Hyperkyphosis surgical treatment

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Therapeutic methods

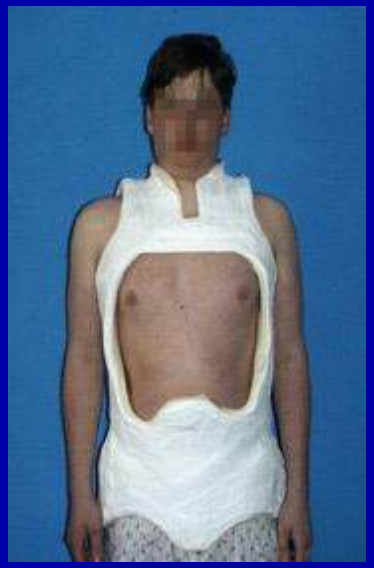
- Conservative
  - physiotherapy
  - individual orthosis
  - plaster brace with reclination
- Surgical
  - Posterior approach correction
  - Combined surgical approach correction

Individual orthosis (modif. Milwaukee)

Plaster brace in reclination

Plaster brace

Indiv. orthosis



after 3 m.

Indication for surgery

-curves over 75 degrees

-pain symptoms

Surgical aim

-decrease of slouching

-long-term keeping in correction

-prevention or decreasing of back pain

Surgical treatment

Combined surgical approach

1. anterior approach
   - -anterior diskectomy and release
   - -intersomatic fusion with bone grafts
2. posterior approach
   - -posterior correction with instrumentation
   - -posterolateral fusion

Posterior surgical approach

- -osteotomy
- -posterior correction with instrumentation
- -posterolateral fusion

Types of osteotomies

SPO - Smith-Petersen osteotomy

PO - Ponté osteotomy

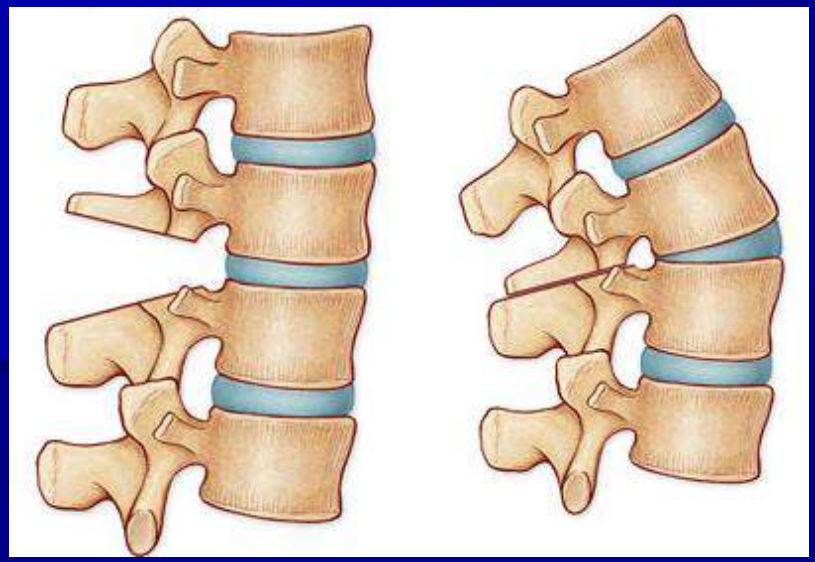
PSO - Pedicle subtraction osteotomy

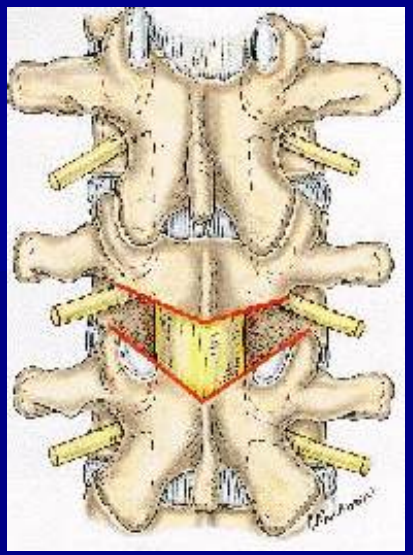
VCR - vertebral column resection

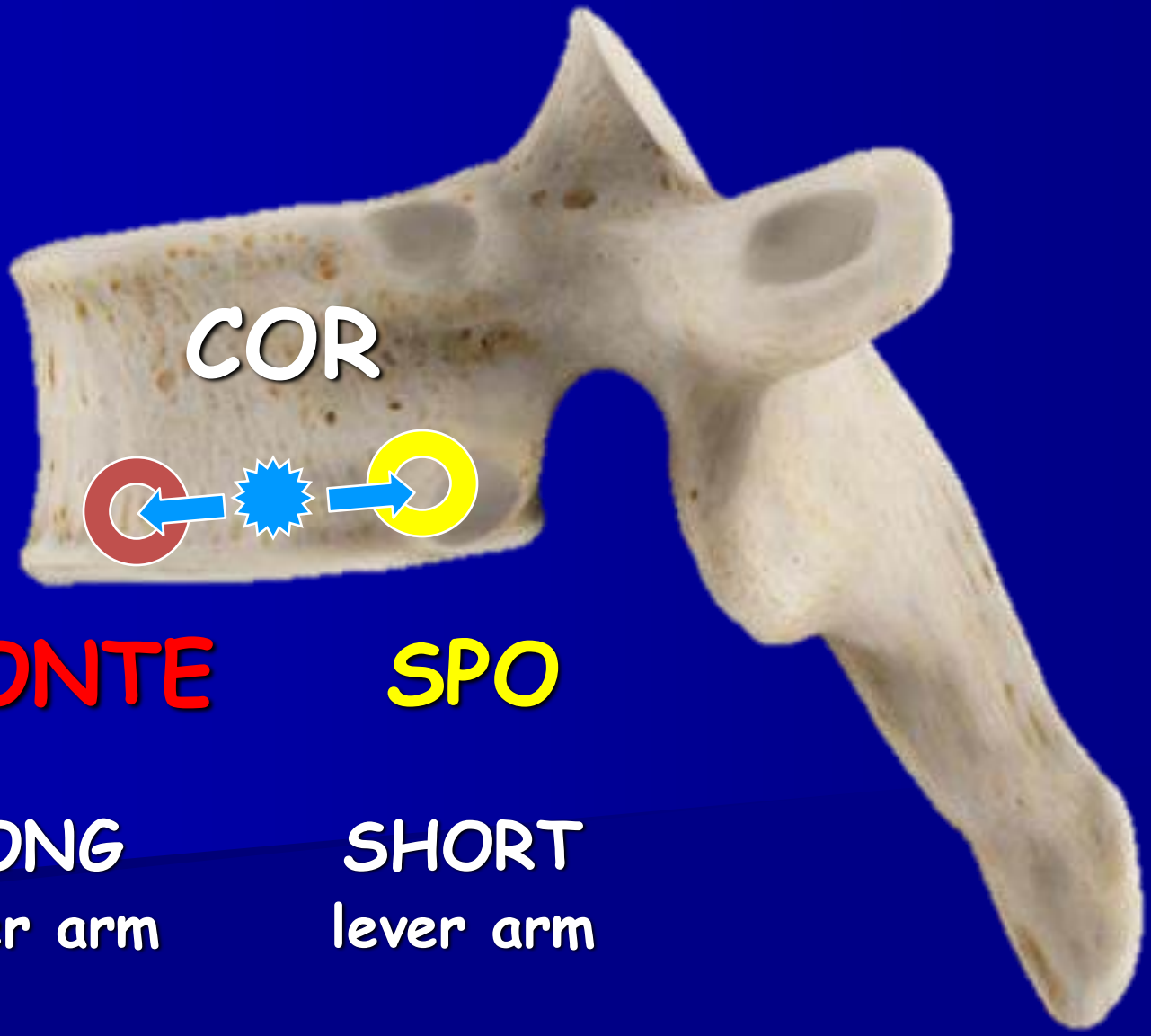
Types of osteotomies

SPO - Smith-Petersen osteotomy

PO - Ponté osteotomy







PONTE

SPO

LONG
lever arm

SHORT
lever arm

SPO
Smith-Petersen Osteotomy

Smith-Petersen 1945

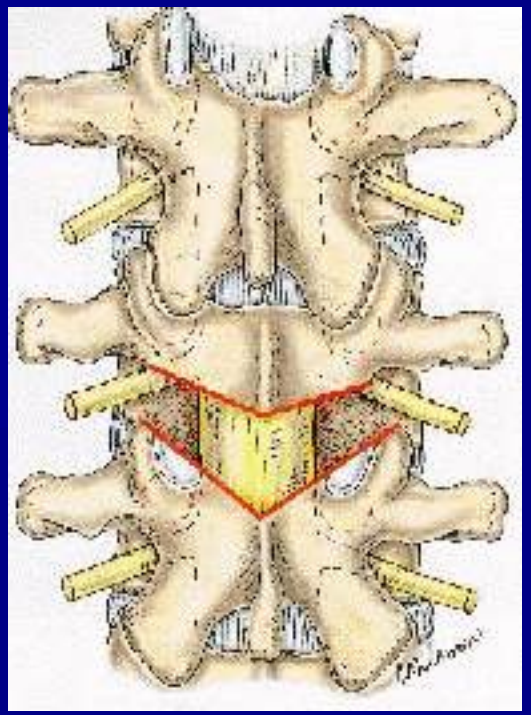
Removing of:
1.posterior ligaments
(lig.interspinosus+lig.flavum)
2.facets (parc.or complete)

-posterior release for sagittal plane realignment
-using in thoracic spine and TL junction
-discs have to be mobile

SPO
Smith-Petersen Osteotomy

Indication:

- Intervertebral disc has to be mobile
- C7 plumb line = 6-8 cm positive

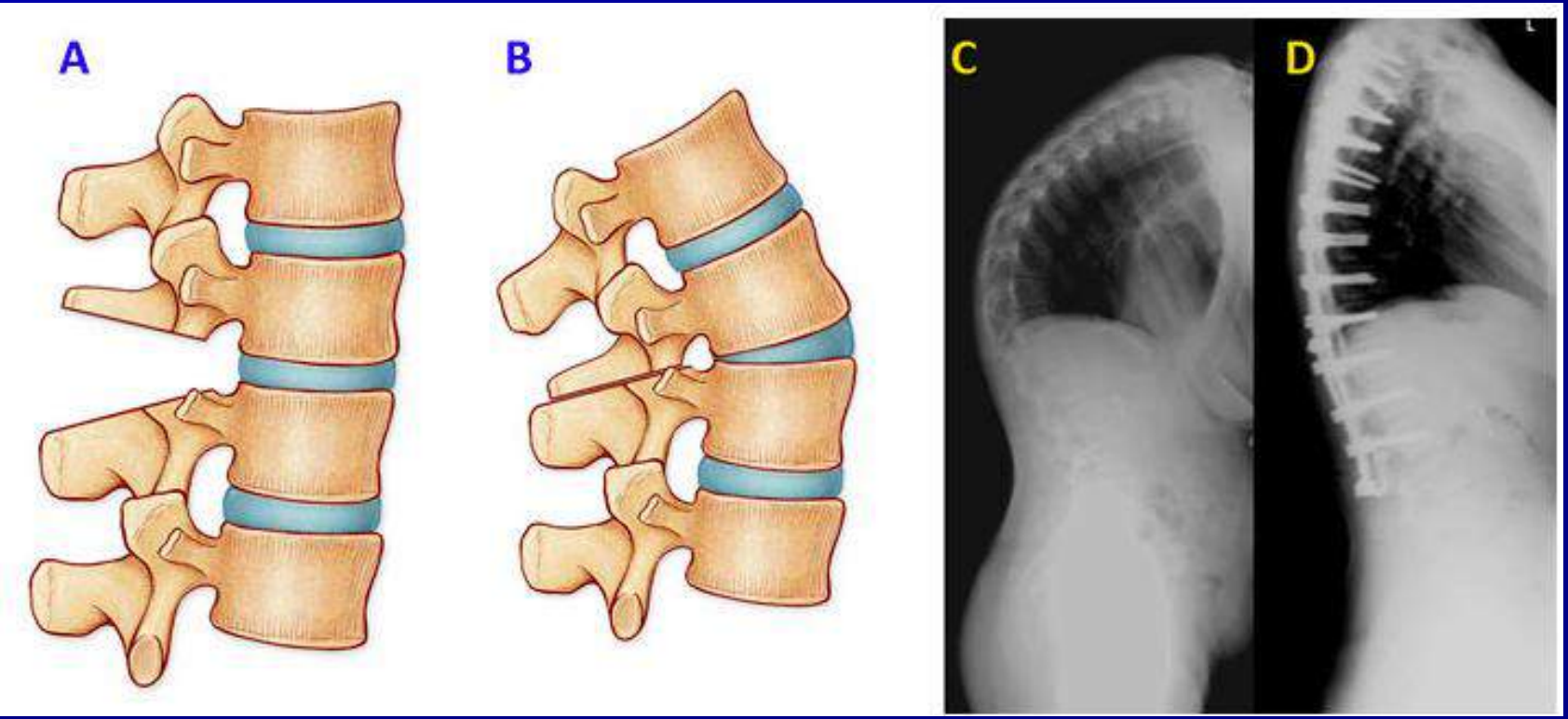


Amount of correction:

9,3-10,7° per level

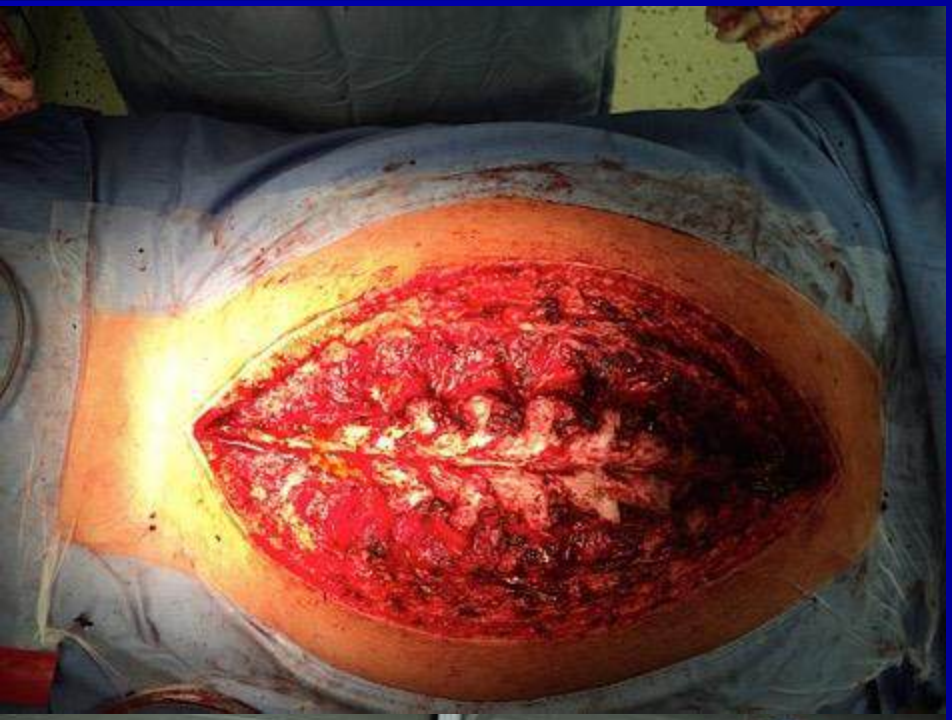
1 degree = 1 mm of bone resected

SPO
Smith-Petersen Osteotomy

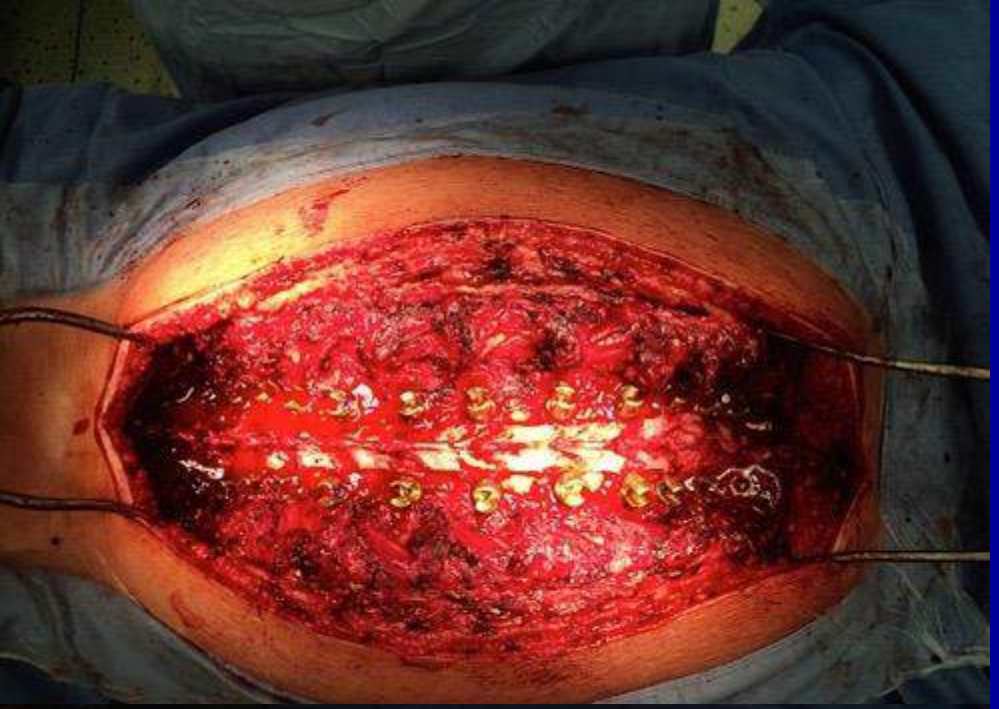


source: www.srs.org

Posterior approach only correction



skeletization

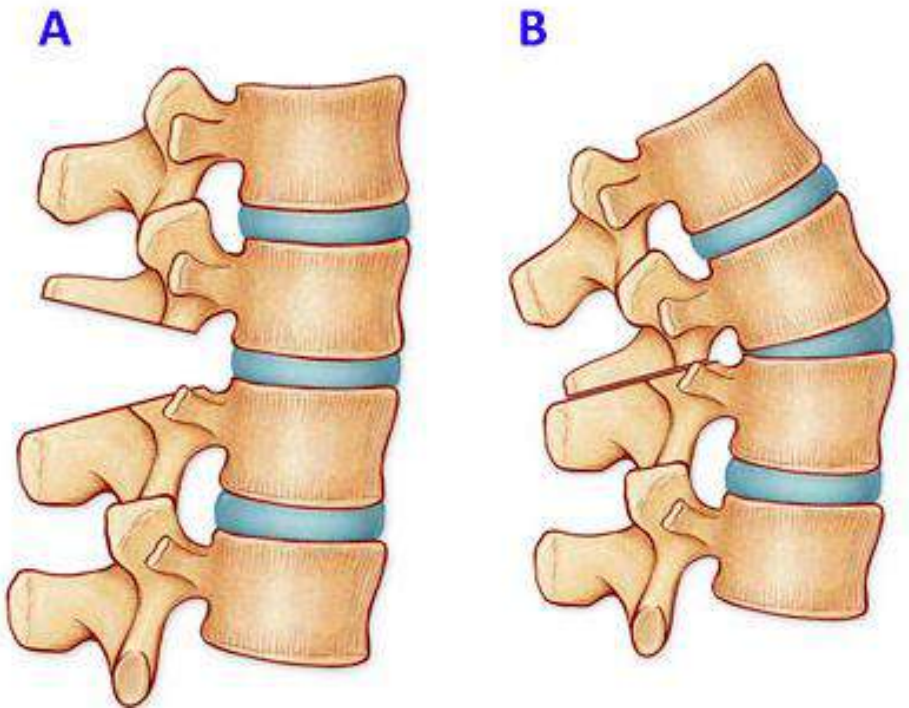


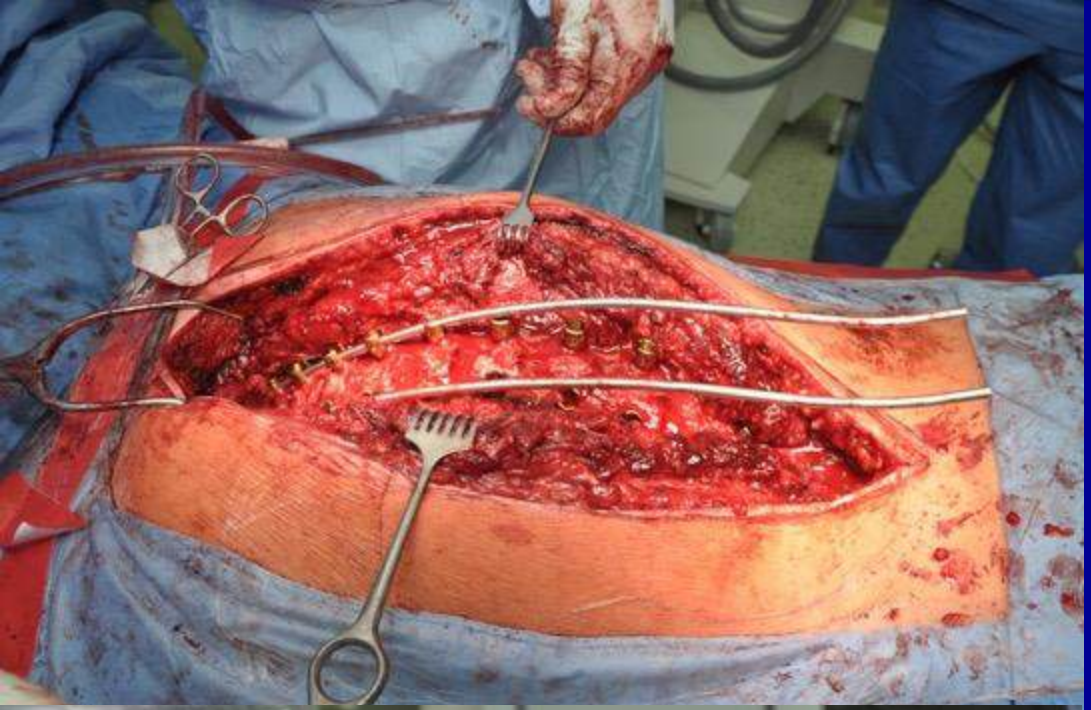
Screw insertion

Osteotomy

SPO

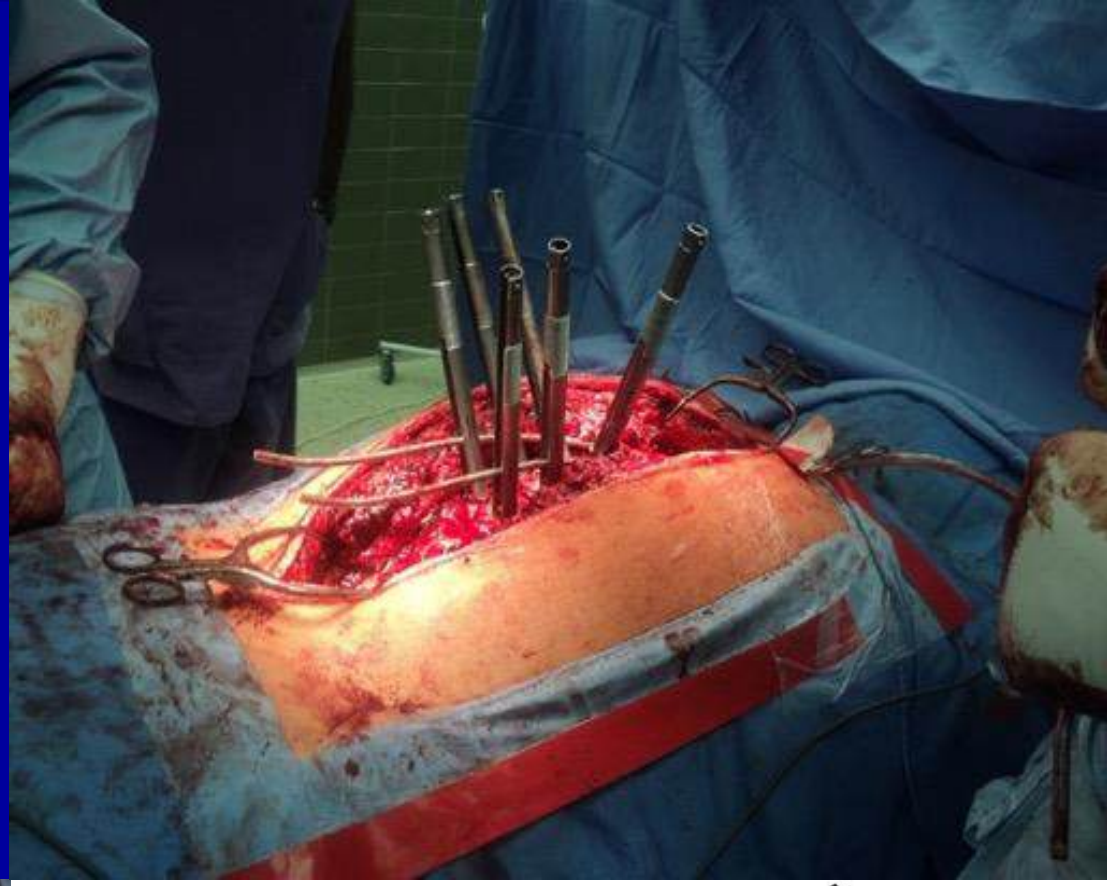
Smith-Petersen osteotomies

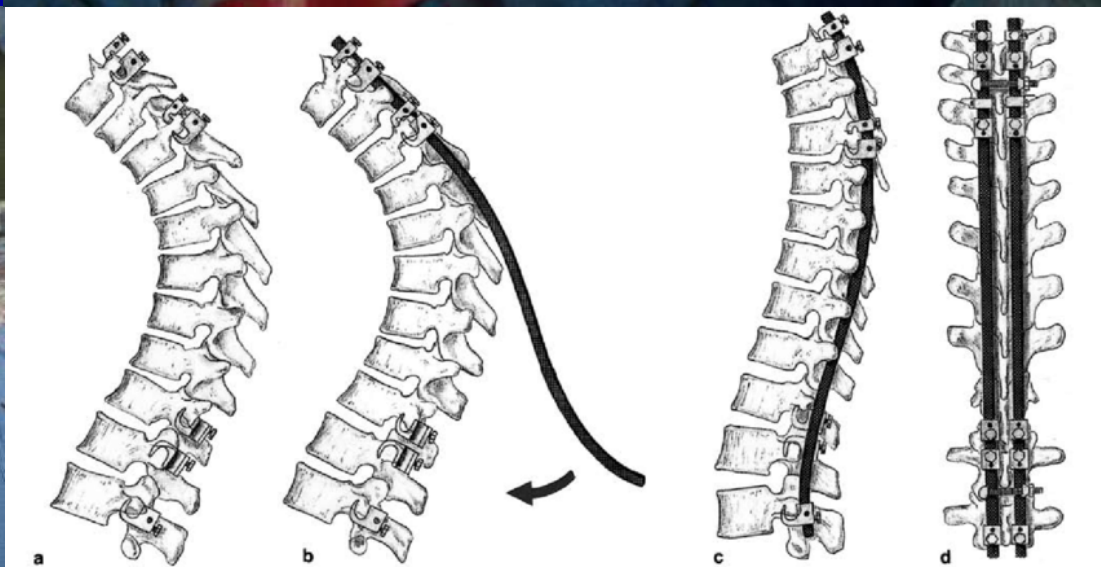


