Scoliosis

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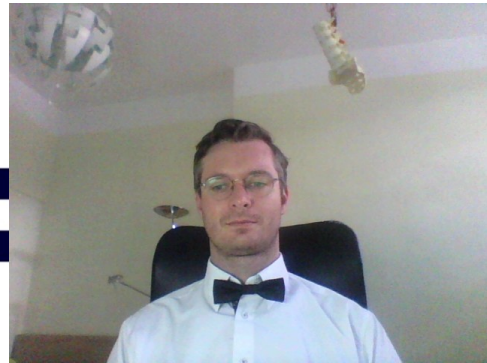
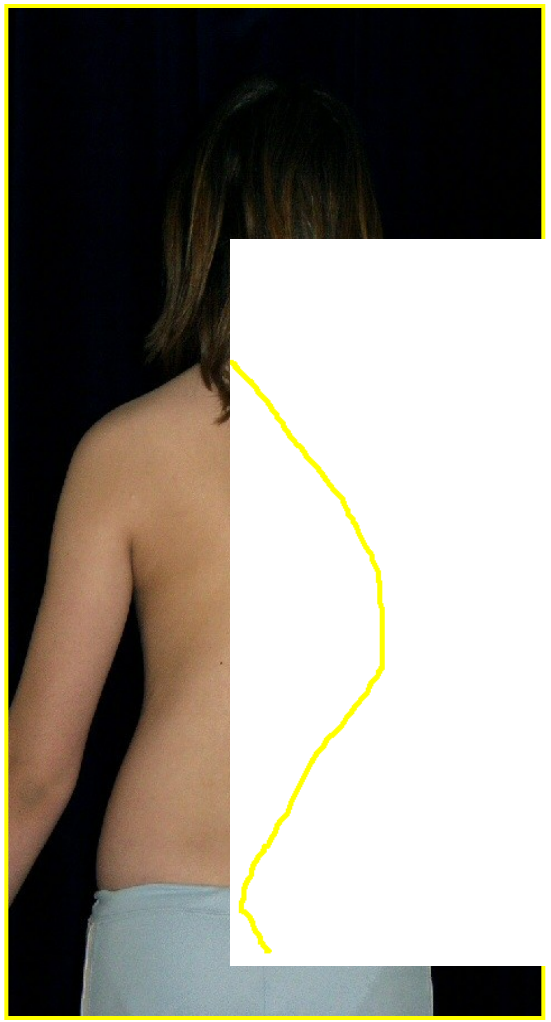
Ass. Martin Prýmek

