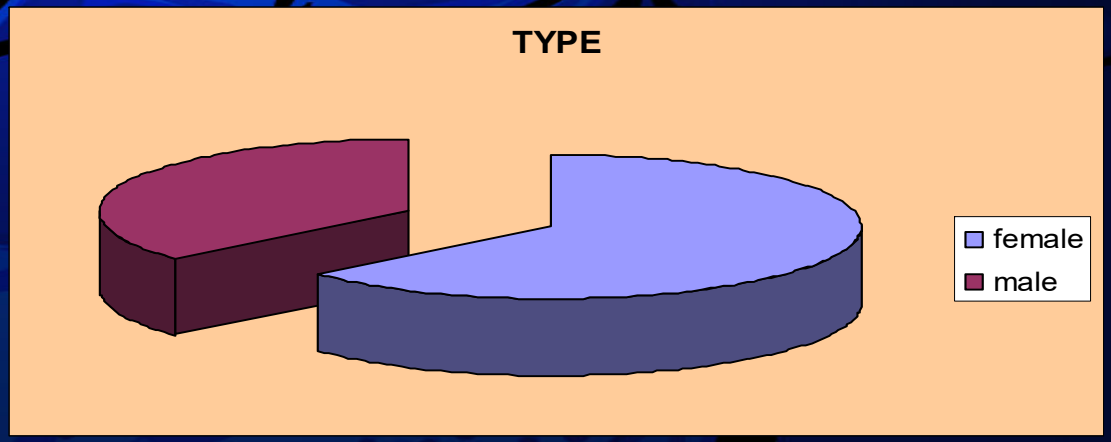
-Ability to correct sagittal plane deformity

-Adding on and junctional kyphosis

Methods

Between 2002 and 2005
Abulreish Pediatric Hospital Cairo Egypt

11 patients single level hemivertebra
4 male 7 female



Average age at surgery 31 months
(21 month to 46 months)

Mean follow up 36 months (24 - 53)

Methods

Preoperative Xray and MRI

Same sitting anterior then posterior surgery
(Anterior partial corpectomy, instrumented correction and fusion with posterior uninstrumented fusion)

Downsize monoaxial top loading screws

Average op duration 120 mins

Average blood loss 150 mls

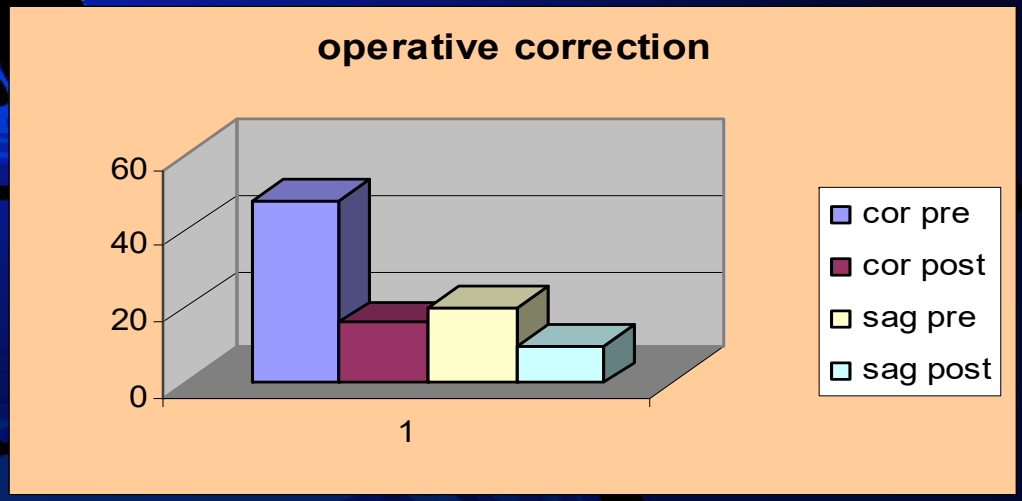
Brace for 3-6 month

Xray postoperatively, 3 , 6 , 12 , 24 months

Results

Average coronal Cobb angle preoperatively 48
Average angle post op 16
Percentage of correction 66%

Average sagittal angle preop 20
Average angle post op 10
Percentage of correction 50%