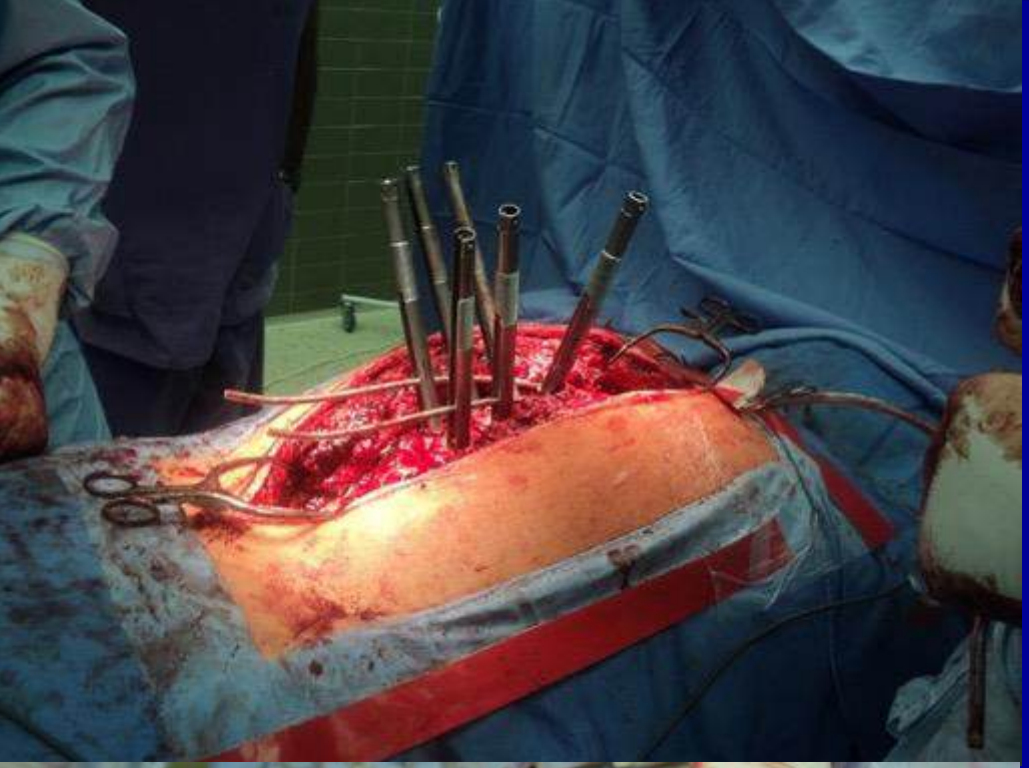


Rod implantation

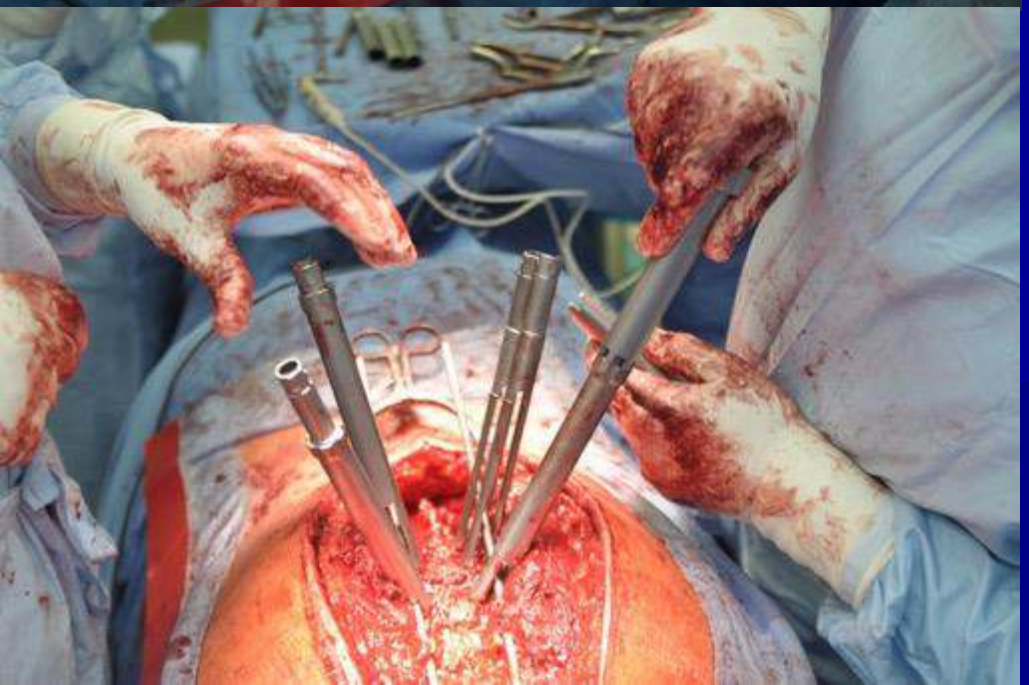
Cantilever maneuver



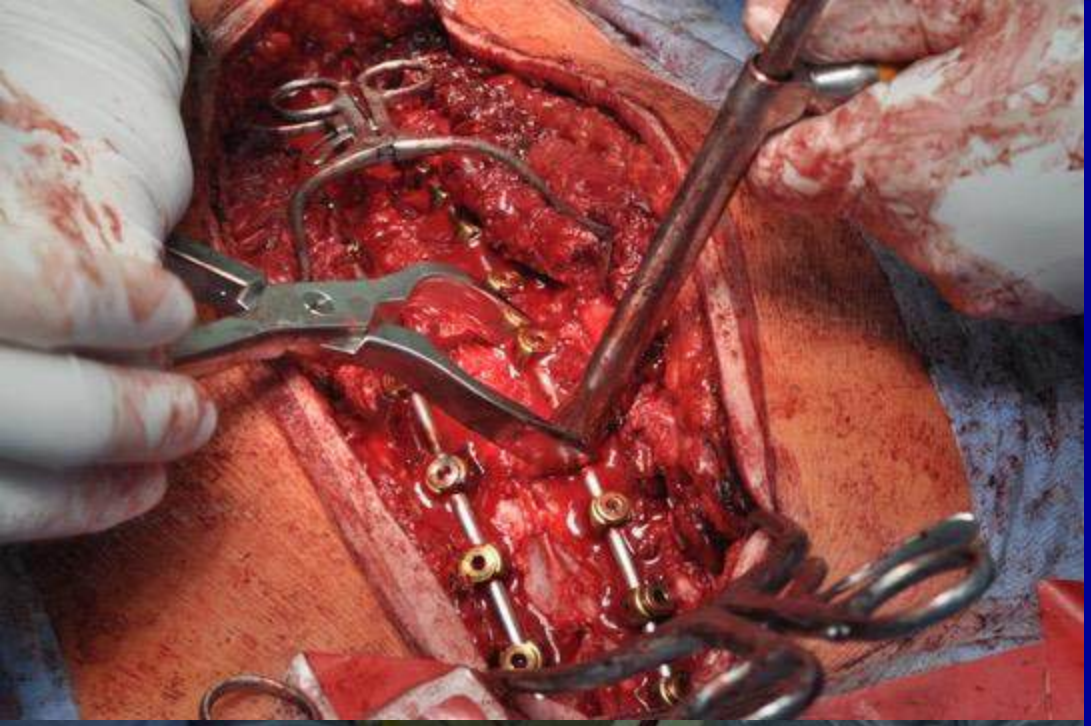




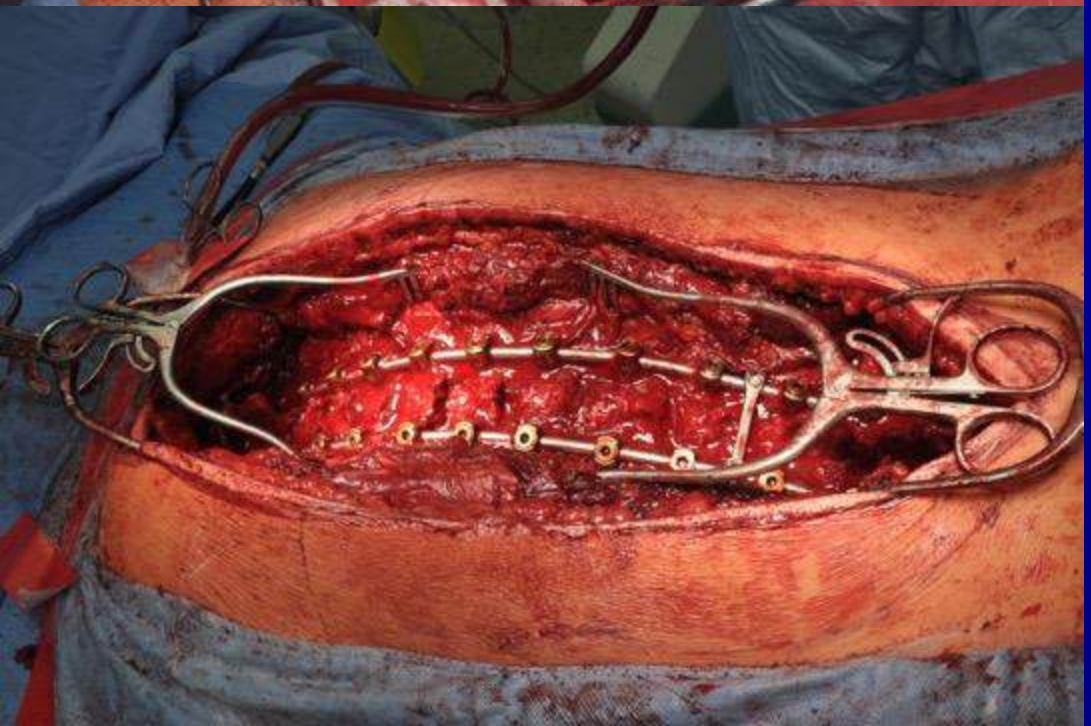
De-reductive tubes implantation



Rod adduction to the screws

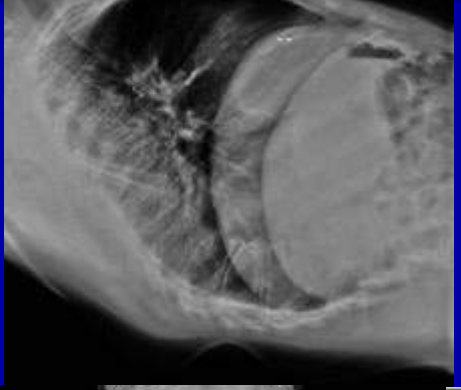


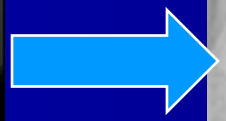
Segmental compression



Final tightening and PL fusion

J.N. 16 y. + 2 m.