MUNI

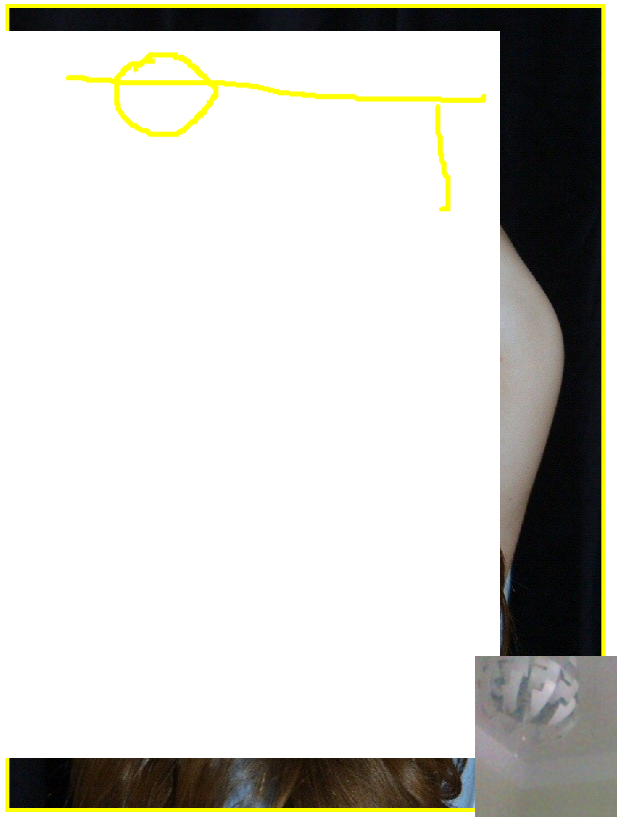


Scoliosis = 3 D deformity

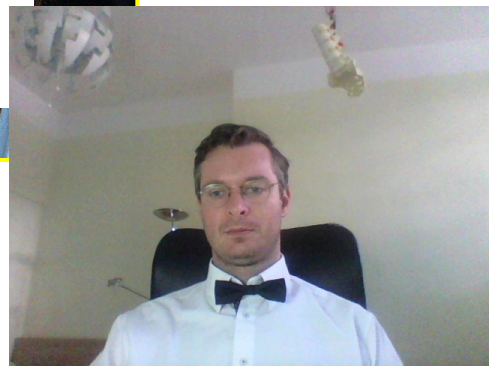


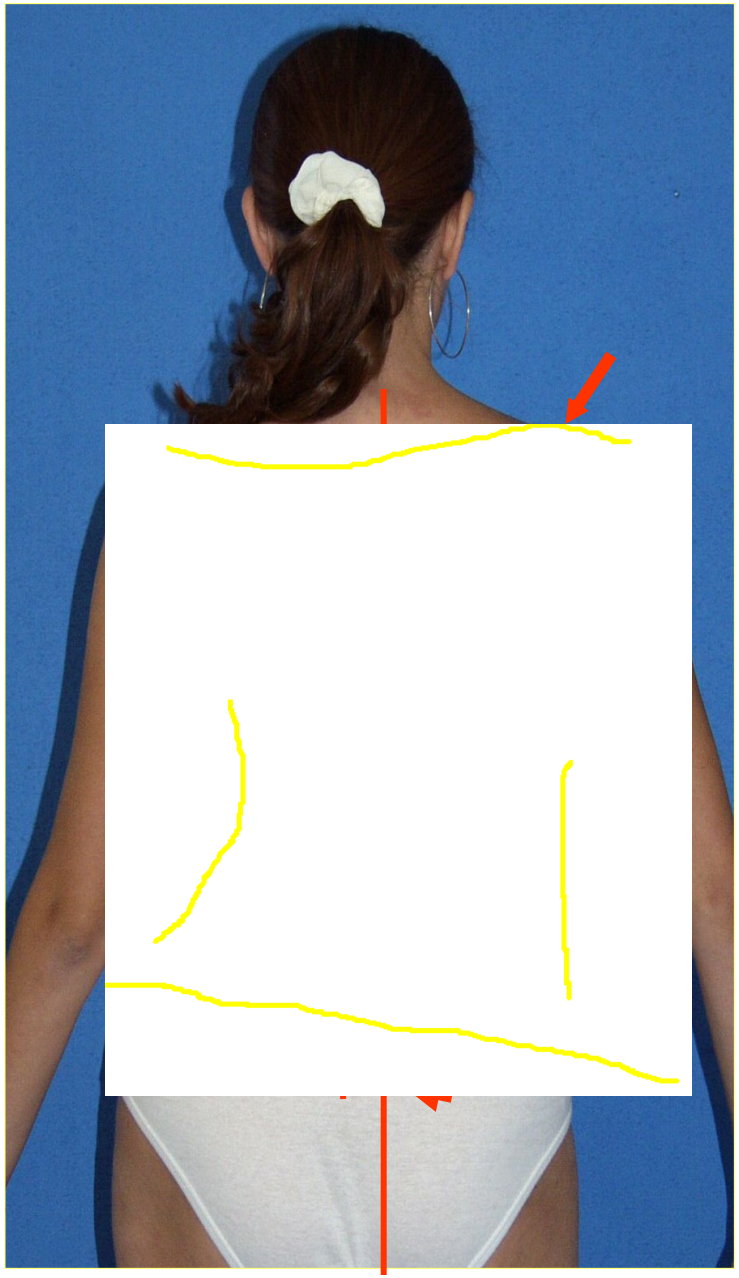
Frontální rovina

Sagitální rovina



Axiální rovina



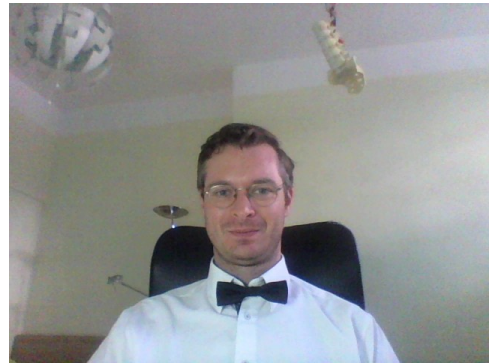


Shoulder height disbalance

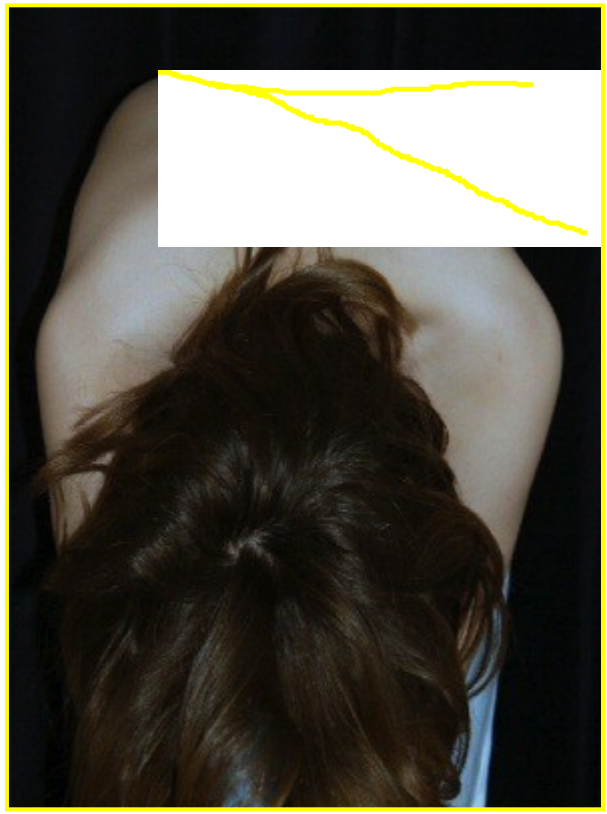
Gibbus – paravertebral prominence

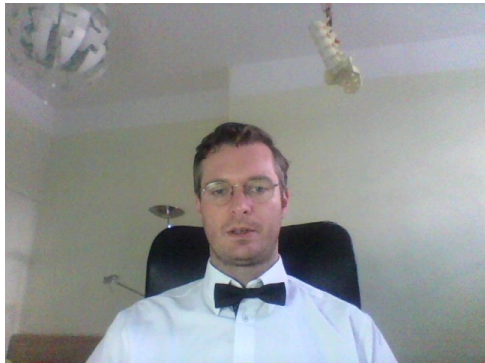
Waist asymetry

Trunk decompensation - frontal plane , C7 plumb line

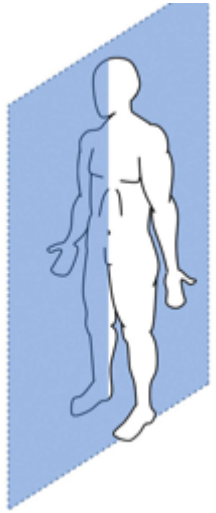


Bending forward!
= Adams test

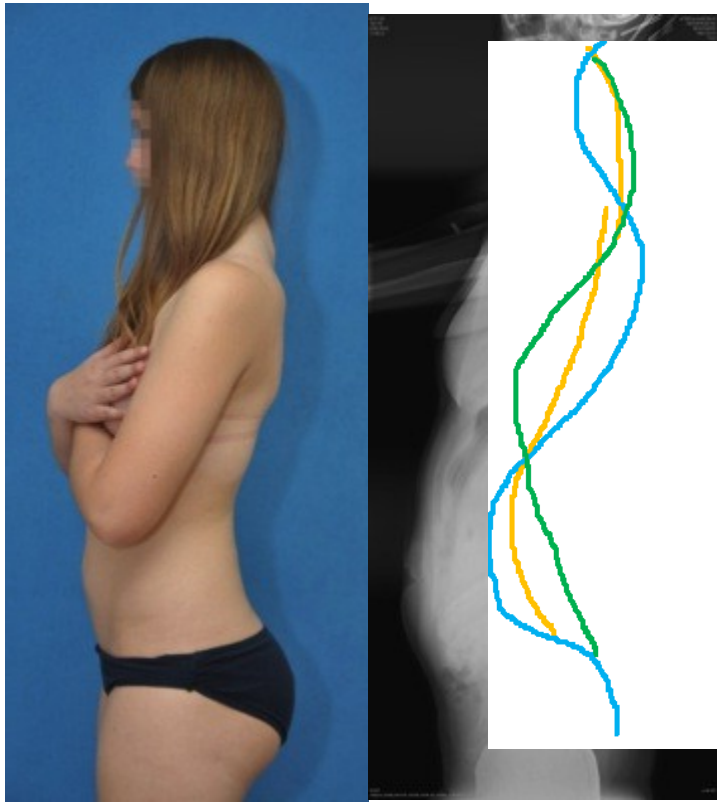




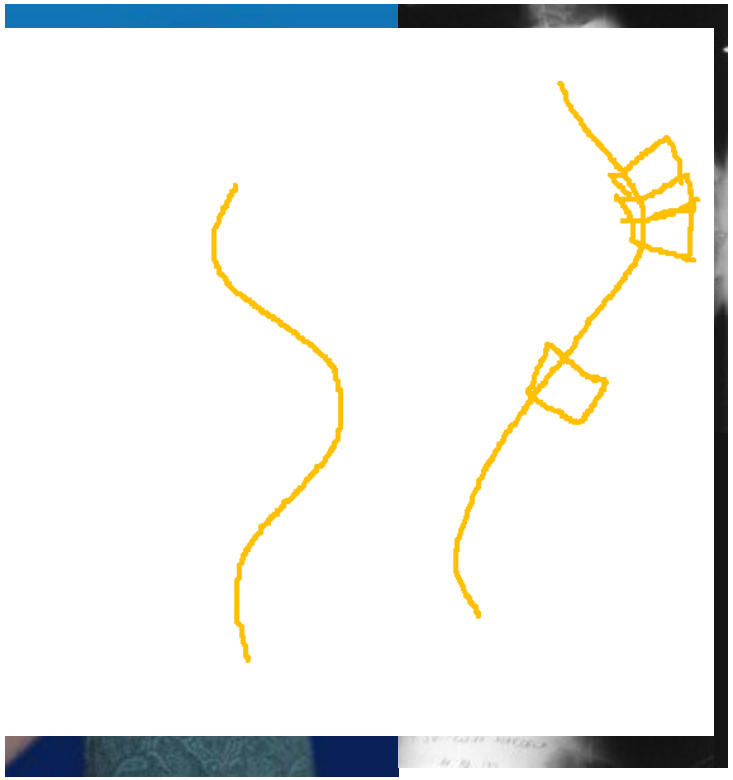
SAGITTAL aspect

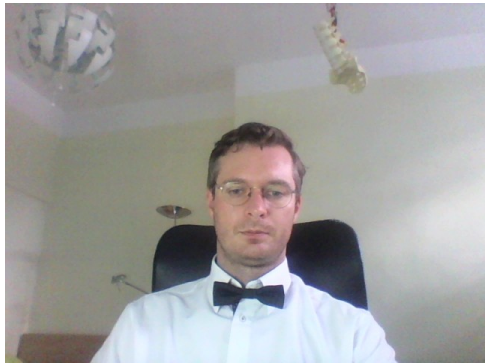


HYPOkyphosis

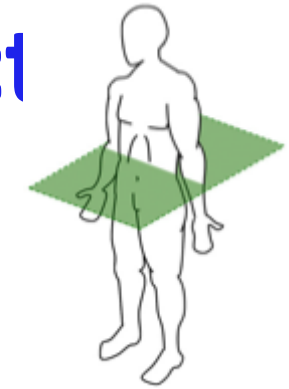


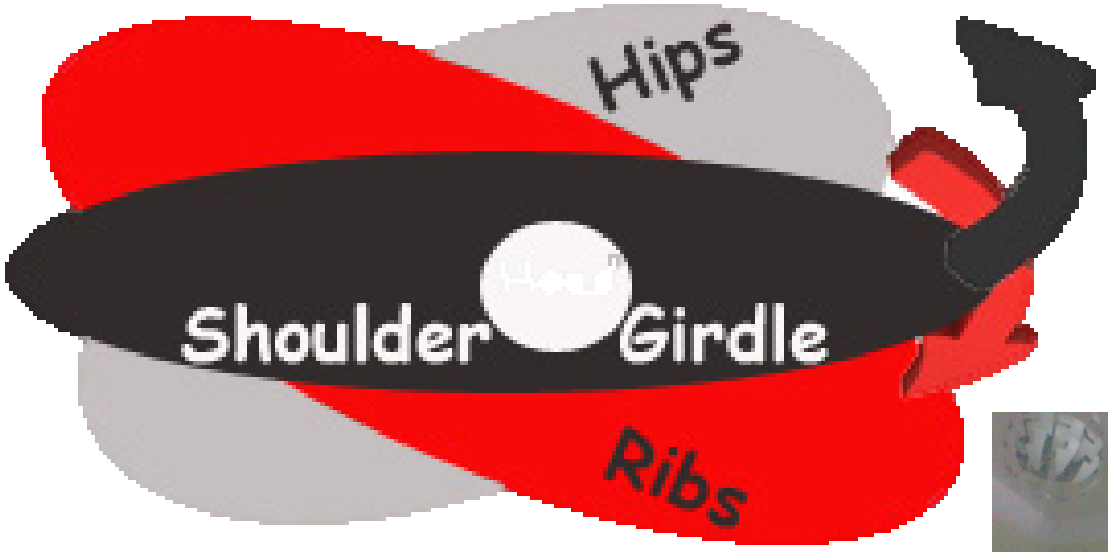
HYPERkyphosis

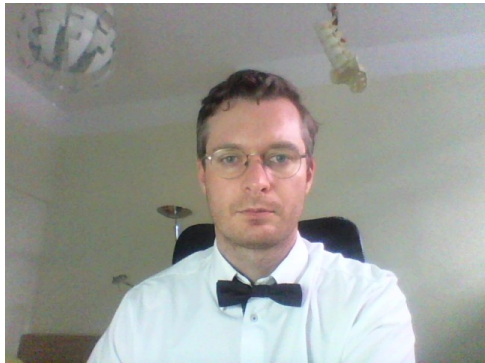


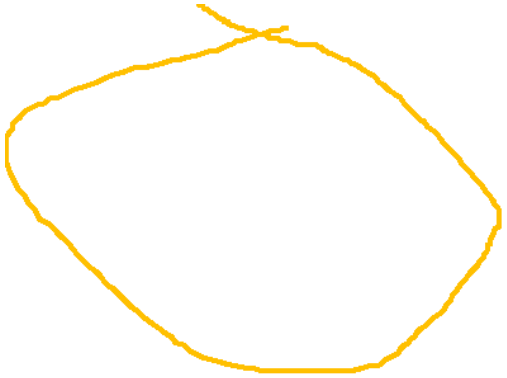


TRANSVERSE aspect









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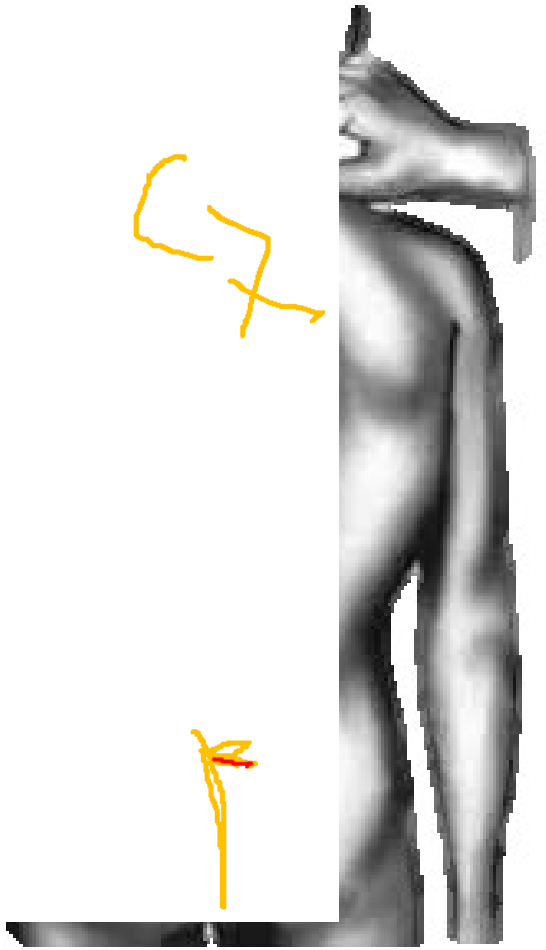

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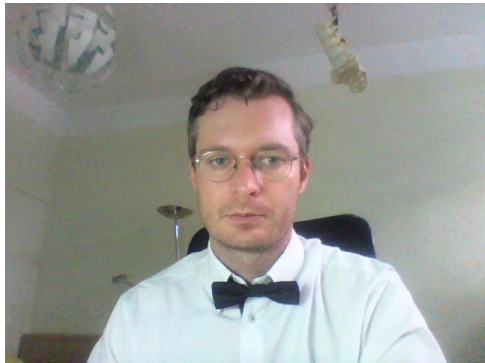
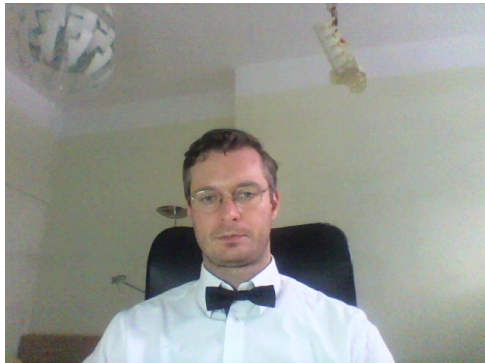
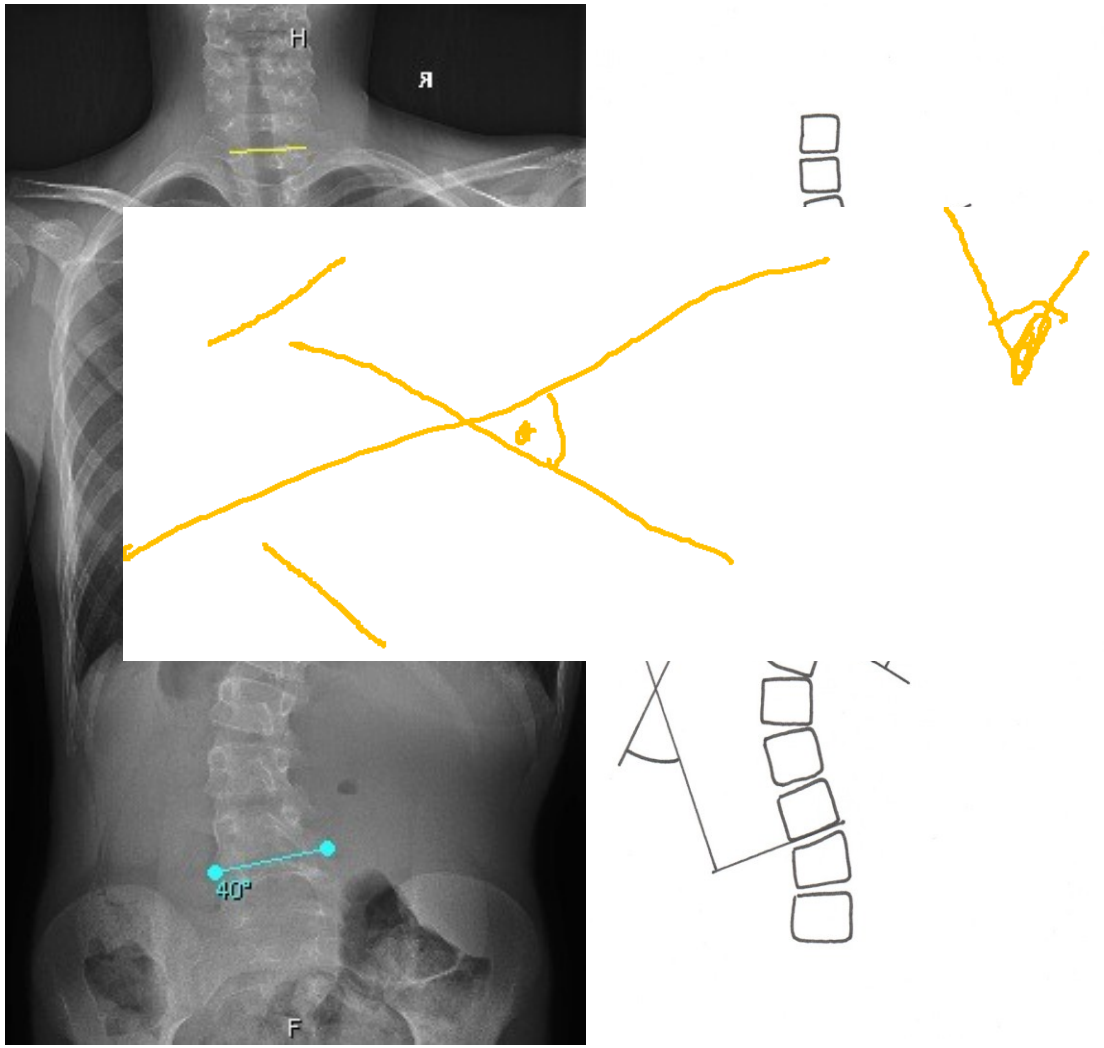
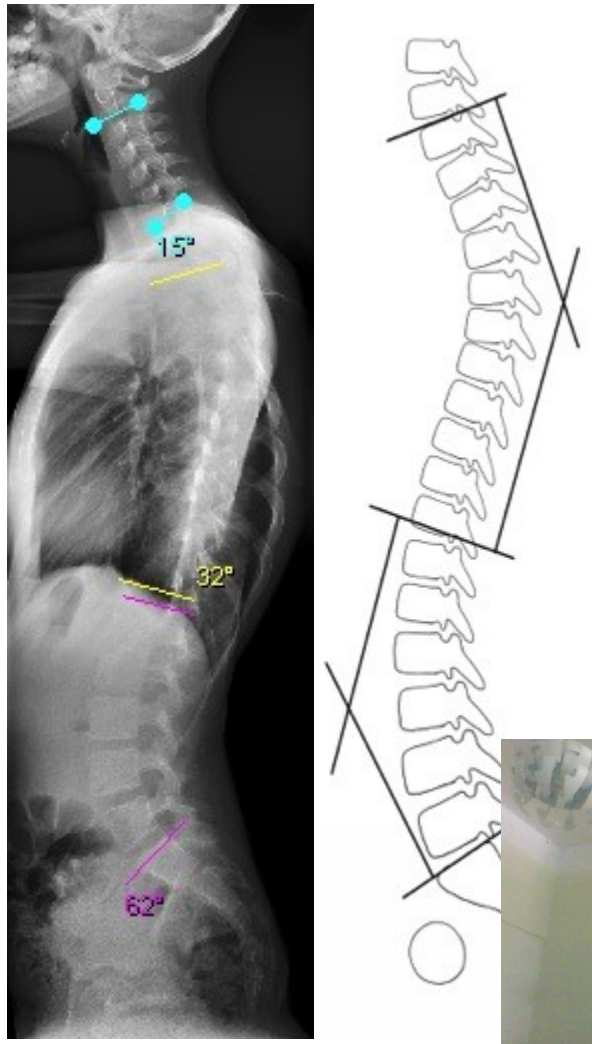