Complications

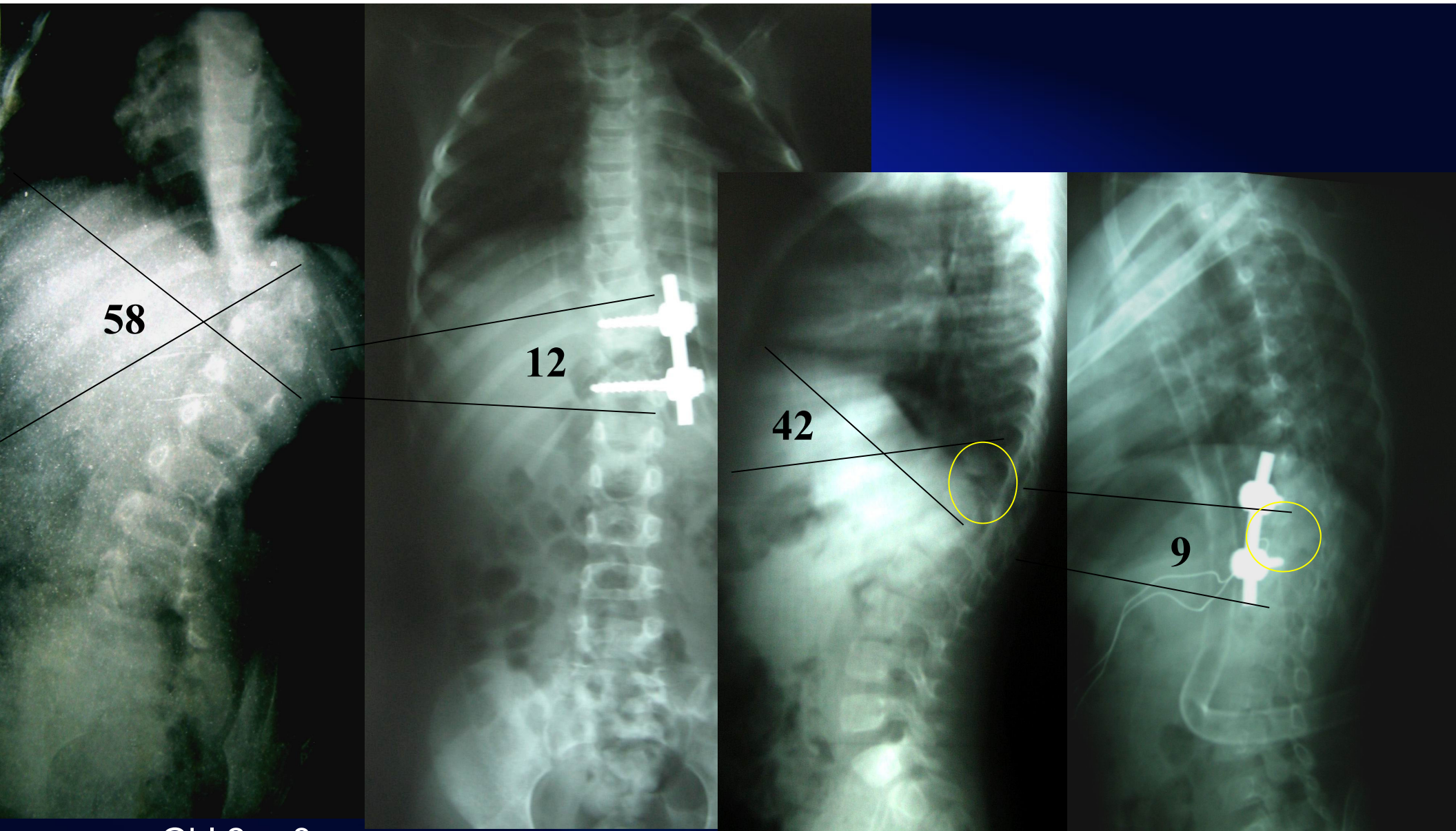
1 adding on 1 junctional kyphus
No neurological complications
No implant related complications

Discussion

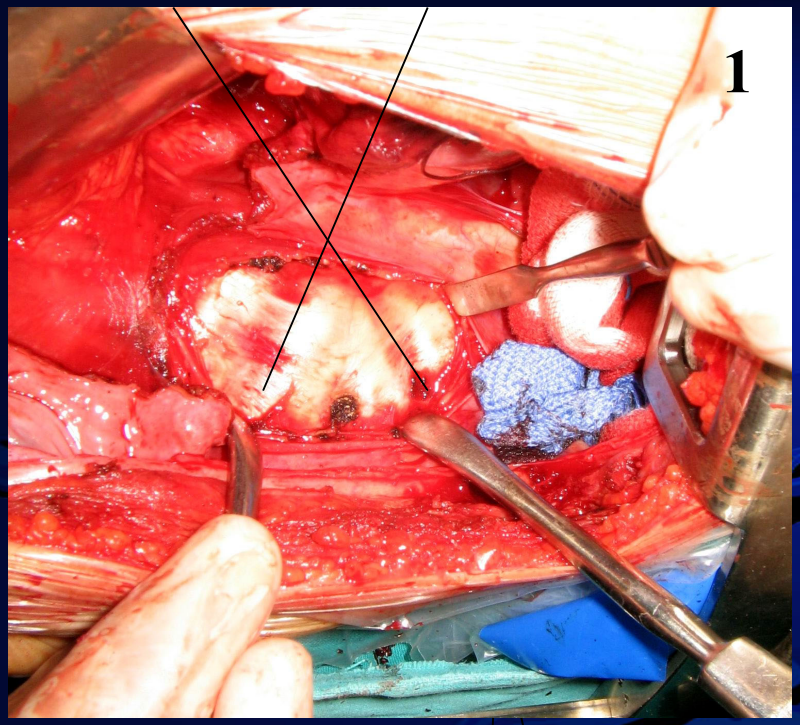
R.D.Lazar, and J.E.Hall , cl.orth.& rel.res. 1999
M.Ruf and J. Harms, Spine 2003