Material
ORTK FN Brno 1985-2021

1062 pat.	Before treatment	After treatment	% correction
physio 270 pts. (26%)	54	51	5
bracing 756 pts. (71%)	57	36	37
surgery 36 pts. (3%)	81	48	41

Surgical treatment

Th kyphosis	Before surgery	After surgery	% correction
Combine appproach 16 pac.	81	48	41
Posterior approach only 20 pac.	92	44	48

Surgical treatment - solitary posterior approach

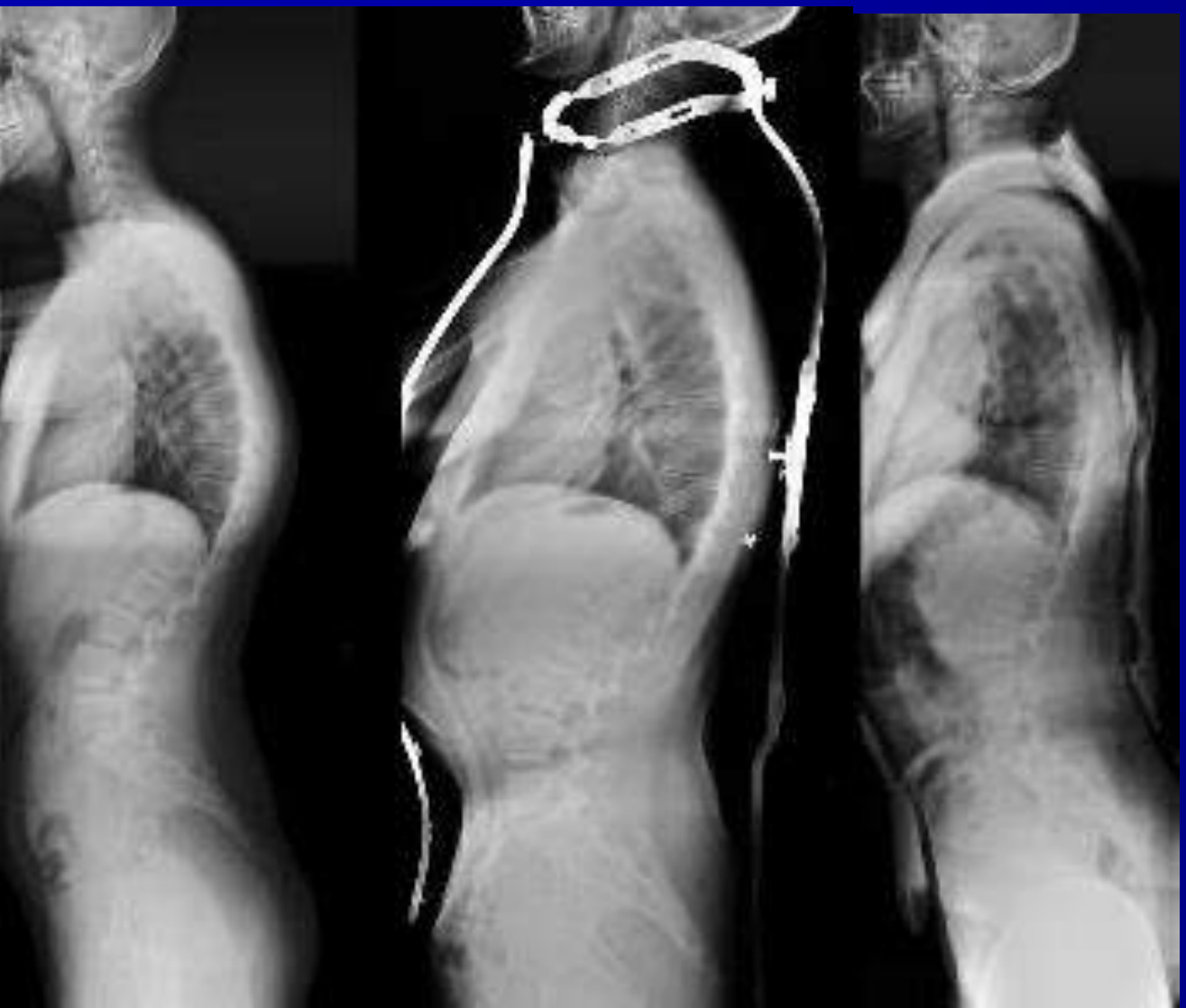
Pacient	Pohlaví	Věk	Rozsah	Cobb před		Reklinace	Cobb po		Cobb 0+4		Cobb 1+0		Cobb 2+0	
				Th	L		Th	L	Th	L	Th	L	Th	L
IN	M	16+5	T3-L3	102	128	95	47	60	48	62	48	63	48	61
JH	M	15+9	T3-L3	95	72	83	37	35	38	42	38	44	39	45
DM	M	19+4	T4-L4	73	76	40	27	46	27	46	27	46	28	48
OO	M	16+10	T2-L2	92	102	72	53	61	55	62	56	65	56	65
DK	M	15+11	T3-L3	81	84	73	41	69	43	70	43	68	44	69
FR	M	17+2	T3-11	68	72	41	45	52	45	55	45	56	46	56
PB	Ž	13+8	T5-L3	81	97	45	37	47	39	48	41	50	41	51
PK	M	15+3	T2-L3	110	65	103	43	64	44	64	44	65	45	65
LV	Ž	24+8	T1-L2	89	58	72	33	49	35	51	36	50	36	49
ZK	M	17+10	T4-L2	91	96	85	38	60	38	61	39	61	40	64
LP	M	15+1	T3-L3	87	78	79	36	56	36	57	38	57	40	58
VS	M	16+8	T2-L1	94	94	75	48	58	48	58	50	59	50	60
MG	Ž	39+5	T2-L3	112	83	104	39	36	39	37	40	37	40	39
MK	M	25+8	T3-L2	88	57	85	57	50	58	50	58	52	59	53
RS	M	16+11	T5-L2	78	76	52	28	52	28	52	30	51	30	50
JN	M	17+0	T3-L2	108	88	102	57	62	57	62	59	64	58	65
JH	M	17+10	T2-L3	114	104	101	85	78	85	78	86	80	87	80
PH	Ž	17+2	T3-L3	97	91	78	46	57	46	58	46	58	46	60
HJ	M	15+5	T4-L2	85	76	72	42	50	43	55	43	53	45	52
RZ	M	19+2	T3-L3	90	85	74	45	54	45	55	46	55	46	56
	18+7			91,75	84,1	76,55	44,2	54,8	44,85	56,15	45,65	56,7	46,2	57,3

Case 1

Girl, 14 y.

Case 2

boy, 14 y.