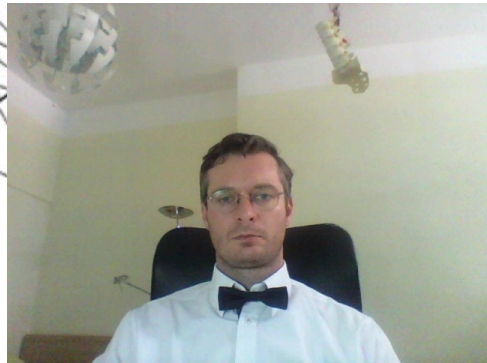
AP lateral bending traction



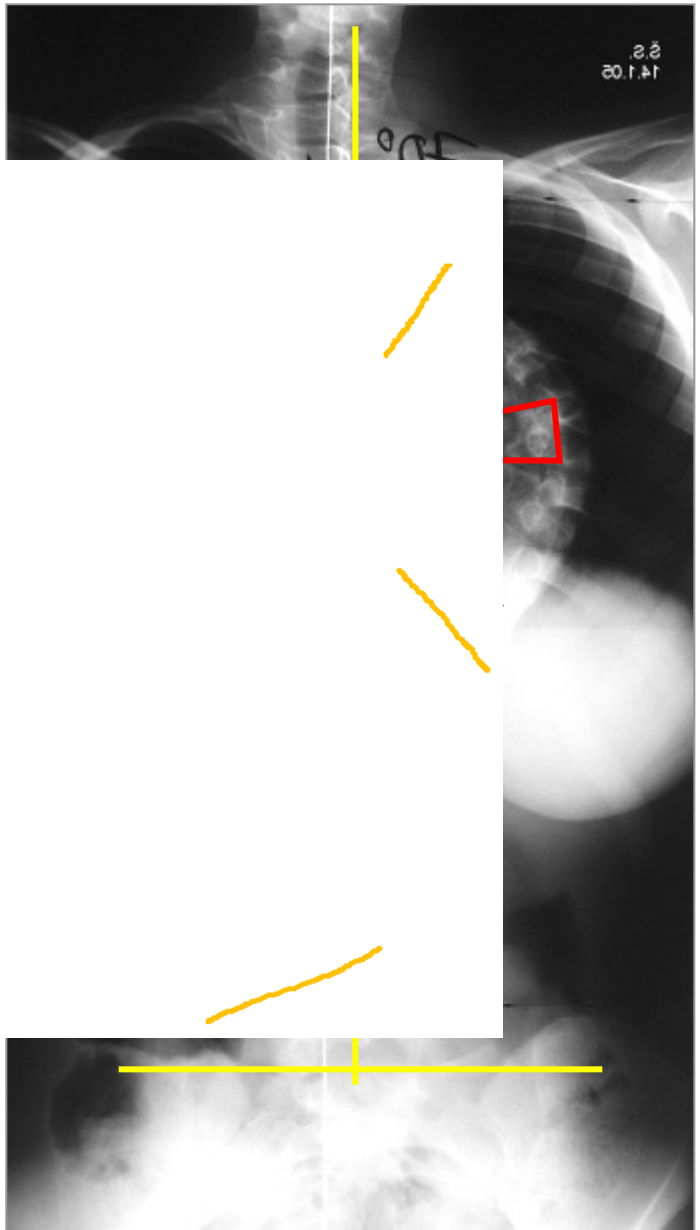
COBB‘s angle

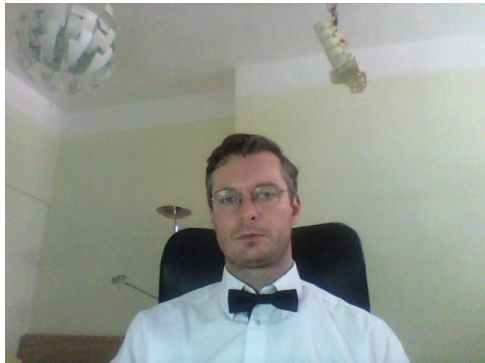


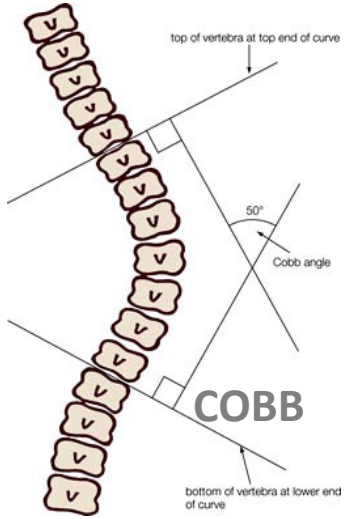




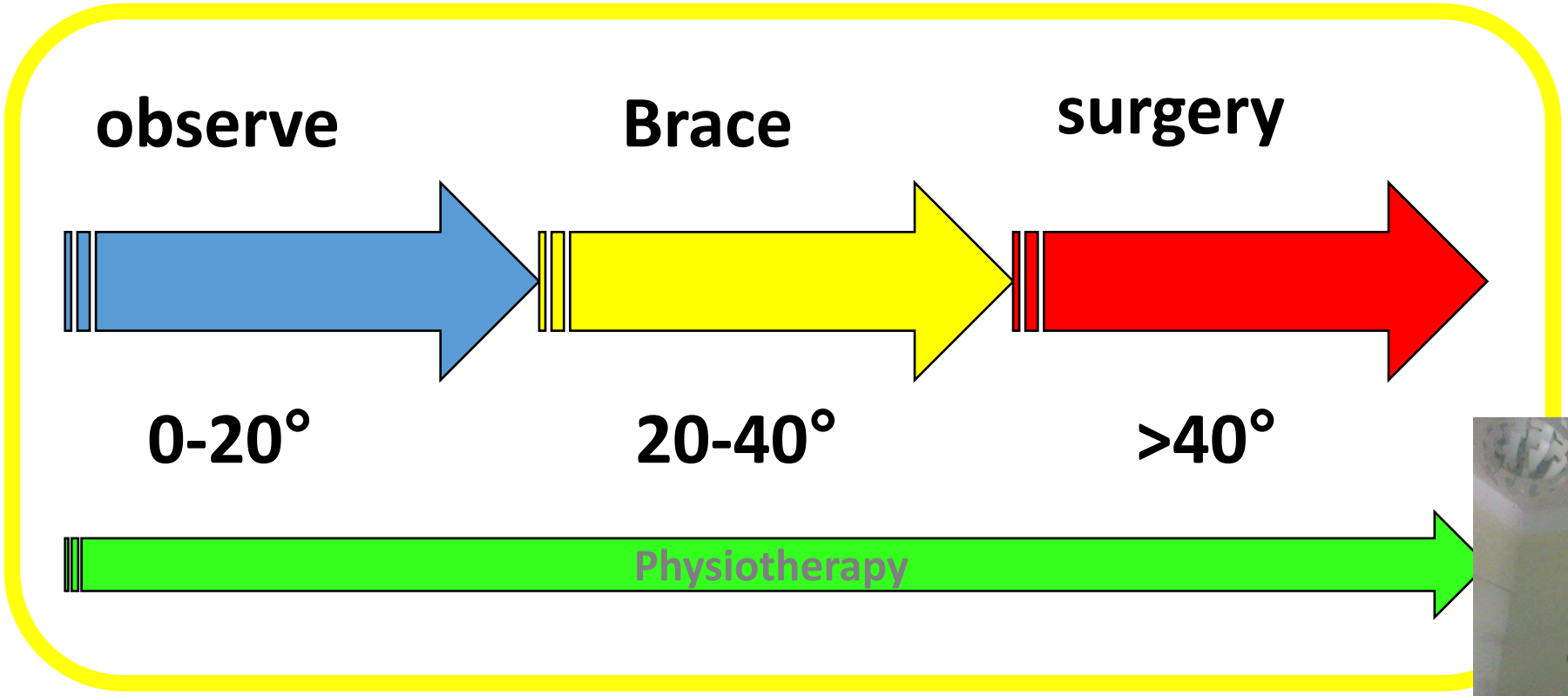
Descriptive terminology

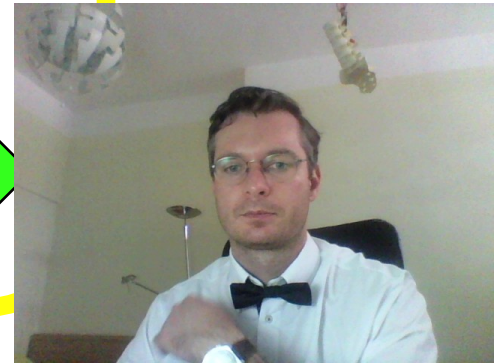




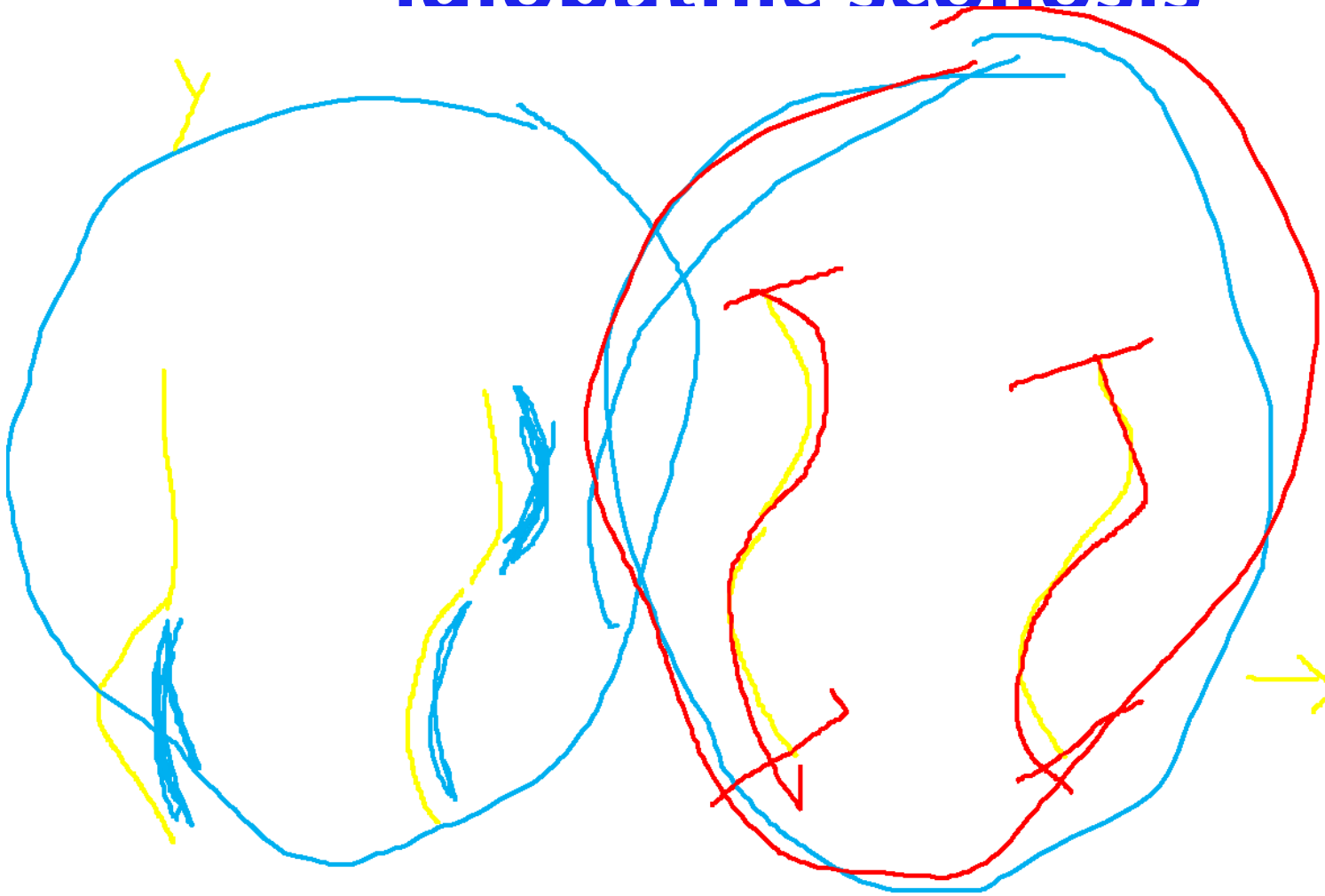


Therapeutic scheme





Natural evolition of untreated juvenile idiopathic scoliosis



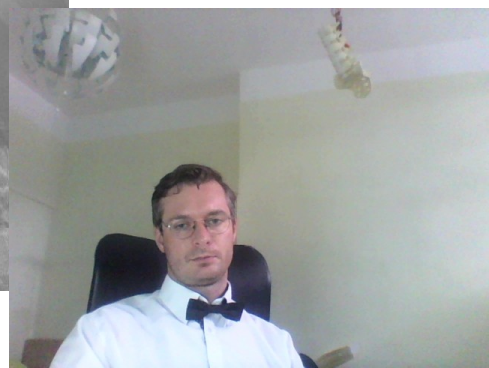
45°

50°

61°

68°

73°

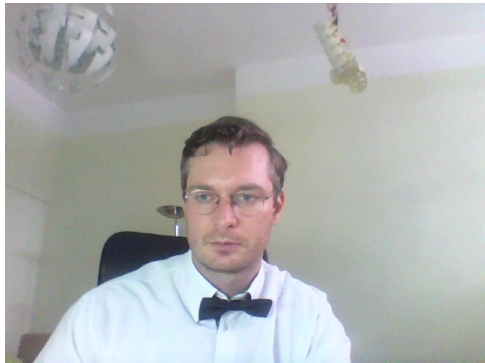


Deformity worsening

ad progresion even in adult age !

)

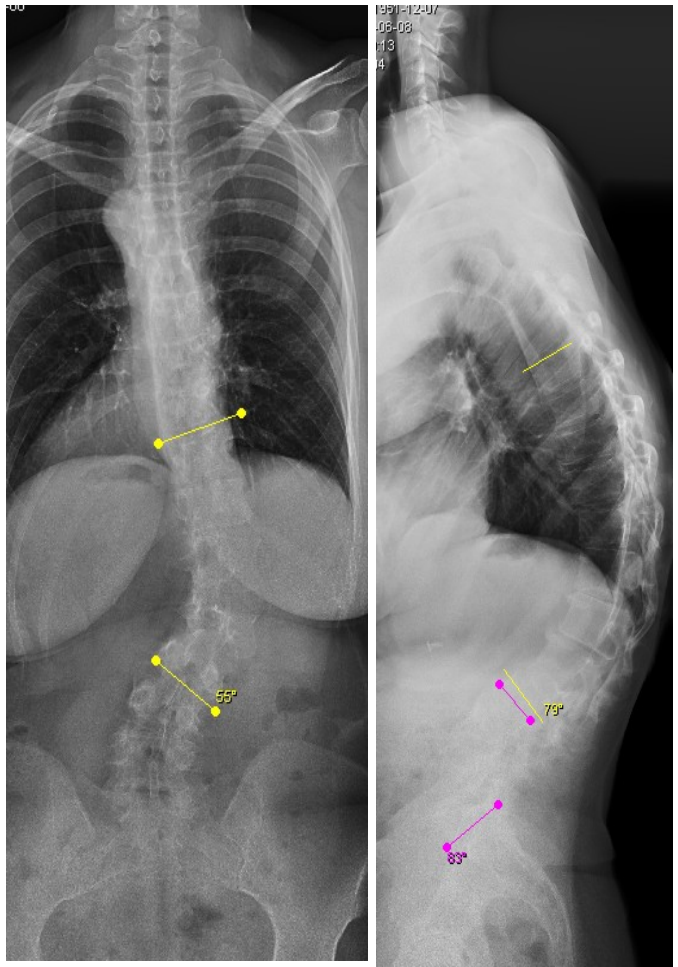
- Thoracic curves - 1 dg./year
- Thoracolumbar curves - 0,5 dg./year
- Lumbar curves - 0,24 dg./year

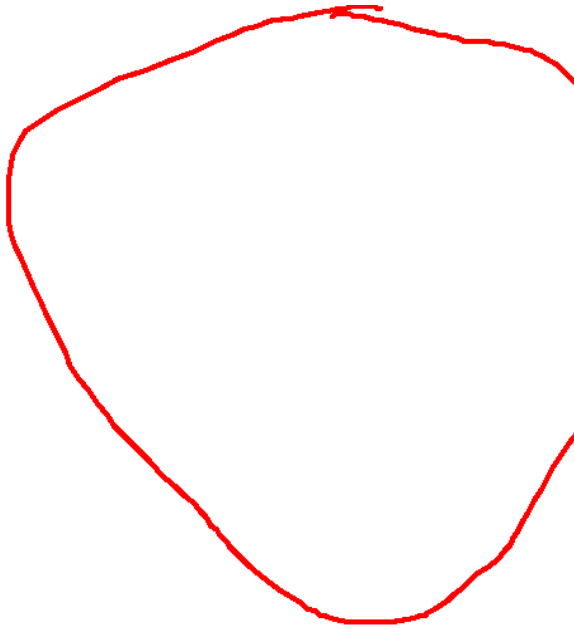


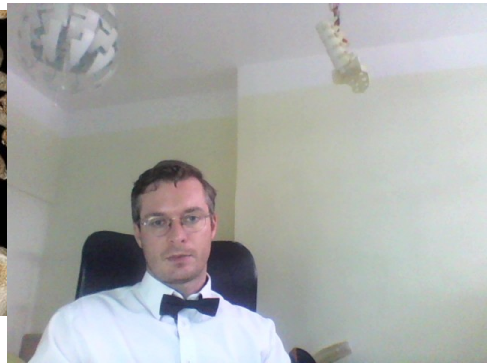
Sever complication of untreated scoliosis in childhood