	Ant/Post Hemi exc &post inst (1999)	Post Hemi exc &post inst (2003)	Present Study (2007)
No. of Patients	11	25	11
Avg age	18ms	40ms	31ms
Blood loss		469	150
Op time		225	120

	Hemi exc &post inst (1999)	Post Hemi exc &post inst (2003)	Present Study (2007)
%Scoliosis Correction	77	72	66
%kyphosis correction	40	63	50
No of deep infection	none	1	none
No of implant failure	none	3	none
No.of neur compl	1	none	none



Girl 2ys 8ms
Cong hemi D11
Kyphoscoliosis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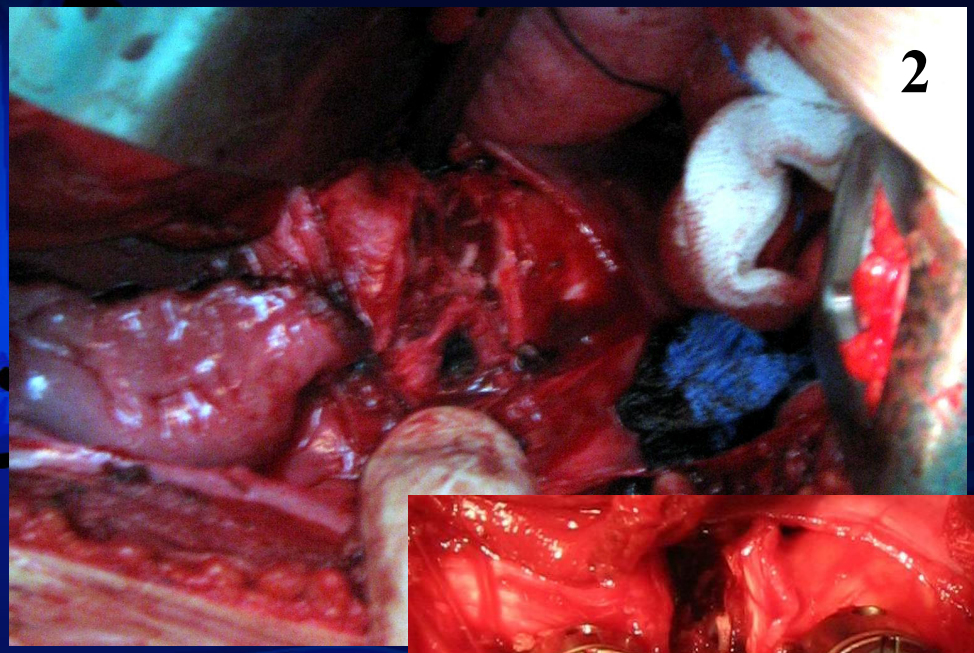
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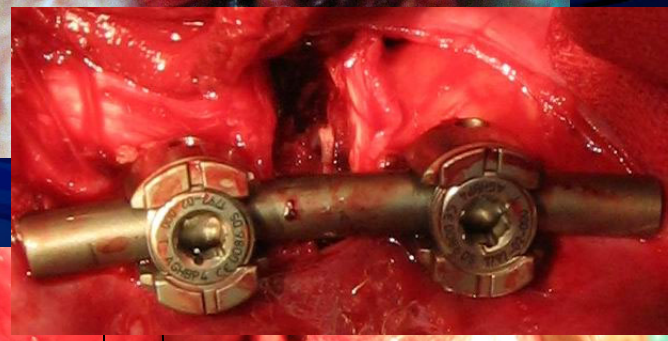