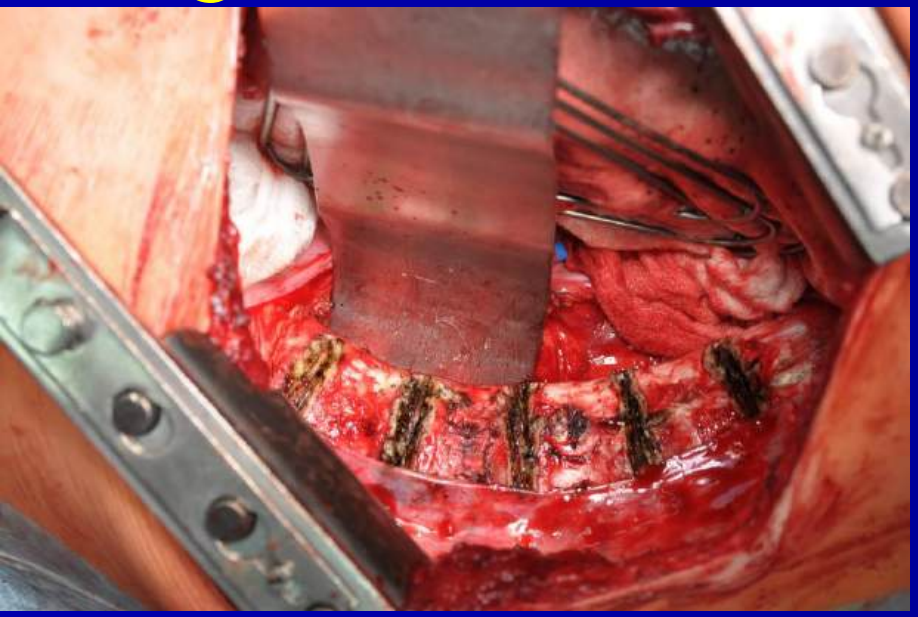


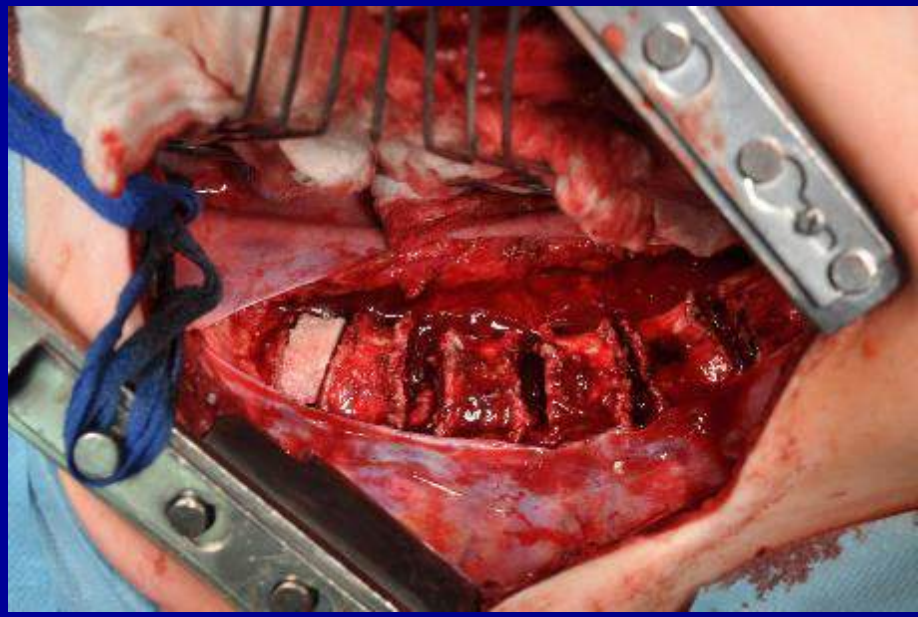
Case 2

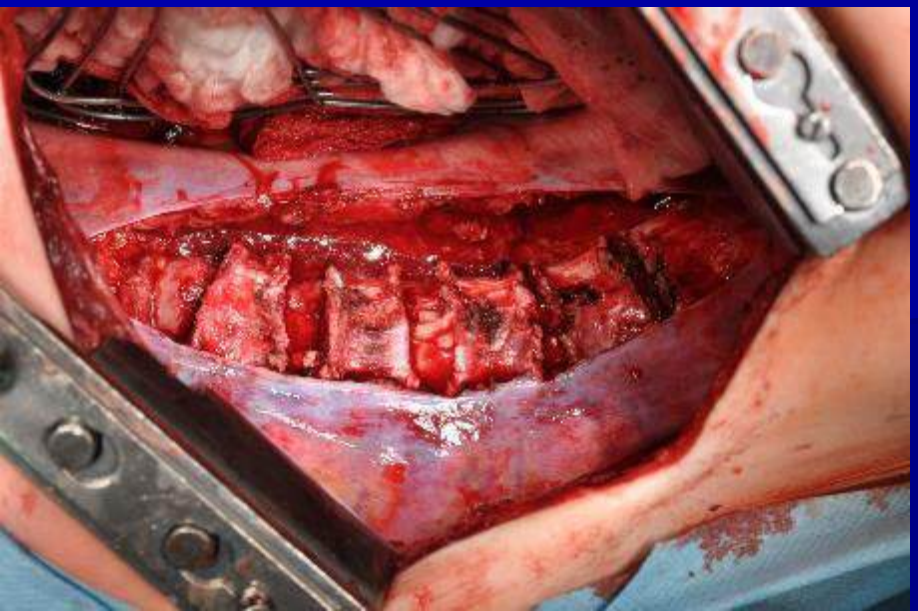
Case 3

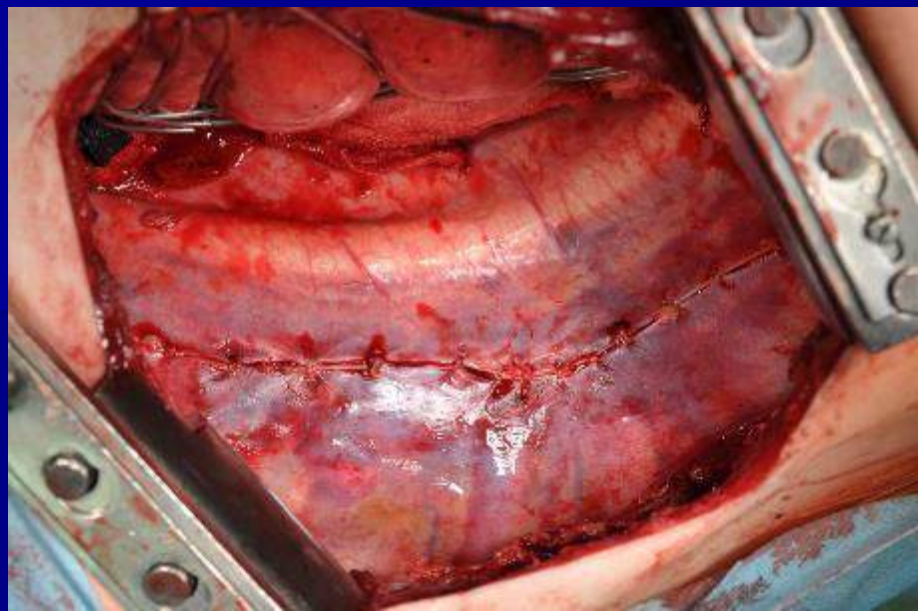
boy, 19 y.