=

Degenerative changes and cardiopulmonal insuficiency

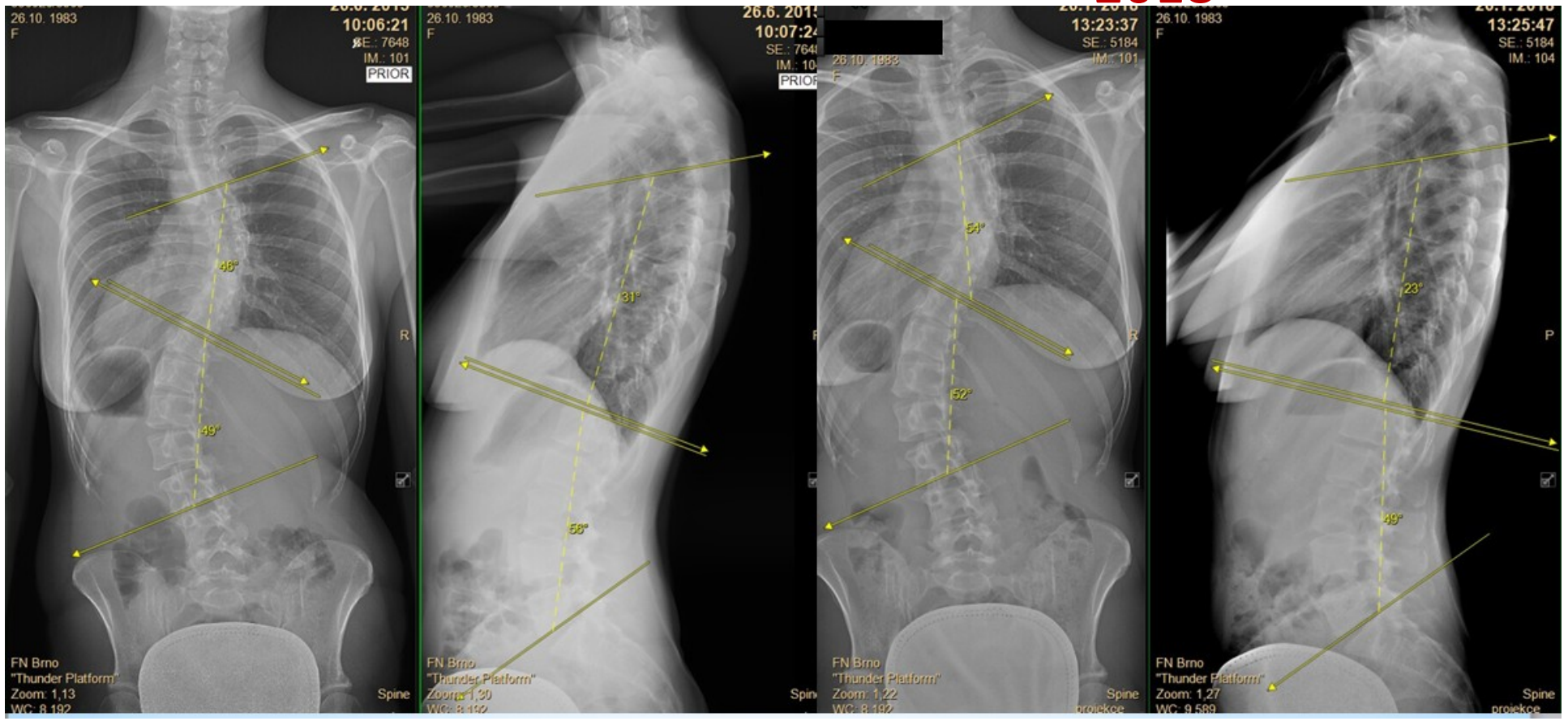






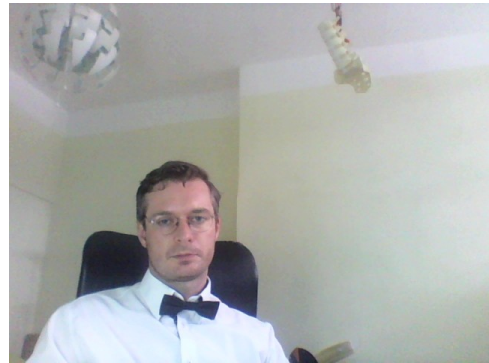
2015

2018



32 let

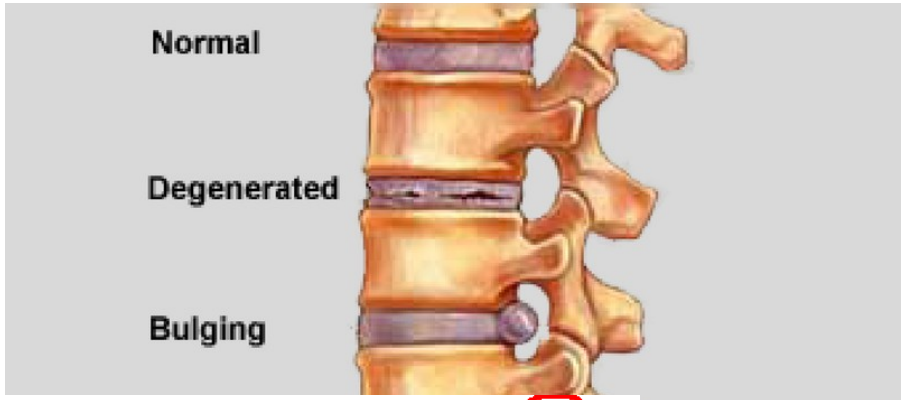
35 let

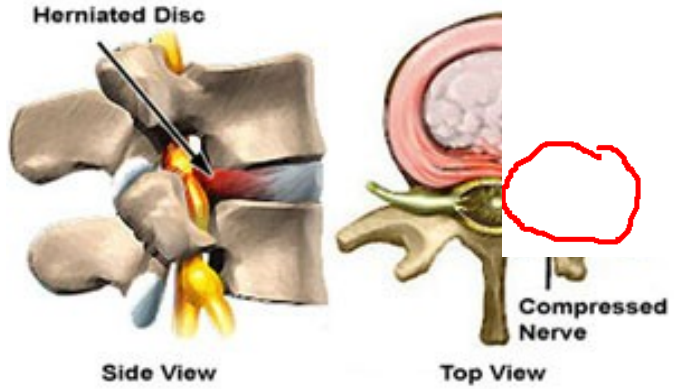


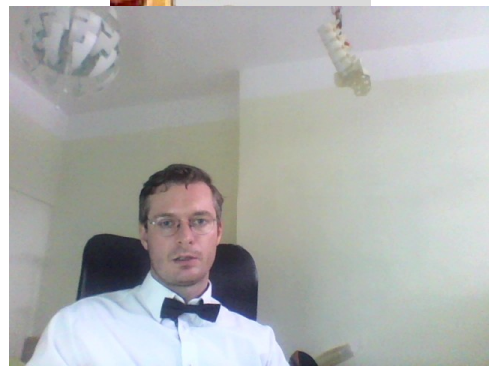
Risks of curve progression

- Progressive oppression of intra-abdominal organs
  - Heart + Lungs
  - Indigestion
- **Degeneration of spine structures**
  - Intervertebral joints
  - Intervertebral disc->

  production of osteophytes with possible ner compression !

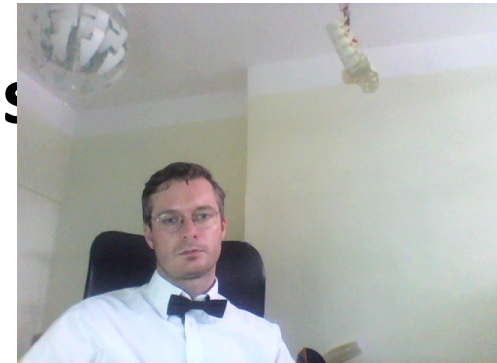






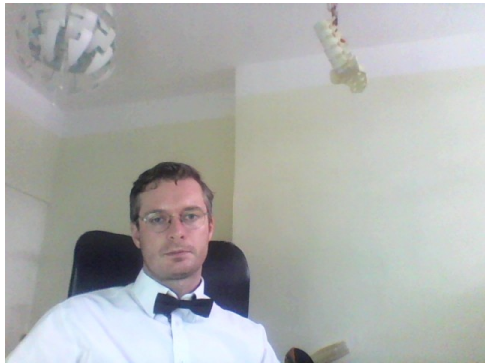
Goals of scoliosis surgery in childhood

1. Stop deformity progression
2. Correction of deformity
3. Improvement of cardiopulmonary functions
4. Prevention of degenerative spine changes

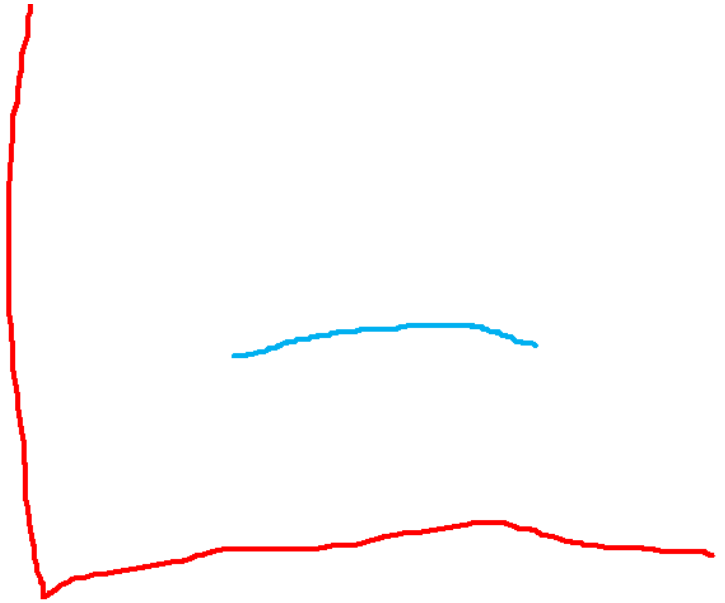


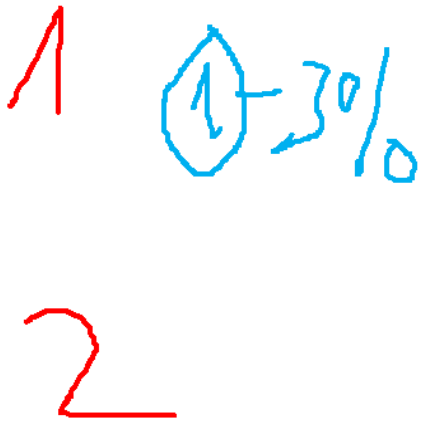
Scoliosis surgery in adult age

- Higher surgery risks with lower success rate of deformity correction
- Often associated with nerve impairment
- Difficult tolerance of corrected torso and spine position
- Slow postoperative convalescence (pain)
  - long-term rehabilitation care is required

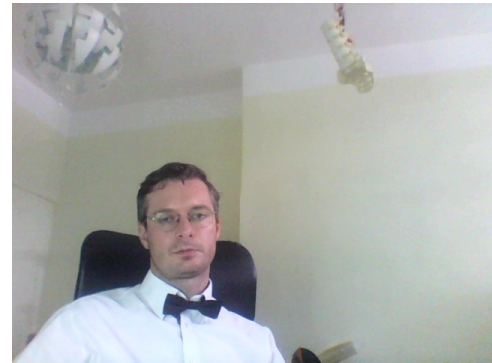


Surgical risks in general





rhythm disorders,
etc.

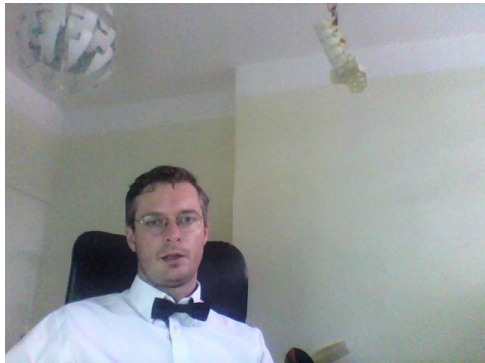


Surgical risks specific for scoliosis surgery

- Increased postoperative pain due to stretching of shortened muscles - in each patient

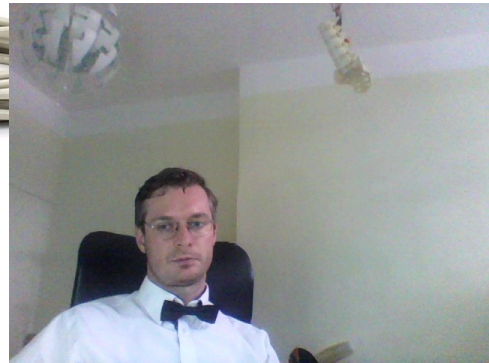
1-2 %

- Paralysis due to surgery
  - For thoracic and lumbar curves it refers to the lower limbs
    Very rare complication, but very serious as a result.



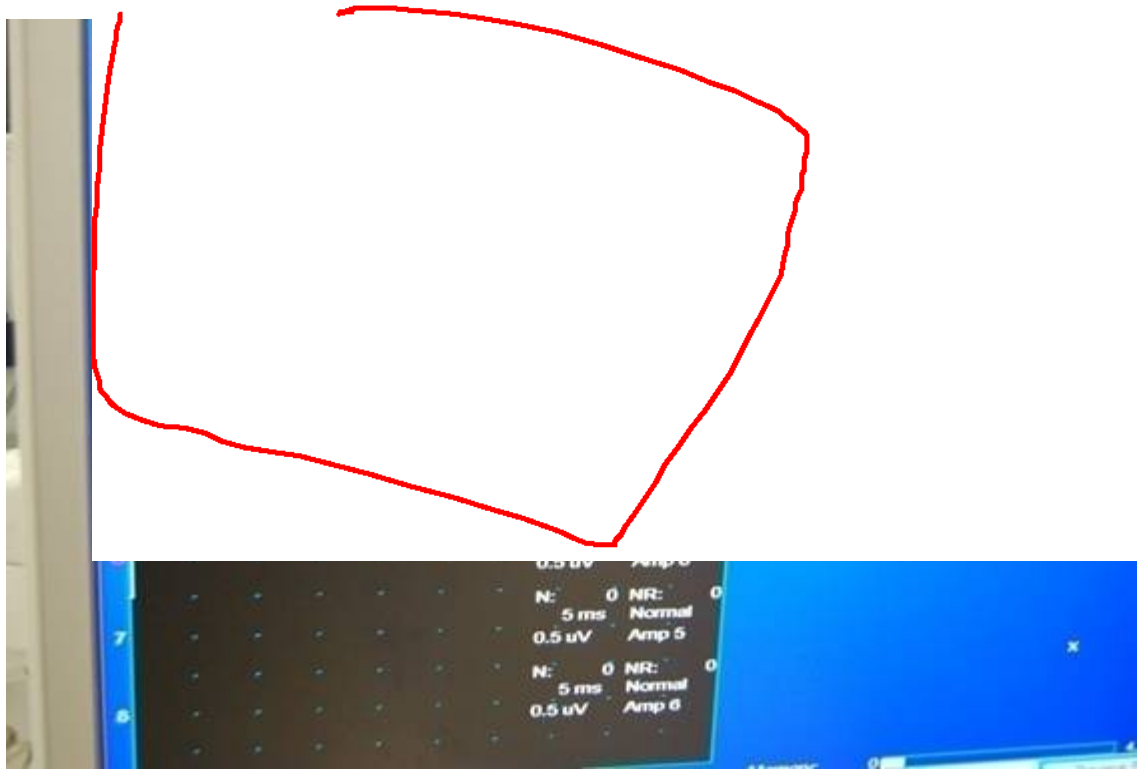
MEP – motor evoked potentials

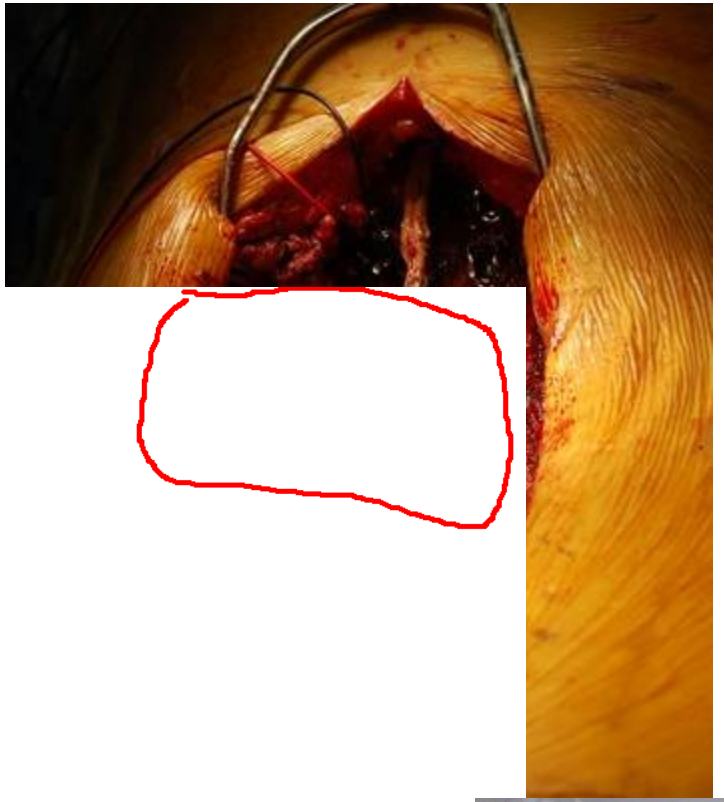
- Monitoring of nervous system functionality during surgery
- It enables immediate reaction to the problem and thus minimizes the risk of permanent nervous disability

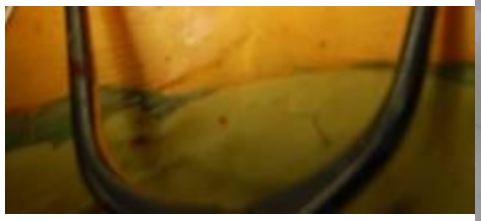


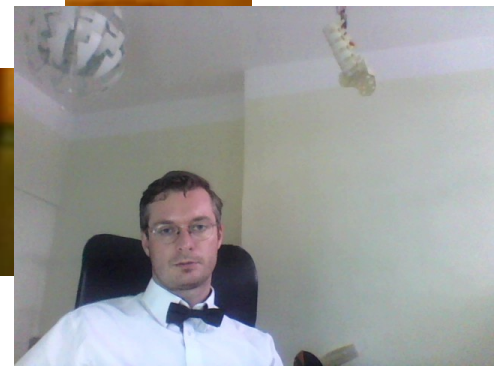
MEP – motor evoked potentials (SSEP)