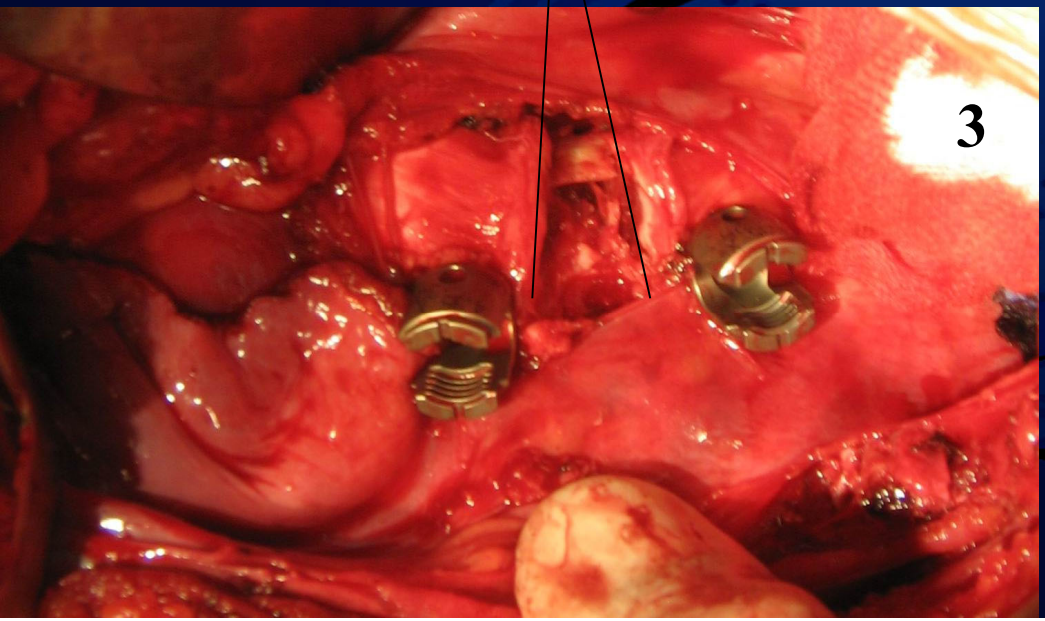
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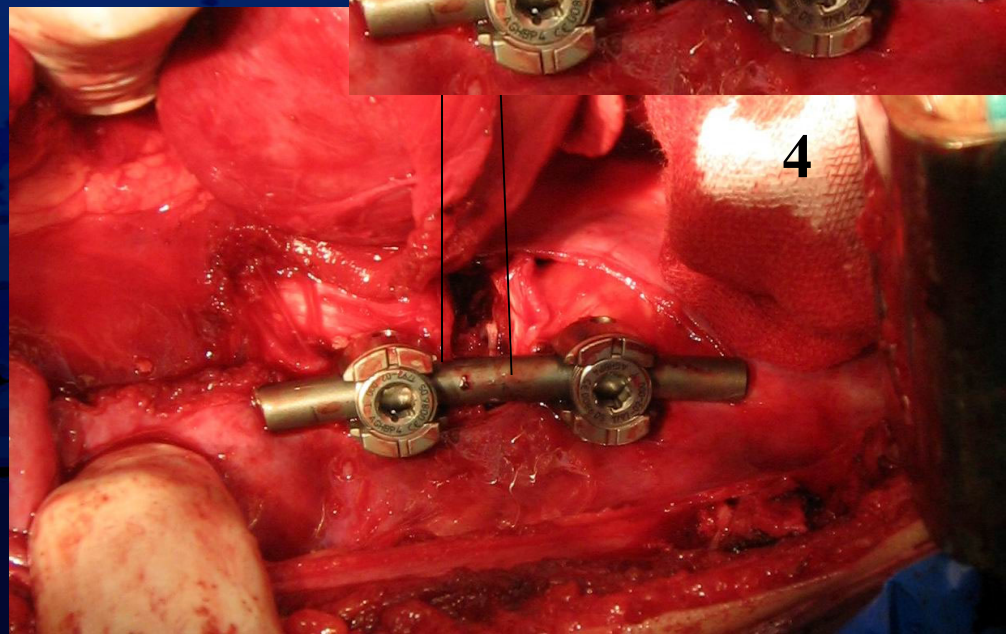