Case 3

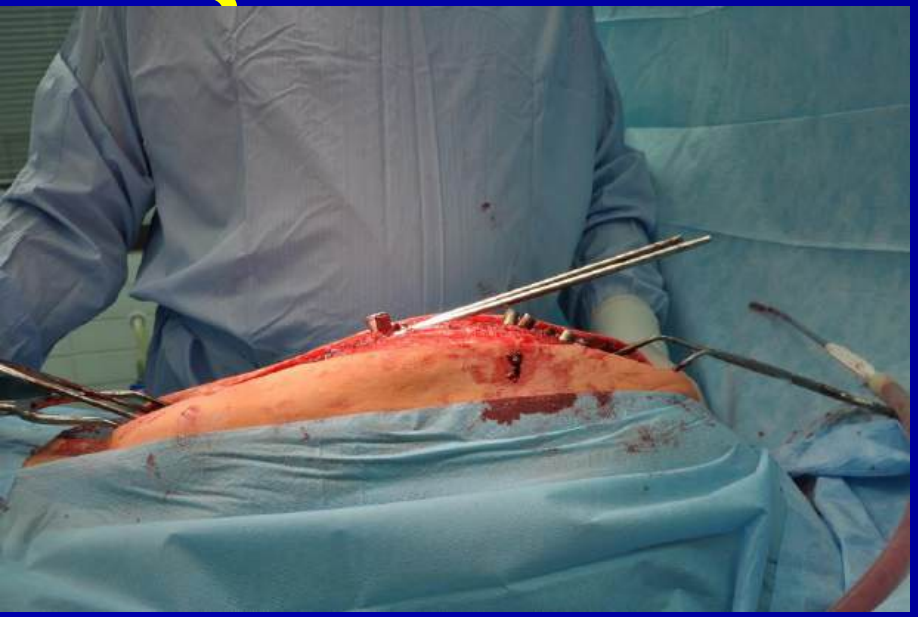


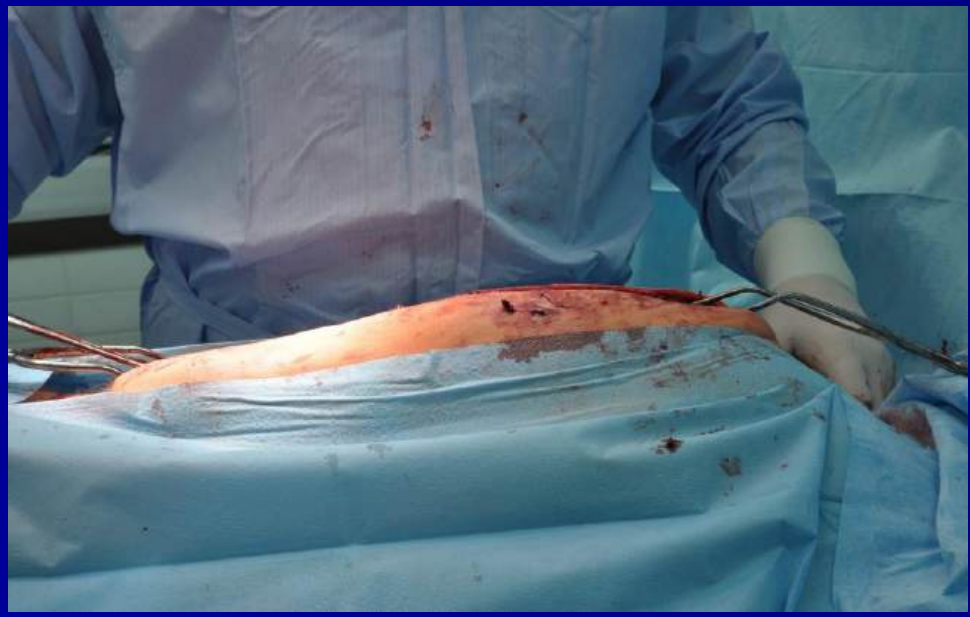


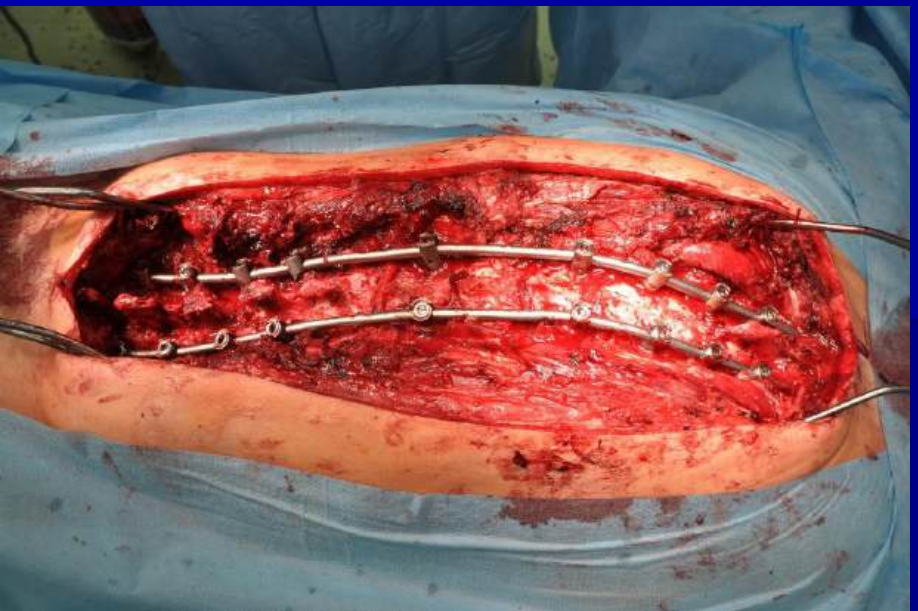




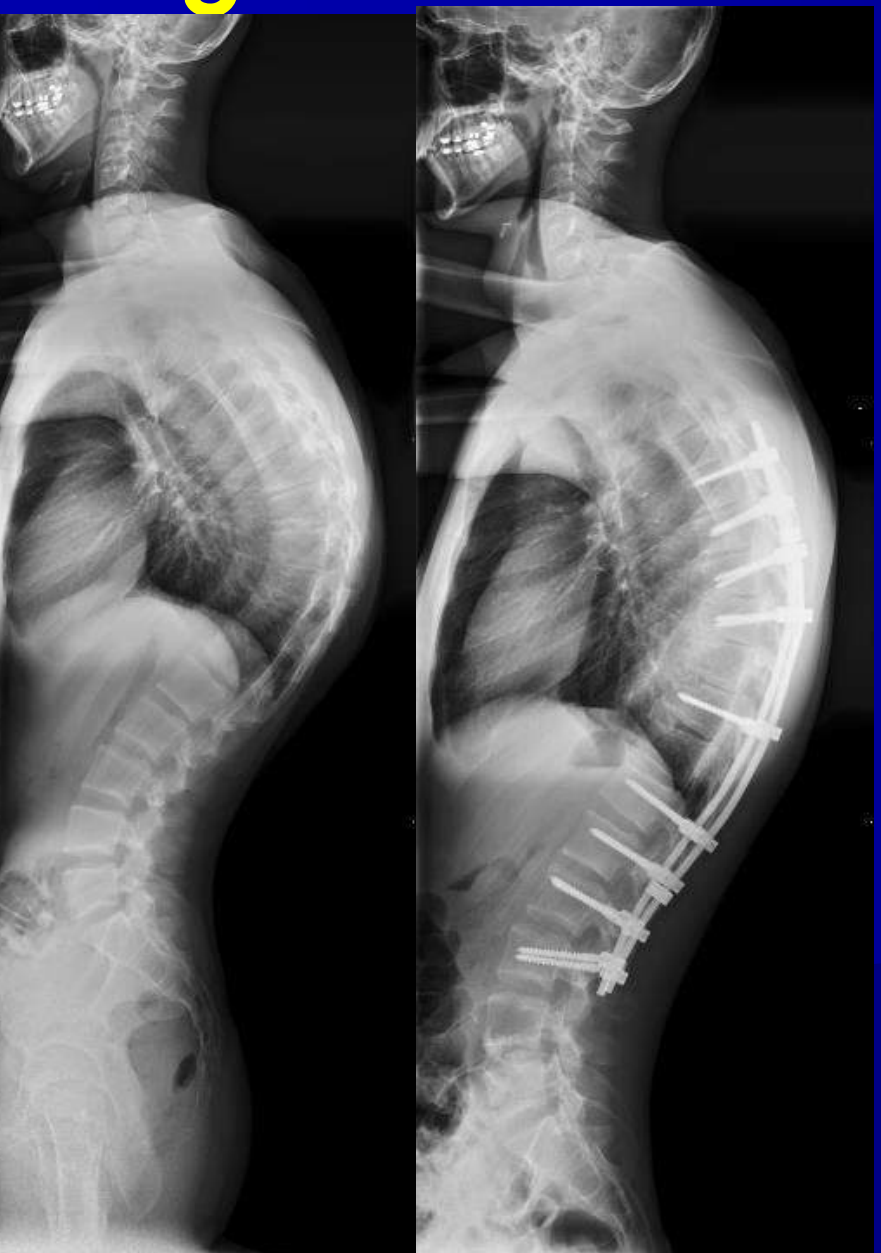
Case 3







Case 3



Case 4

boy, 13 y.

reclination

Case 4

Range of instrumentation ?

LIV
(lowest instrumented vertebra)

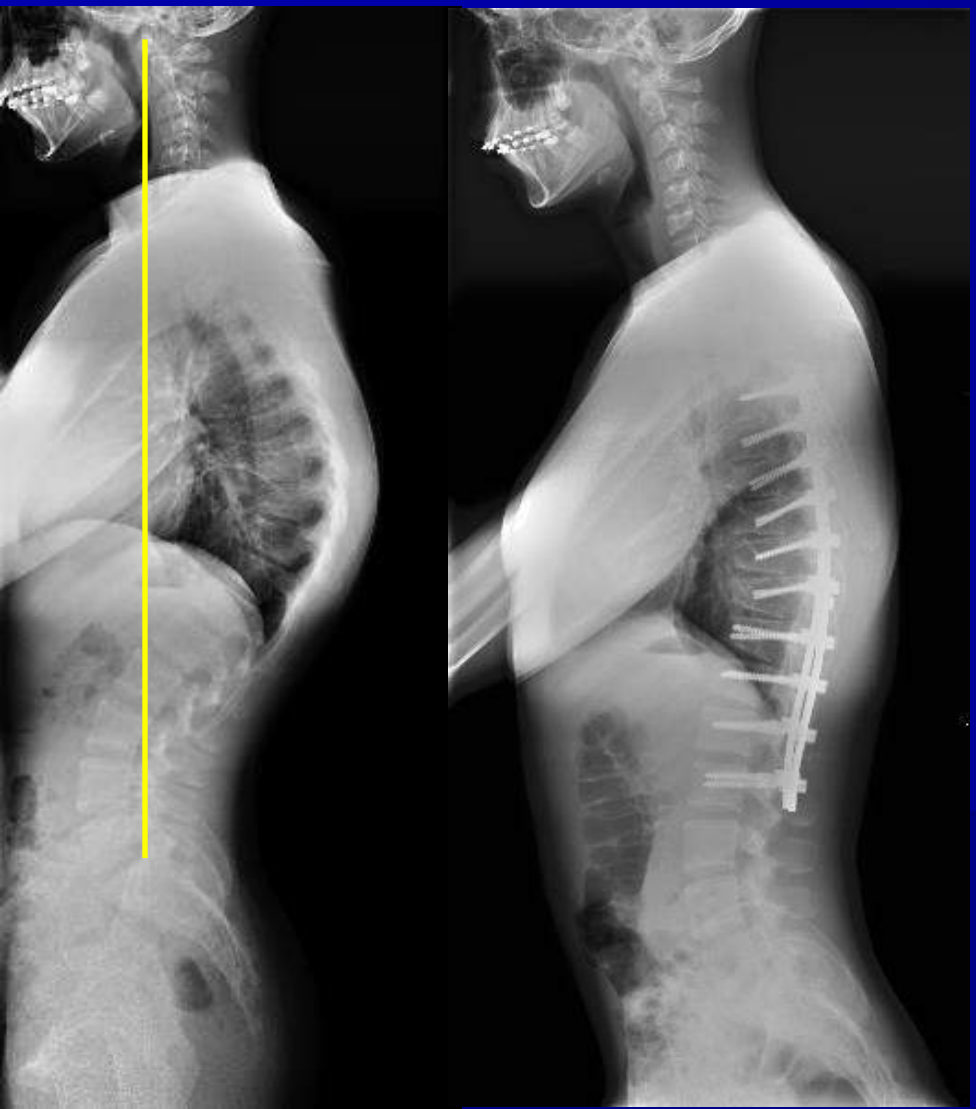
Case 4

Case 4

Case 5

boy, 15 y.

Case 5

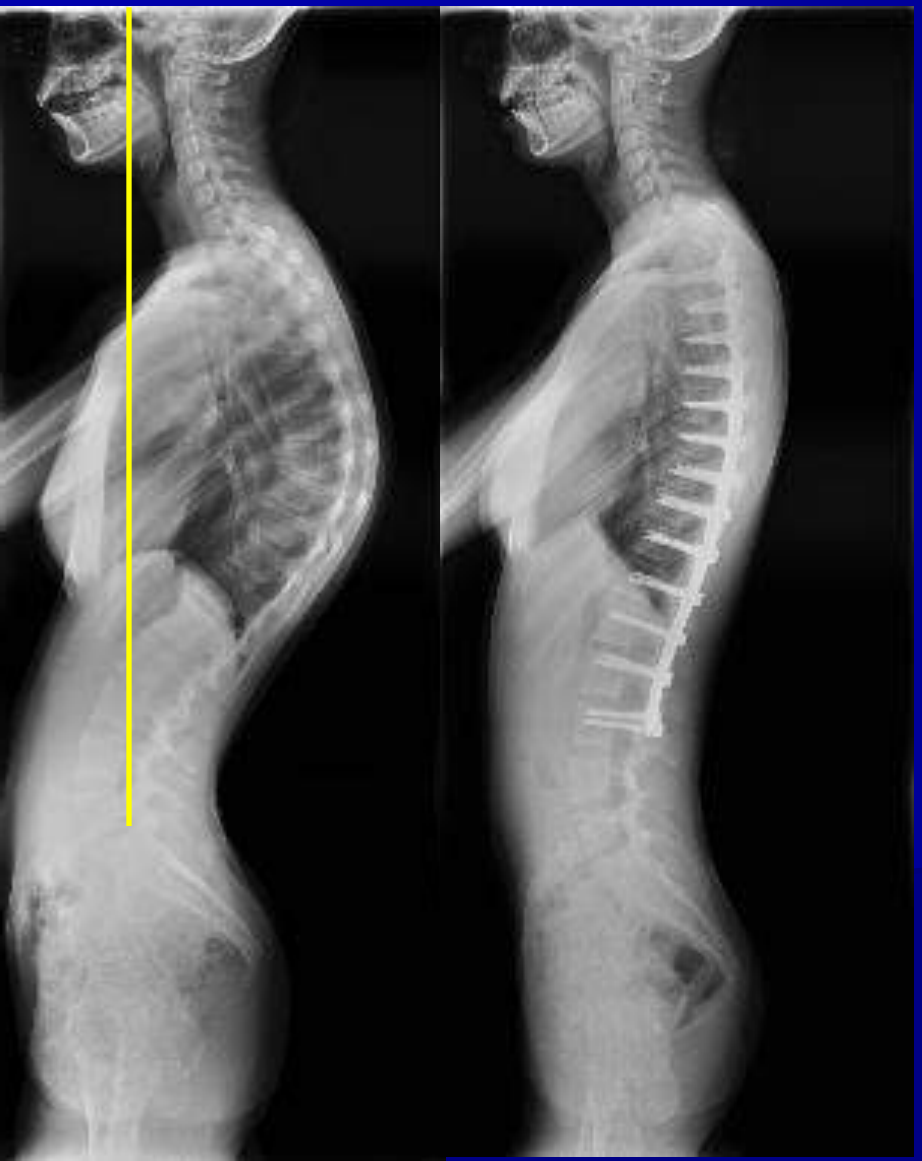


Case 5

Case 6

girl, 15 y.