SEP a MEP



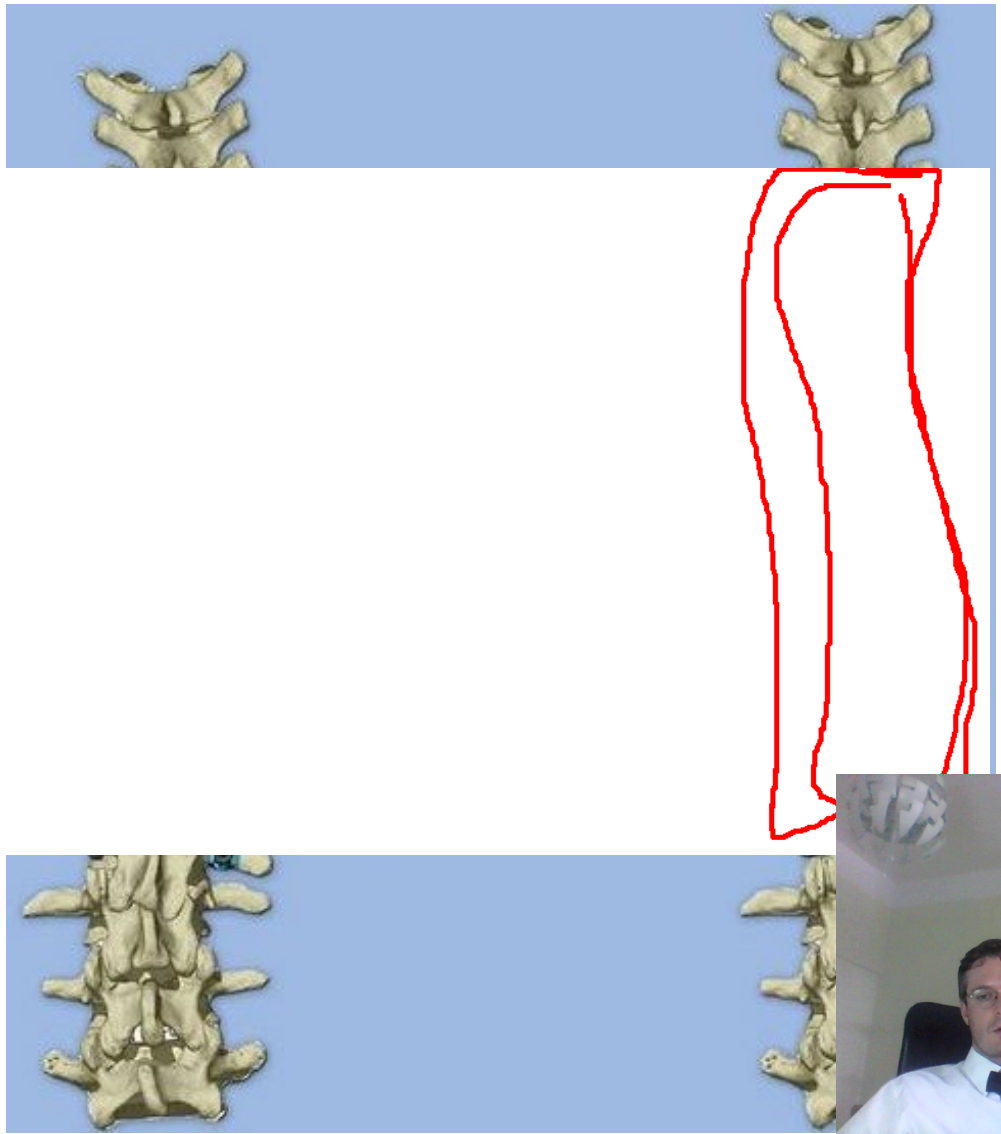


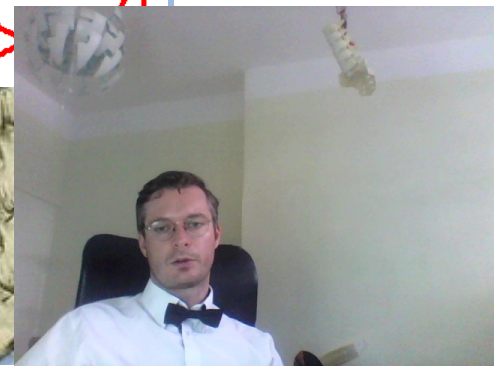


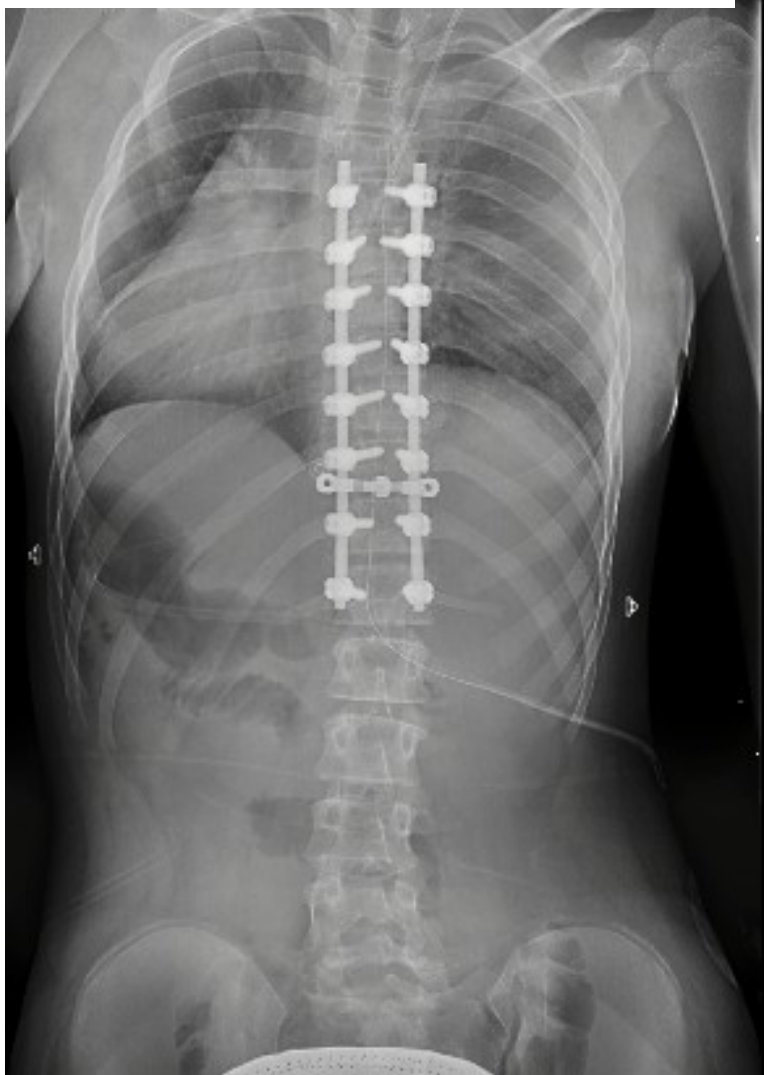


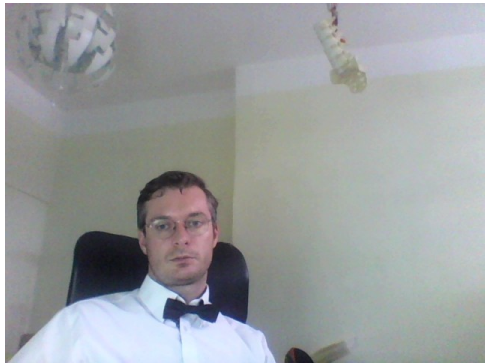
Method of surgical scoliosis treatment.

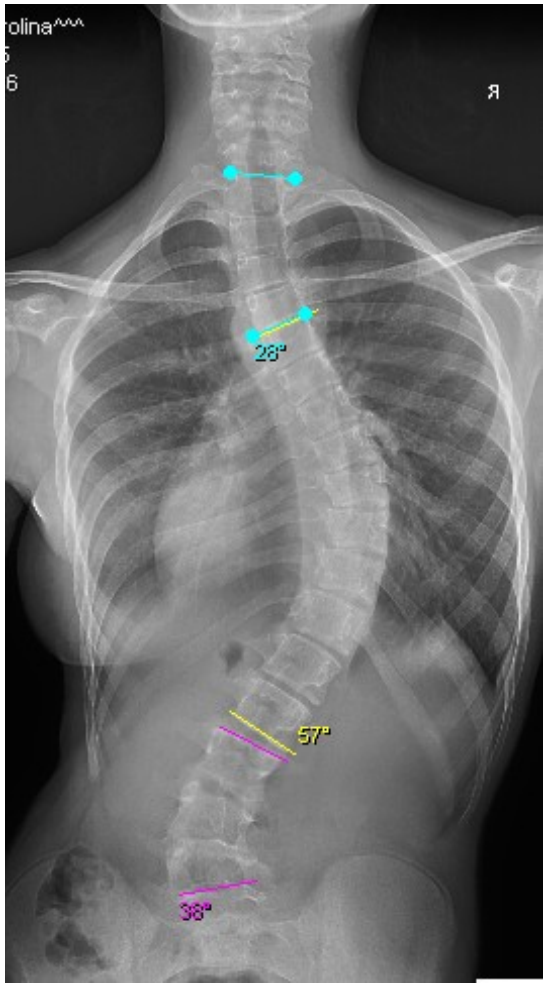
- Transpedicular screws
- Bended rods
- Bone grafts (autograf
- = INTERVERTEBRA