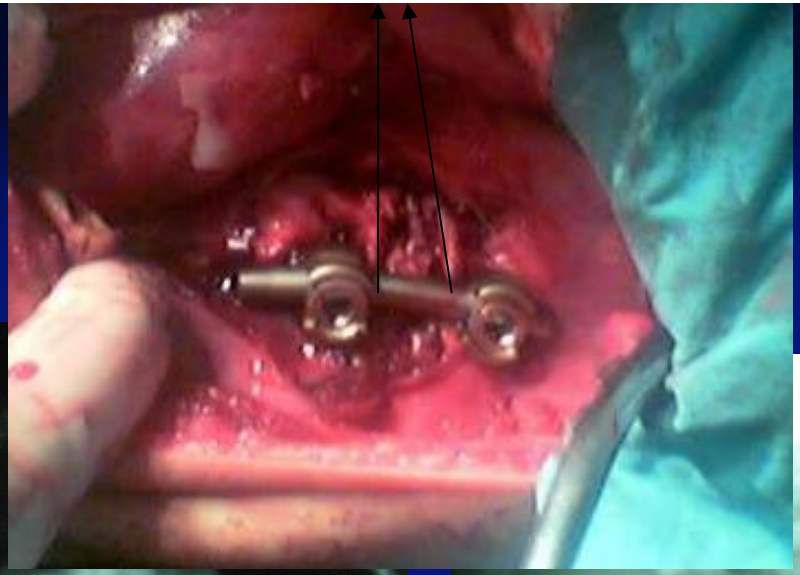
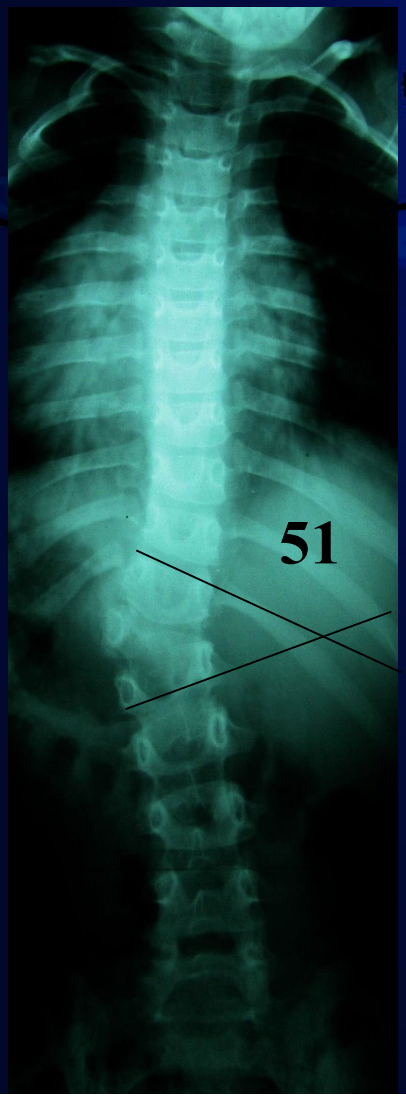
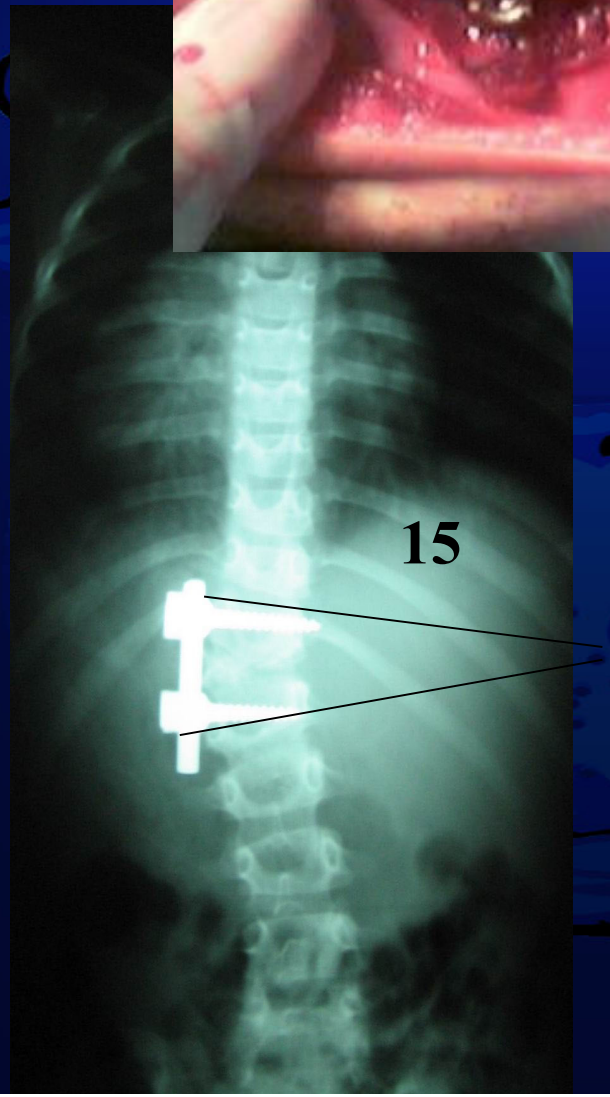
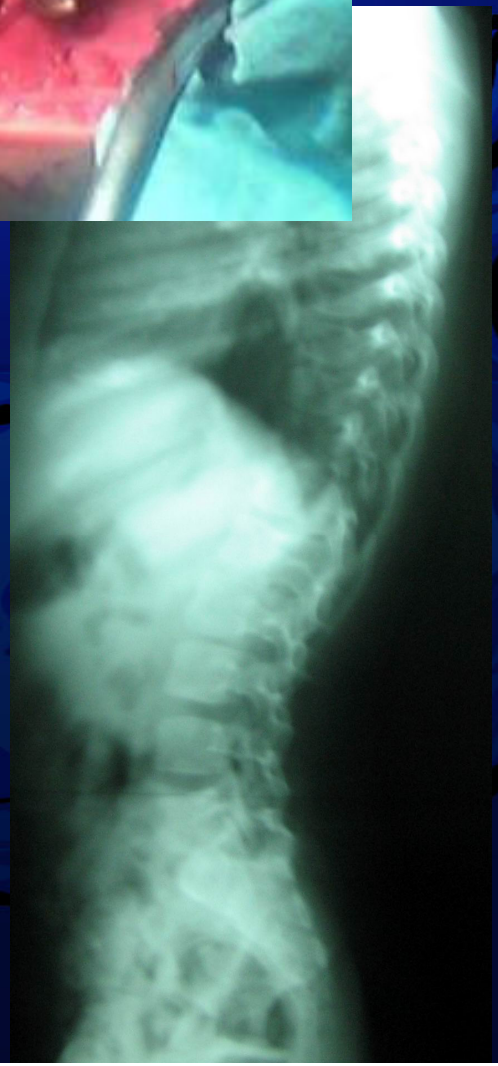