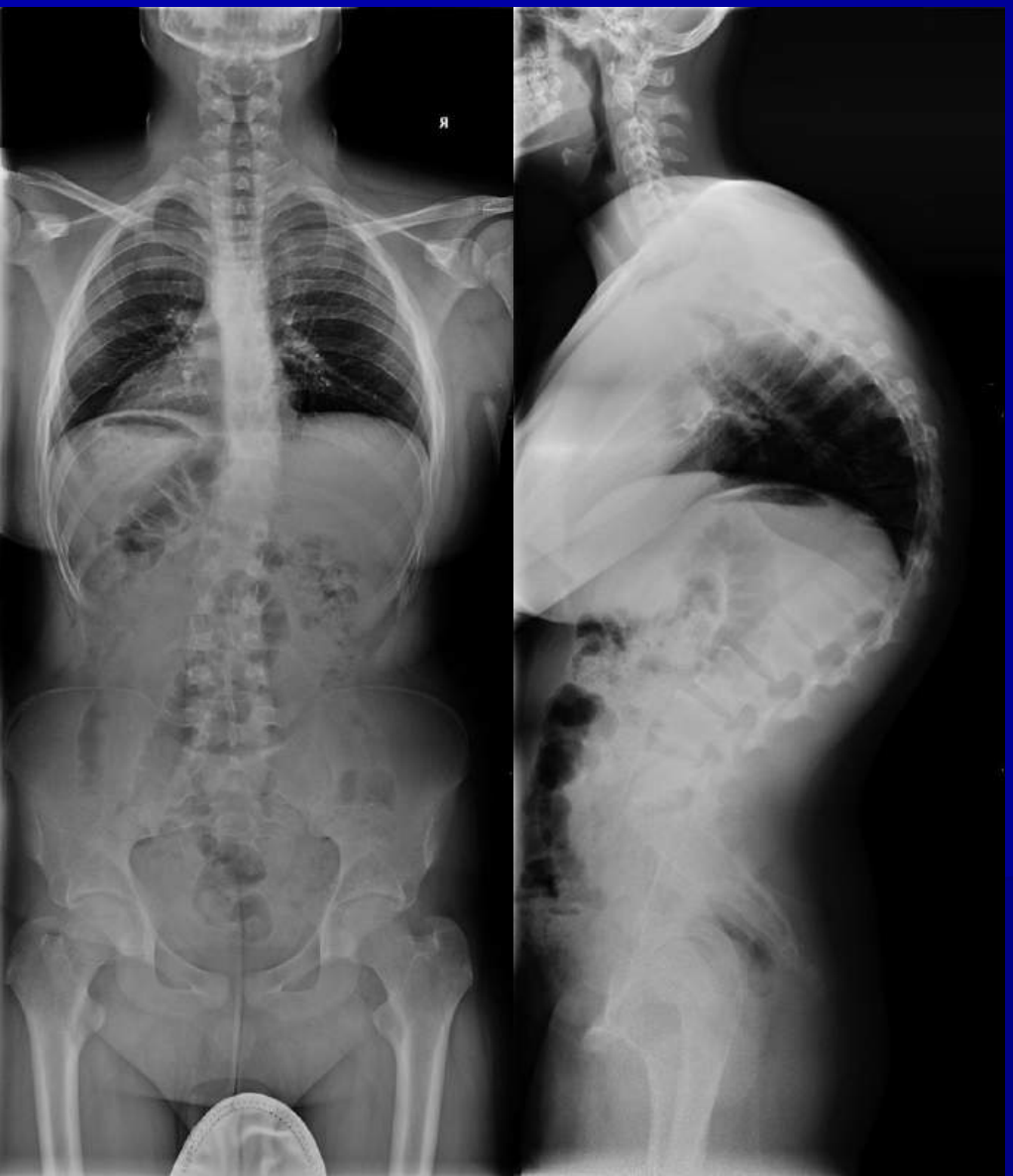
Case 6



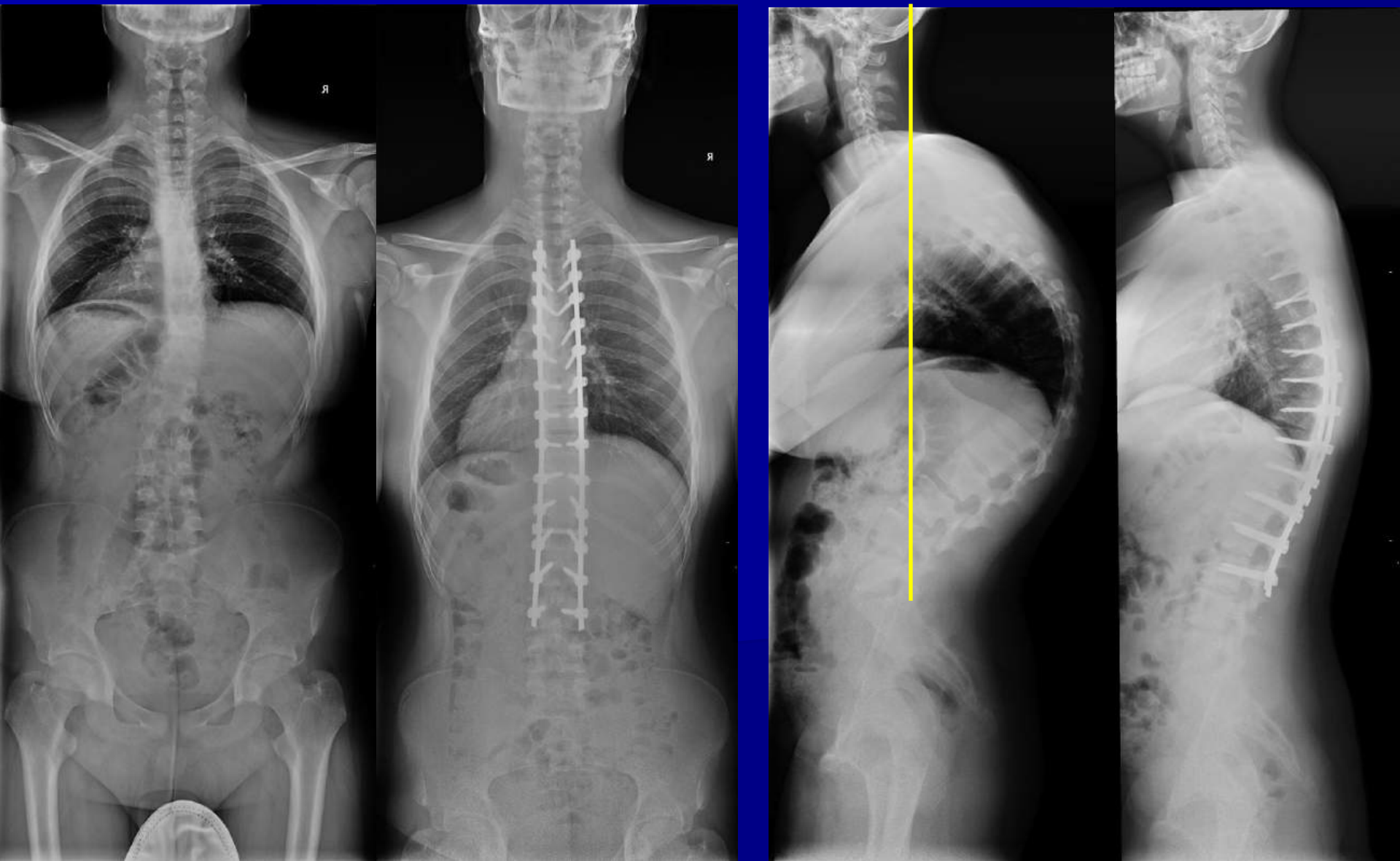
Case 6

Case 7

boy, 16 y.



Case 7



Case 7

Take home message

Most of deformities are flexible and we are treating by conservative way – physio, bracing.

Take home message

We are treating stiffer deformities with plaster cast for 3 month and consequently with brace.

Take home message

Stiff and large deformities are treated with surgical correction and spondylodesis.

Take home message

Posterior surgical approach with SPO anables:

- Comparable thoracic kyphosis correction with combined approaches.
- Better postoperative comfort.
- Postoperative thoracic scare tissue complications exclusion

Thank you for your attention