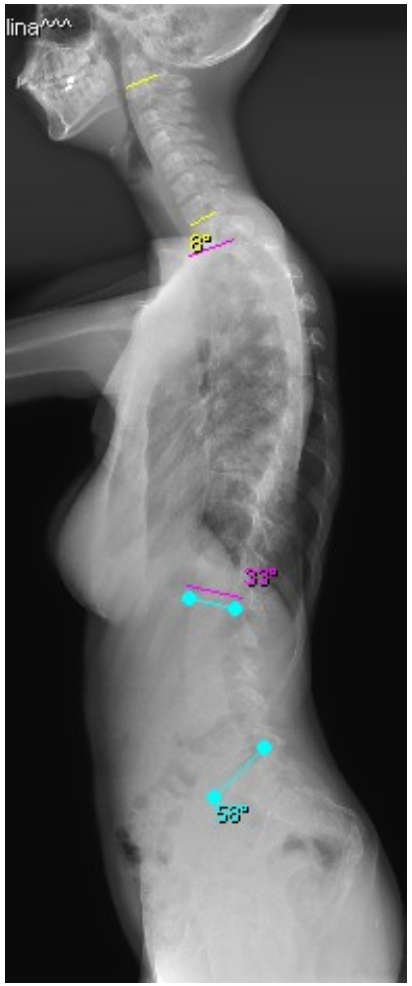


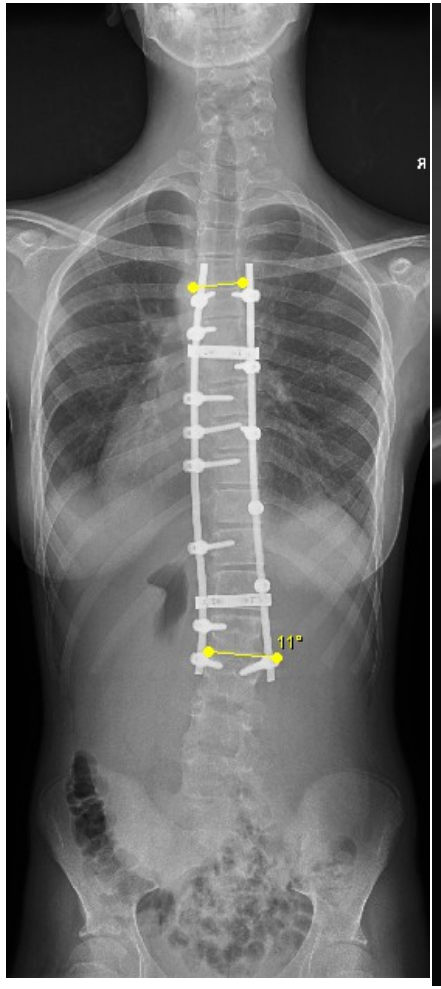


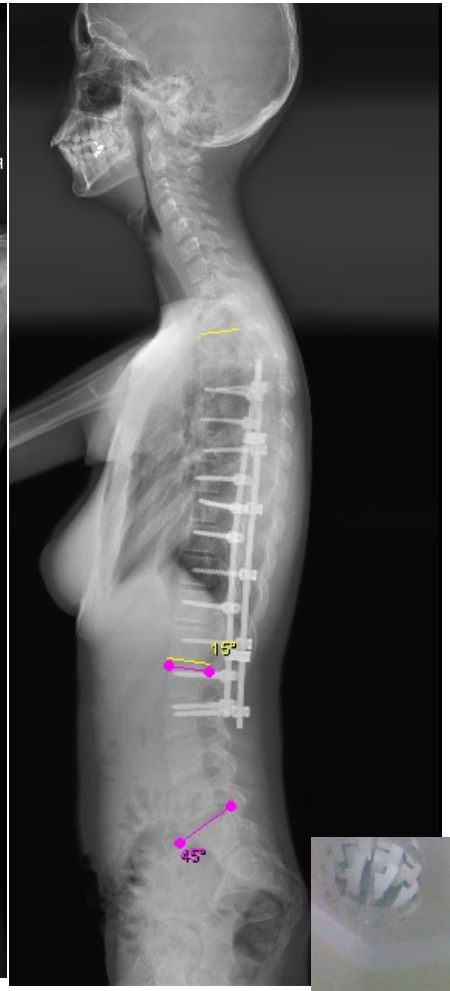


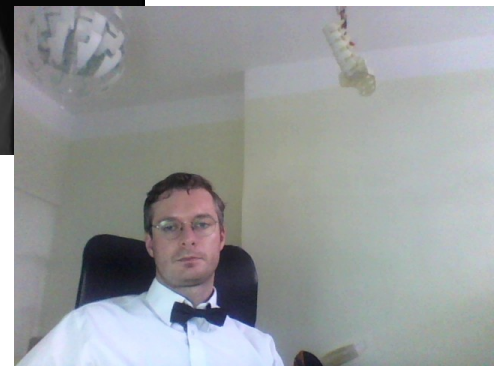


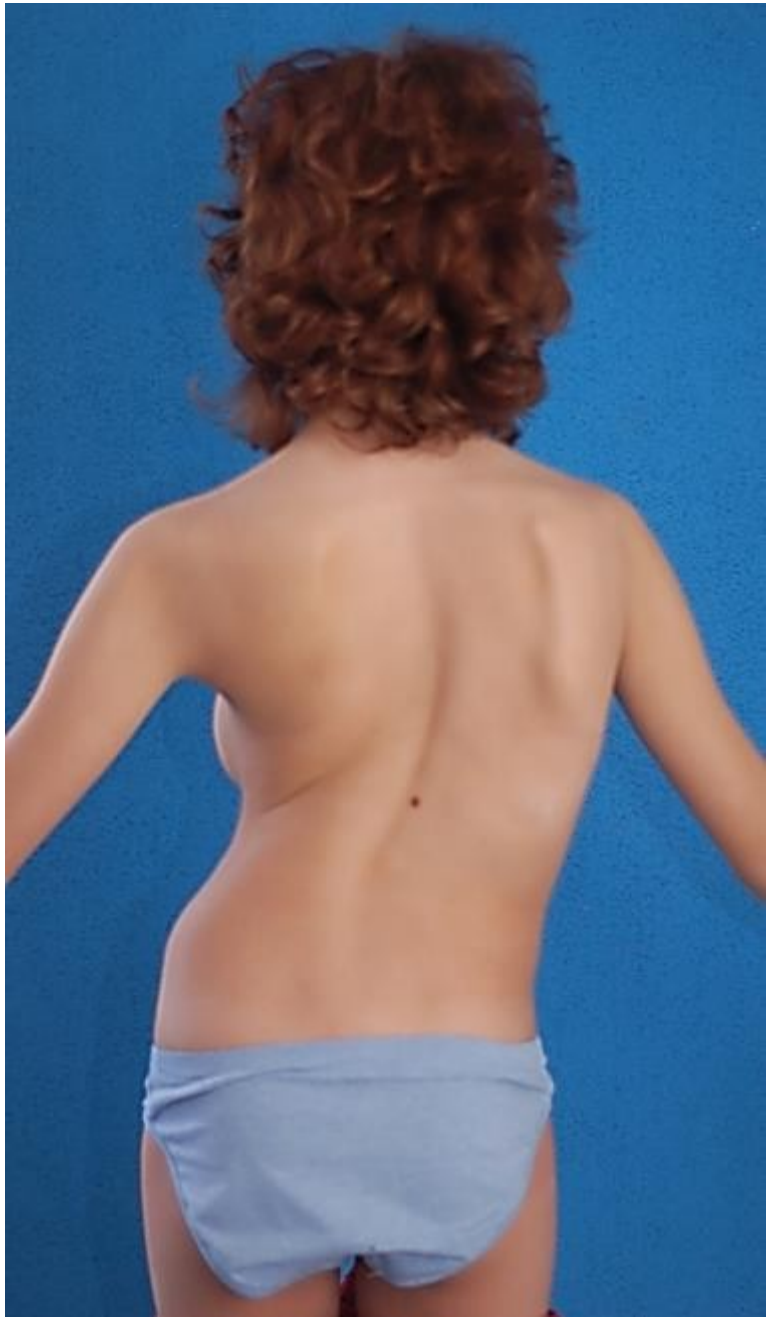

olina^^^
6
Я
28°
57°
38°

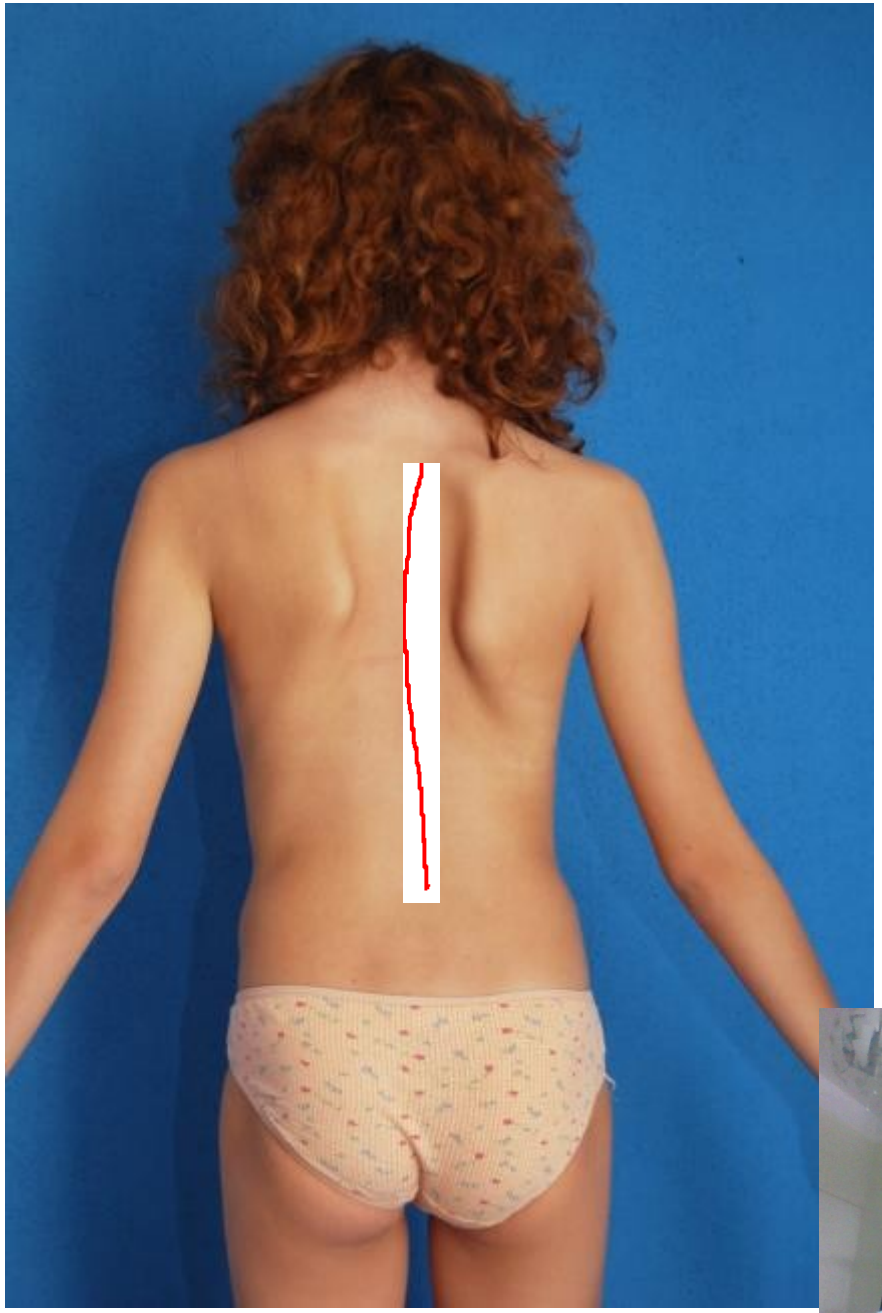

lina^^^
8°
33°
58°

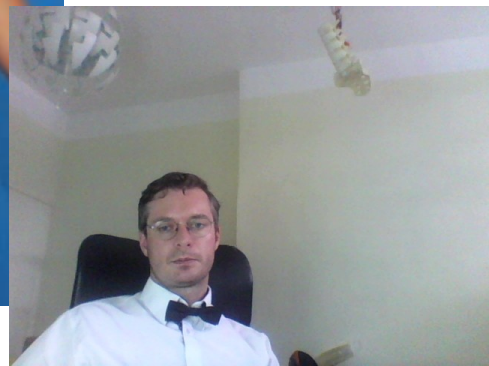

Я
11°


15°
45°









Základní pojmy popisné

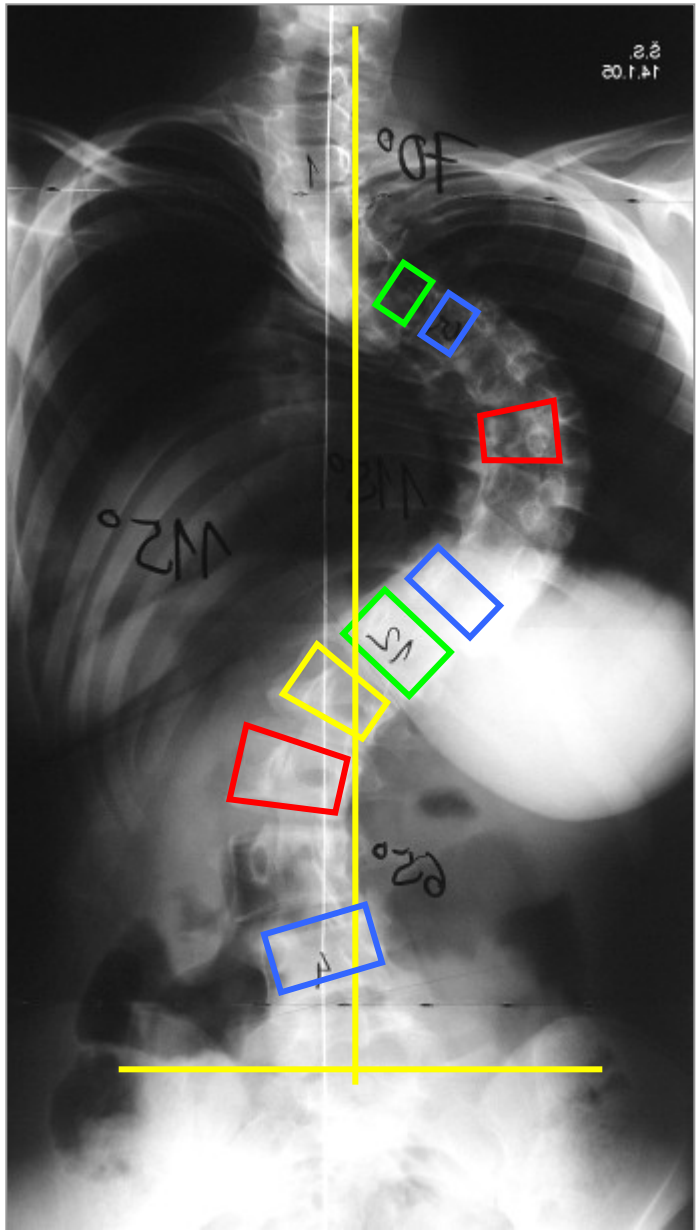
Apical vertebra

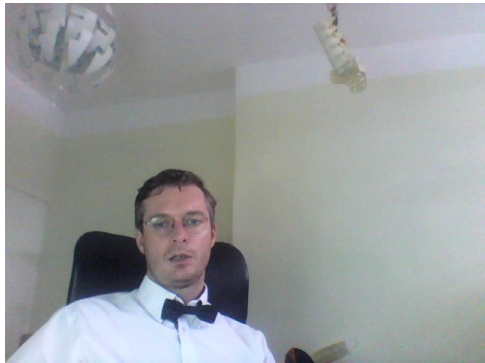
End vertebra

Neutral vertebra

CSVL

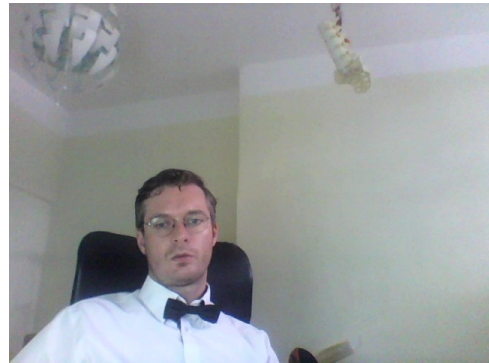
Stabile vertebra





Scoliosis types due to ethiology

- Idiopathic……..4/5 **80%**
  - infantile
  - juvenile



Scoliosis types due to ethiology

Deformity type

- Idiopathic
- Congenital
- Neuromuscular

Age

- Infantile
  - < 3 y
- Juvenile
  - 4-10 y
- Adolescent
  - 11-17 y
- Adult
  - > 17 y

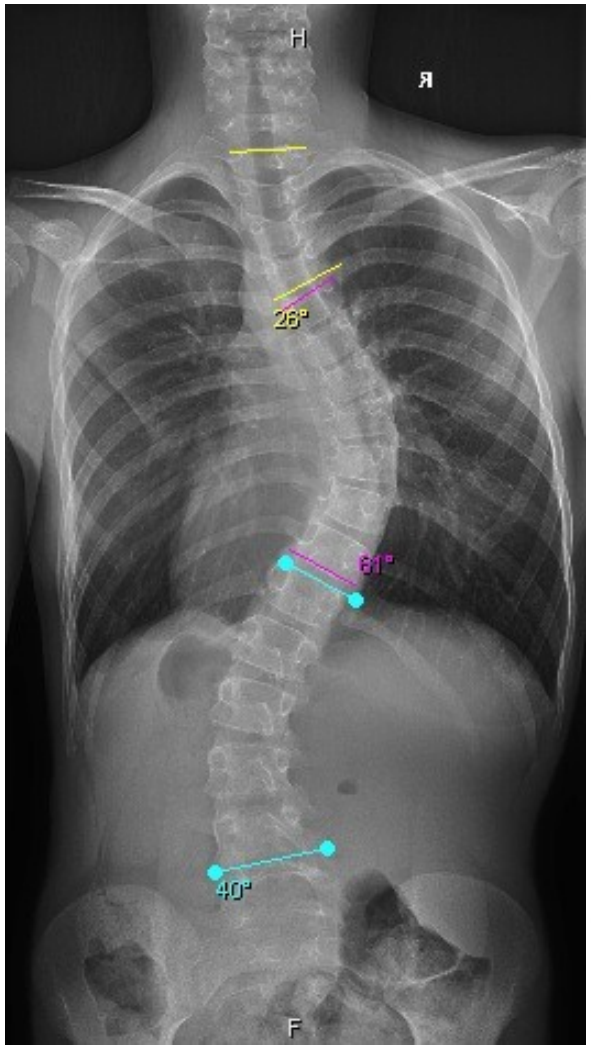
SCOLIOSIS
= 3 dimensional deformity

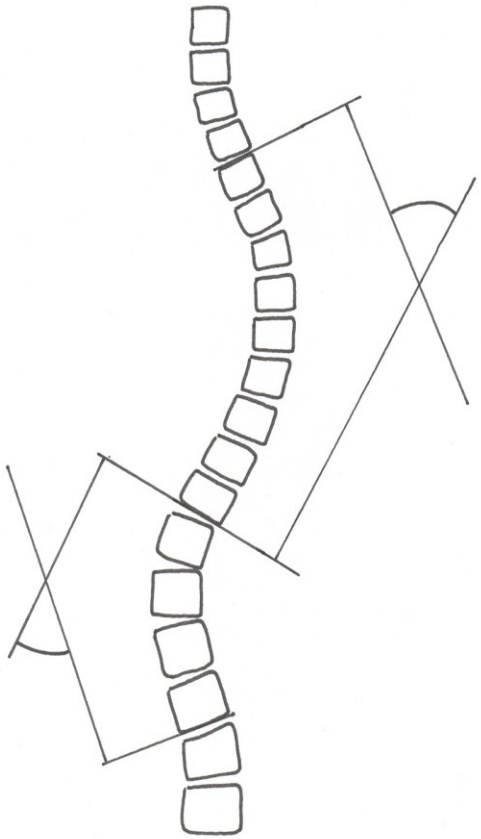
Coronal plane

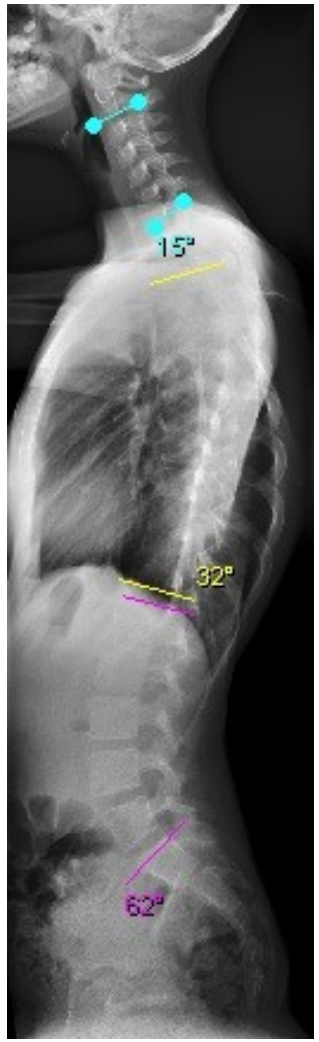
Sagittal plane

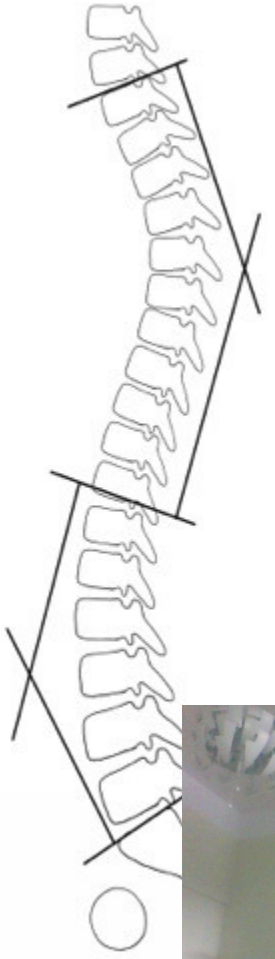
Transverse plane

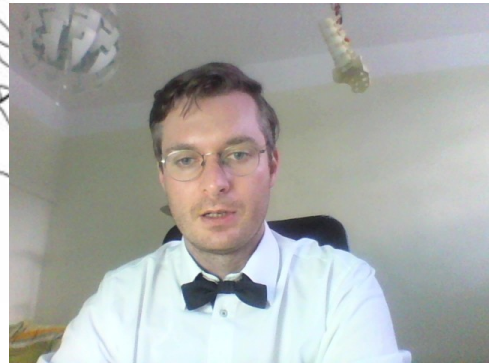
COBB‘s angle







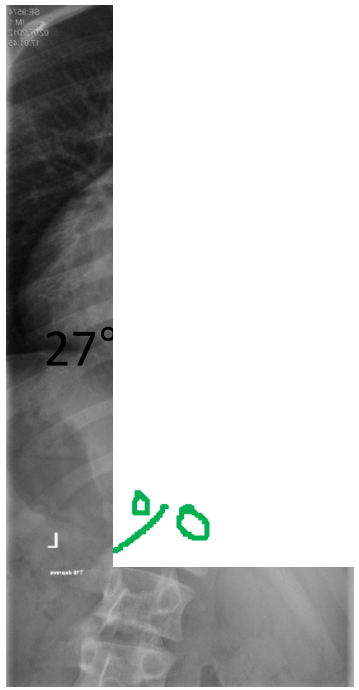




Essentially distinguish between:

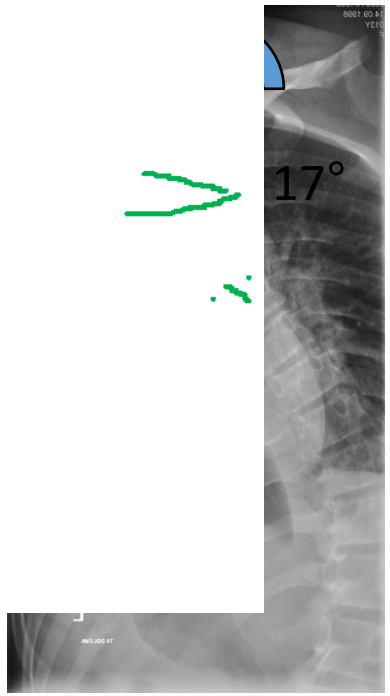
Structural curve

bend



Non-structural curve

25

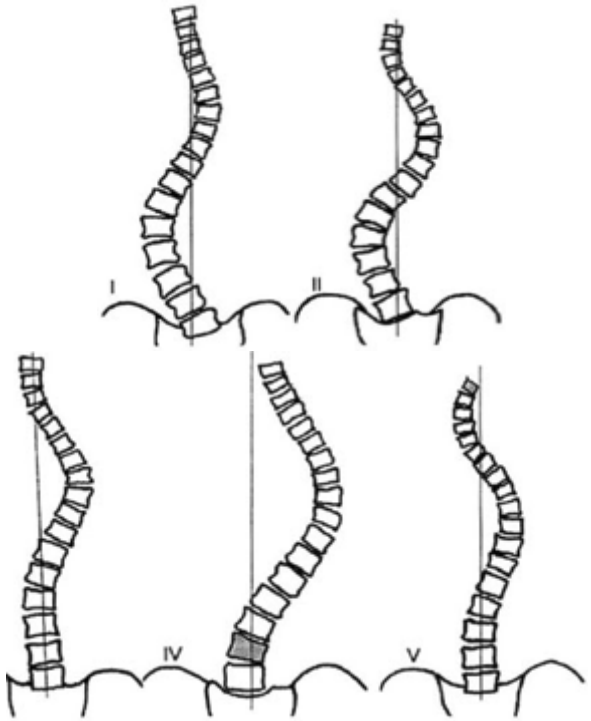


EVOLUTION
in scoliotic classifications

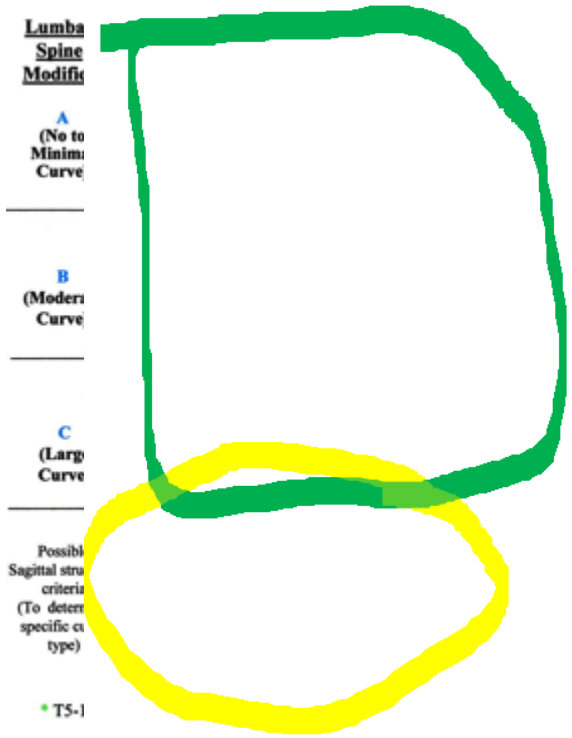
KING-MOE ⇨

1D

frontal



fro



LENKE‘s classification

- Curve type
- Lumbar spine modifier
- Thoracic sagittal profile

LENKE's classification

- Curve type

(Minor Curves)

Proximal Thoracic	- Side Bending Cobb ≥ 25° - T2-T5 Kyphosis ≥ +20°
Main Thoracic	- Side Bending Cobb ≥ 25° - T10-L2 Kyphosis ≥ +20°
Thoracolumbar/Lumbar	- Side Bending Cobb ≥ 25° - T10-L2 Kyphosis ≥ +20°

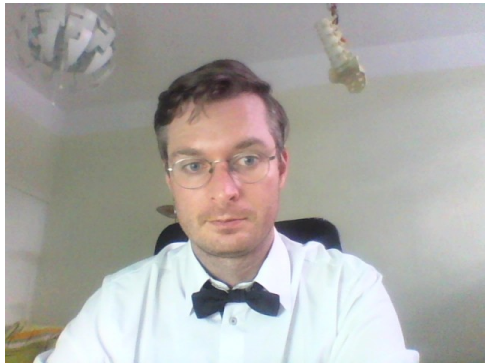
Minor = All other curves with structural criteria applied

§Type 4 - MT or TL/L can be major curve

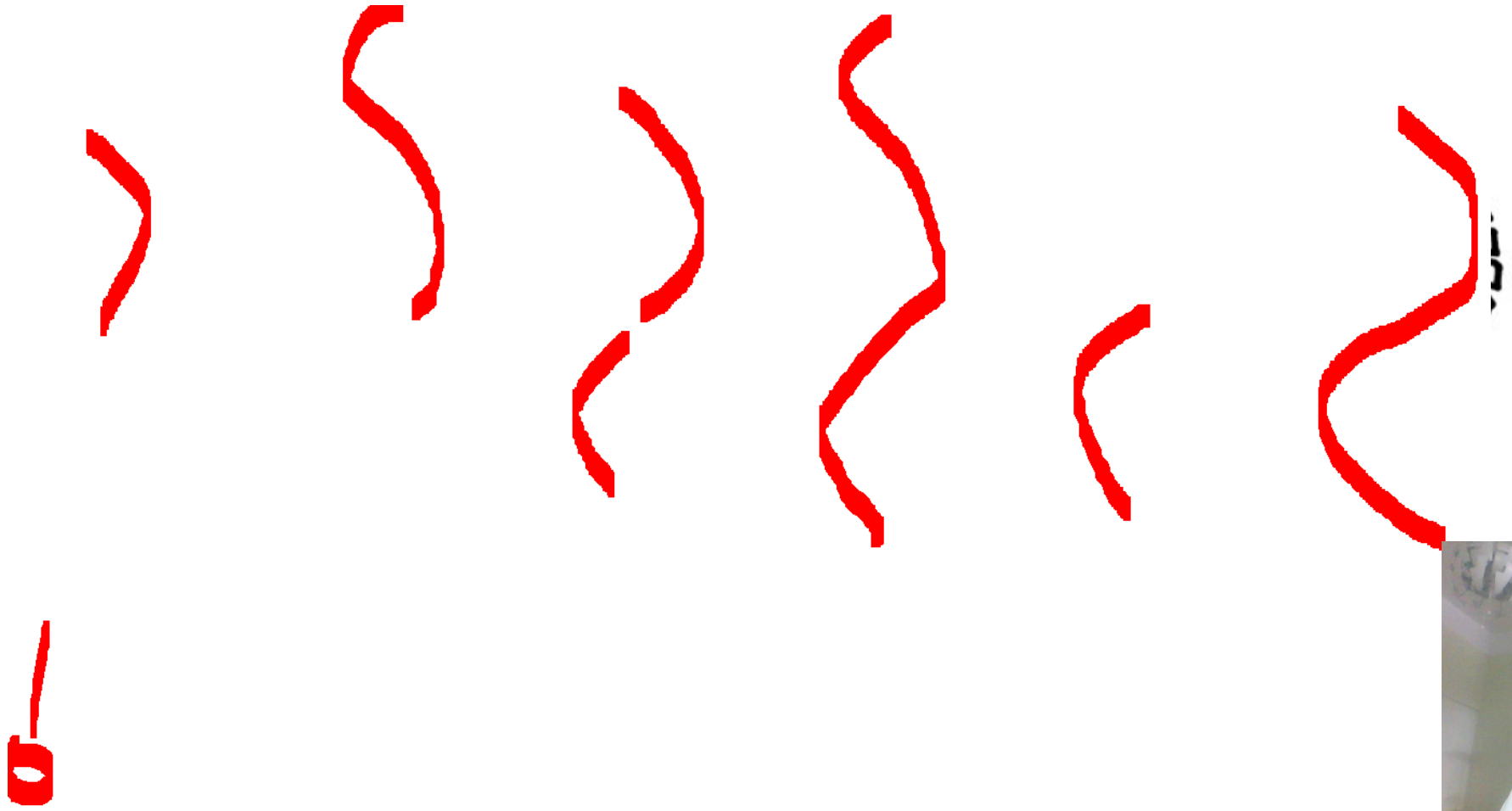
LOCATION OF APEX

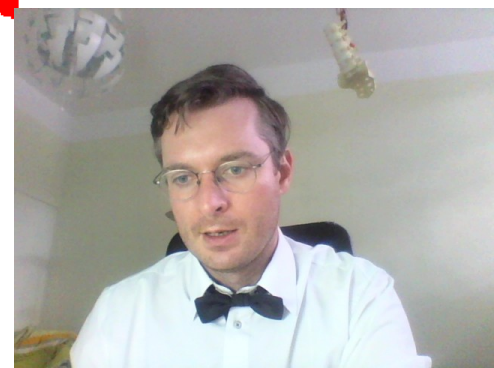
(SRS Definition)

CURVE	APEX
Thoracic	T2-T11/12 Disc
Thoracolumbar	T12-L1
Thoracolumbar/Lumbar	L1/2 Disc-L4