4

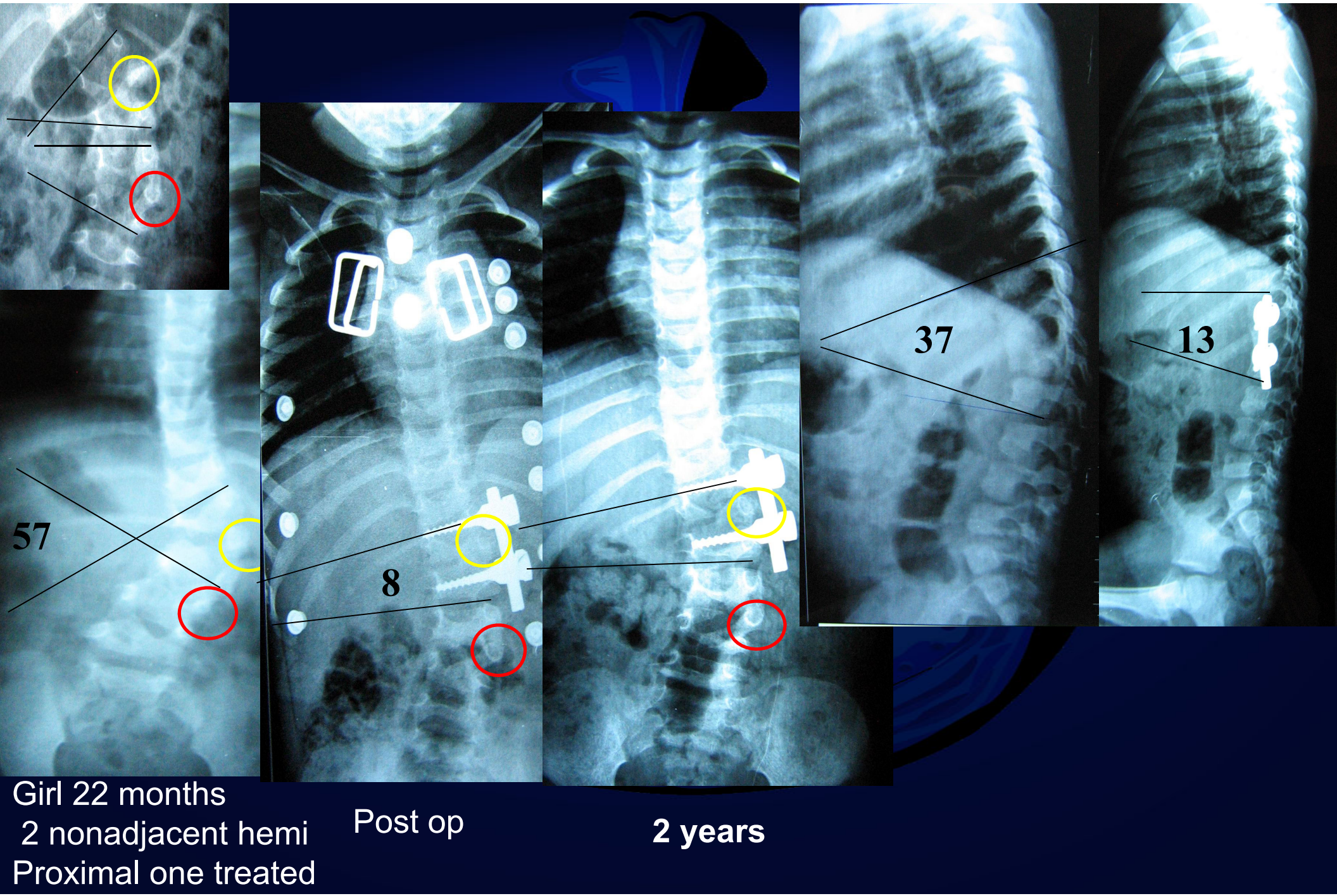
Girl 3y 2m
Hemi L1

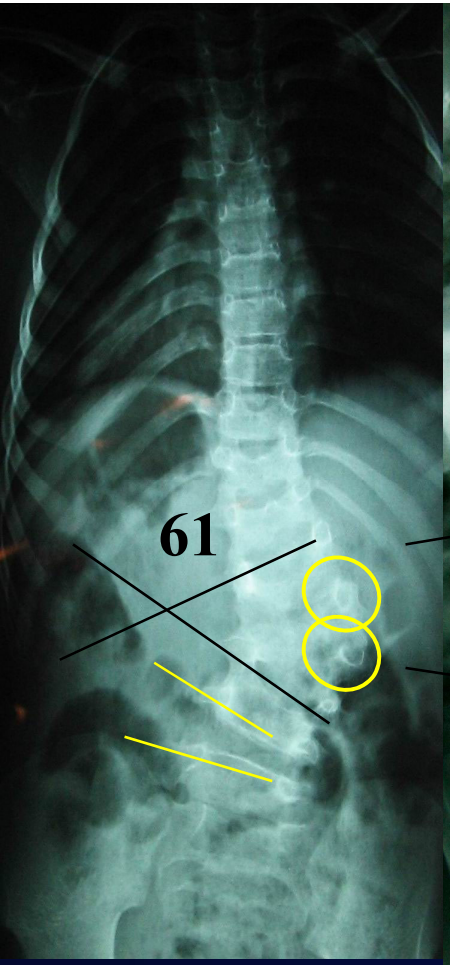


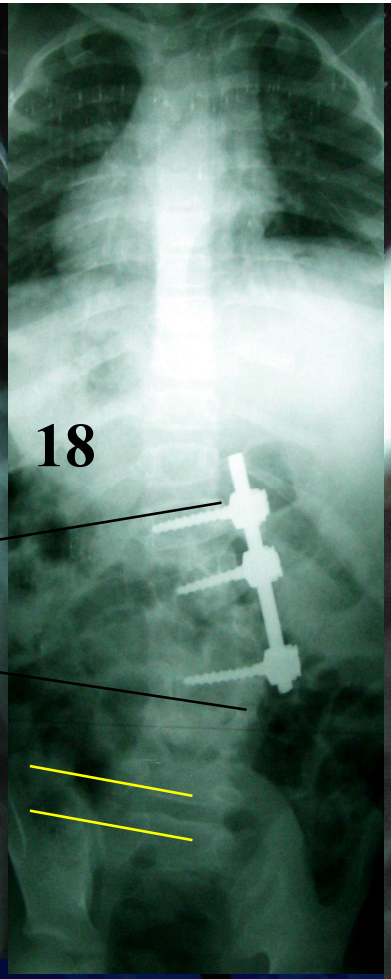


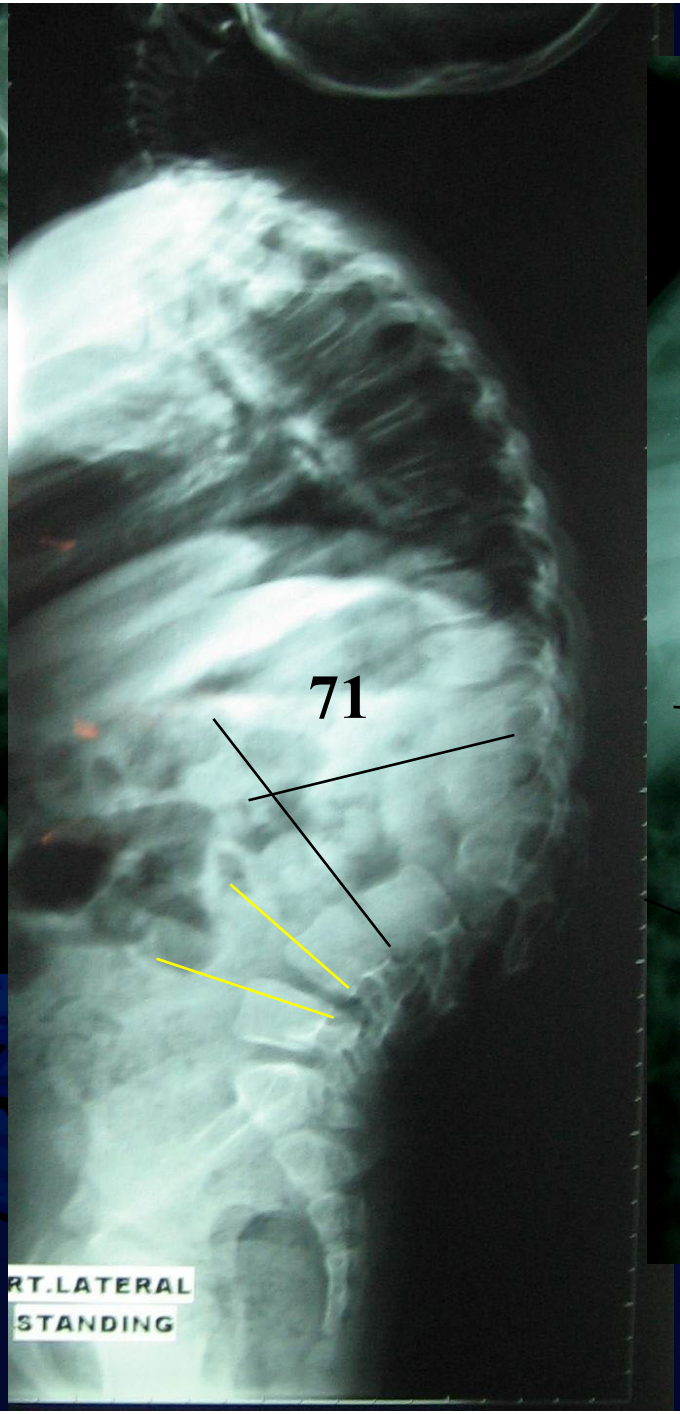


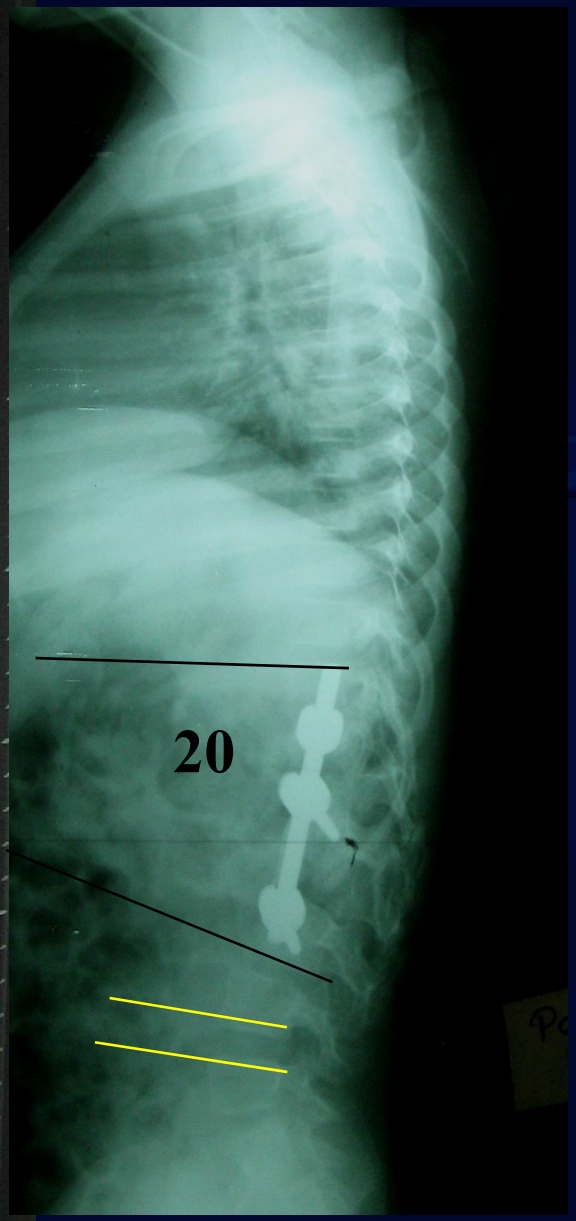



57
8
37
13
Girl 22 months
2 nonadjacent hemi
Proximal one treated
Post op
2 years









Girl 3y 6m
Double adjacent hemivertebra
L2 L3

Conclusion

This technique is a safe and effective alternative for surgical treatment of hemivertebra.

It avoids the risks and disadvantages of complete excision and pedicle screws instrumentation with comparable efficacy.

Yet we need to wait for a longer follow up and CT scan would be helpful to assess the effect on spinal canal.