Lenke‘s classification
curve types

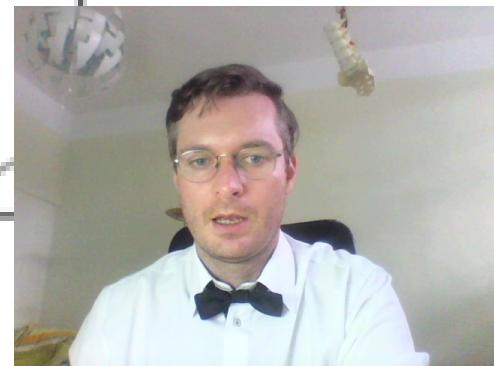




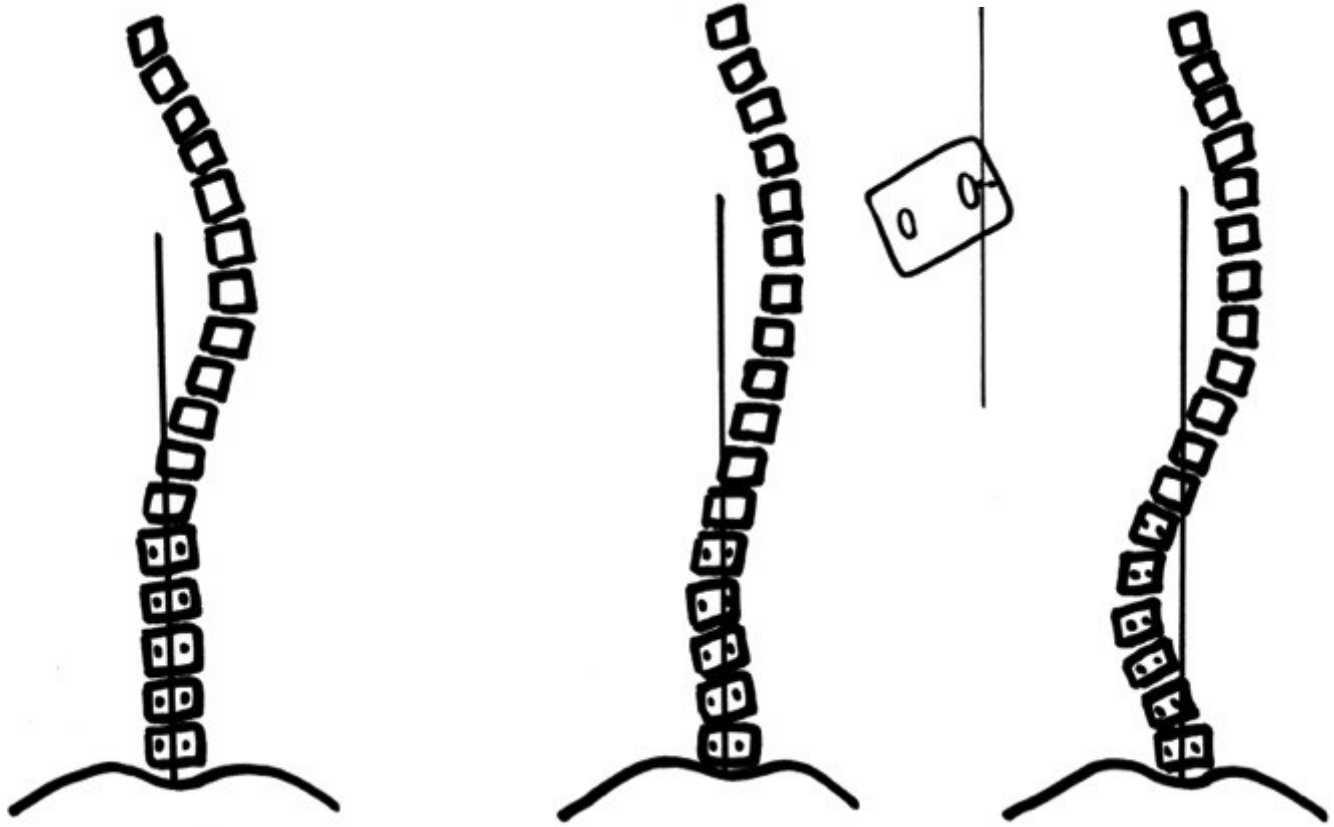
LENKE‘s classification

- **Lumbar spine modifier**

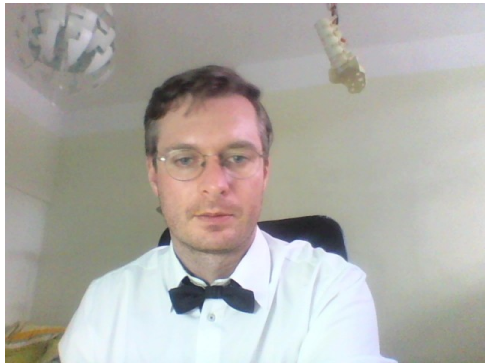
Lumbar Spine Modifier	
A	
B	
C	



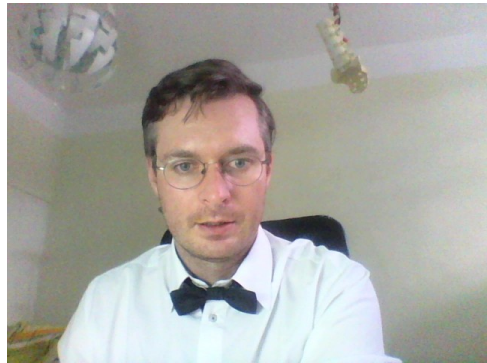
Lenke‘s classification lumbar parameter



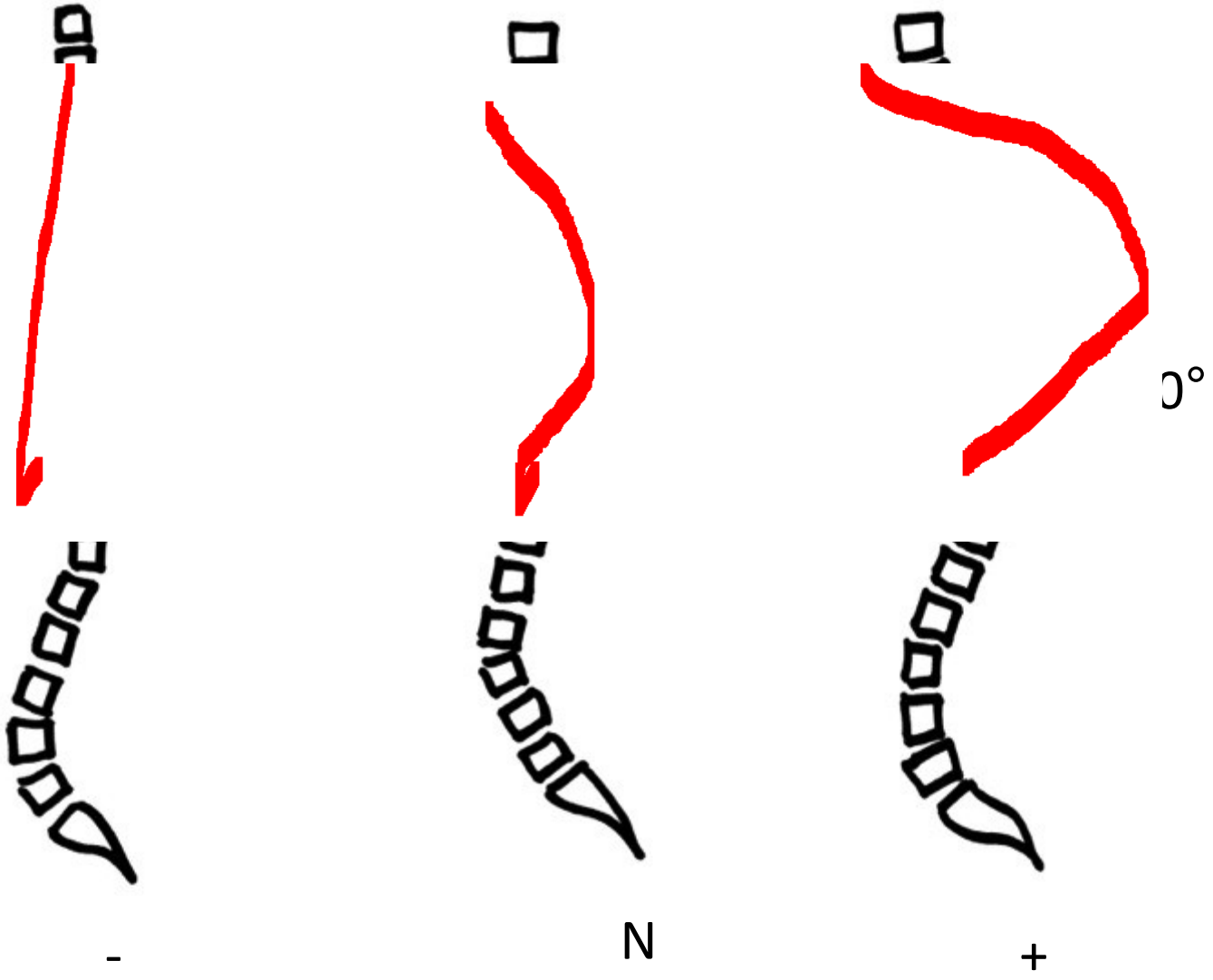
A B C

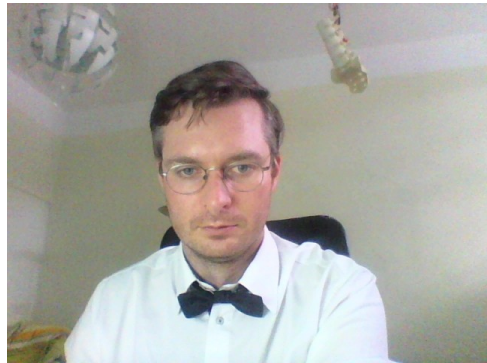


LENKE‘s classification



Lenke‘s classification sagittal parameter





Lenke‘s classification
EXAMPLES

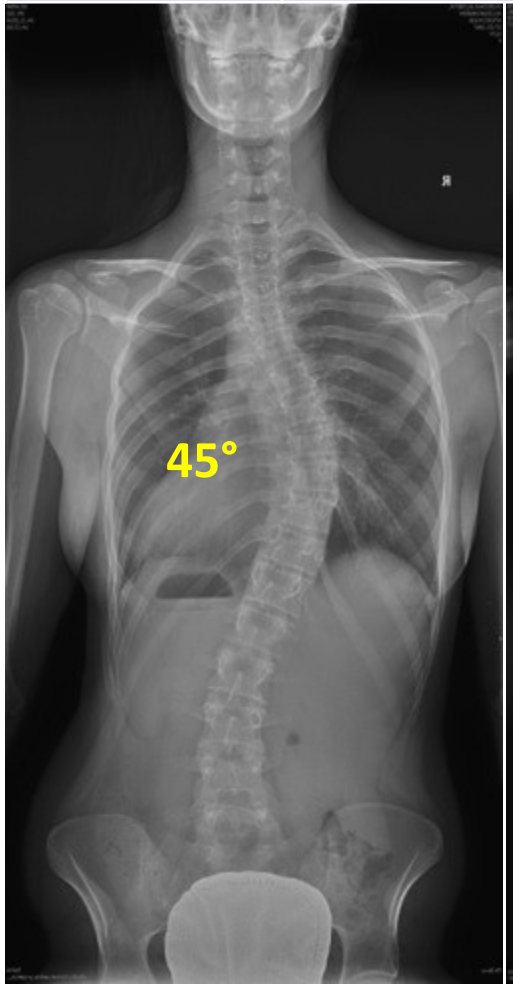
> 40°

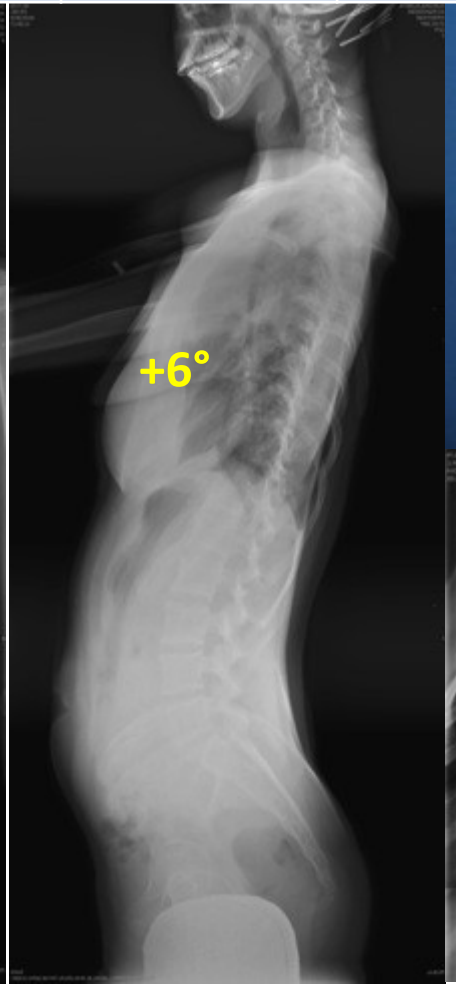
Lenke 1

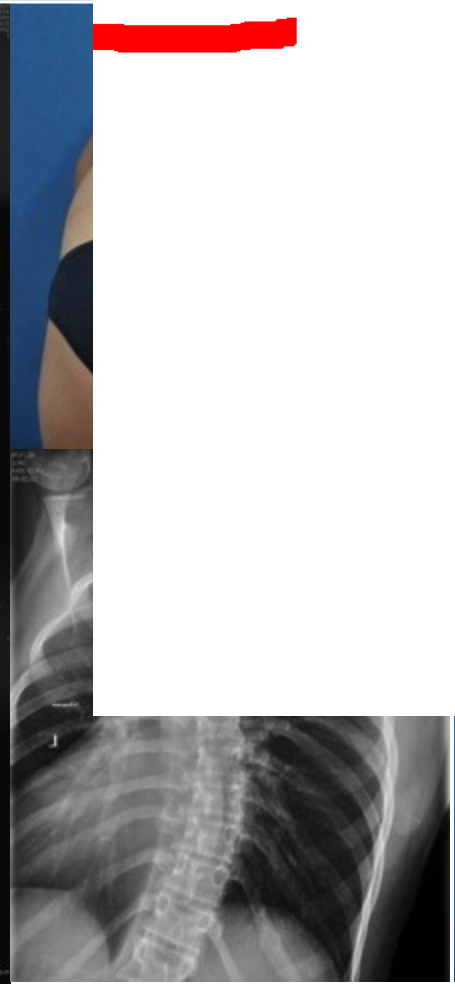
Lenke 1A-

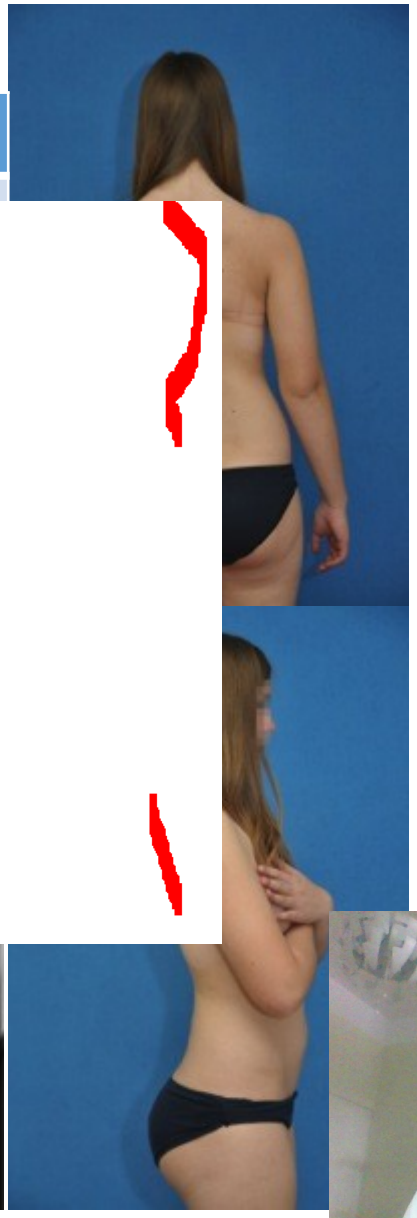
Girl 13+9

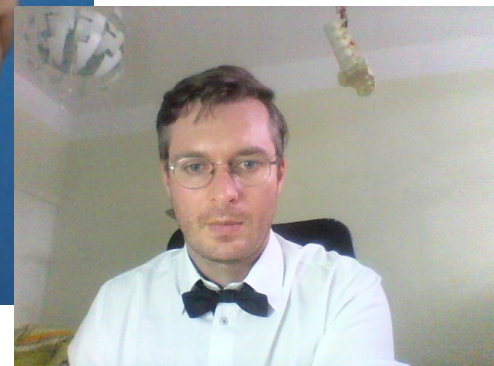
type	Proximal thoracic	Main thoracic	Thoracolumbar/lumbar	Description
1	Non-Structural	Structural (Major)	Non-Structural	MT (Main Thoracic)







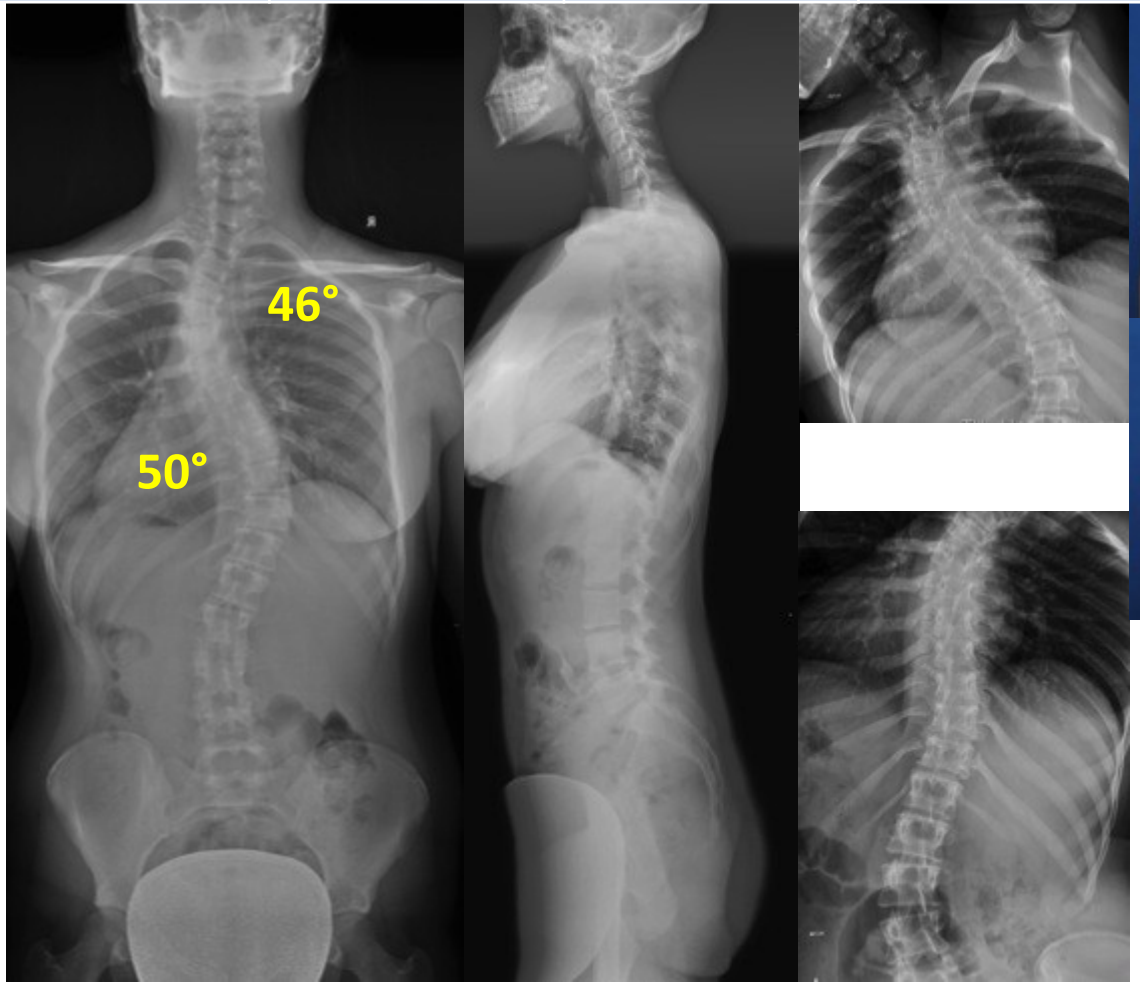


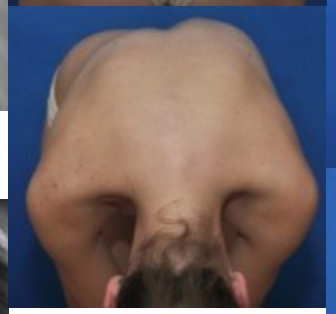


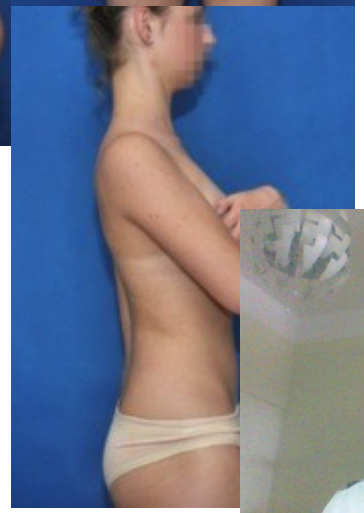
Girl 14+1

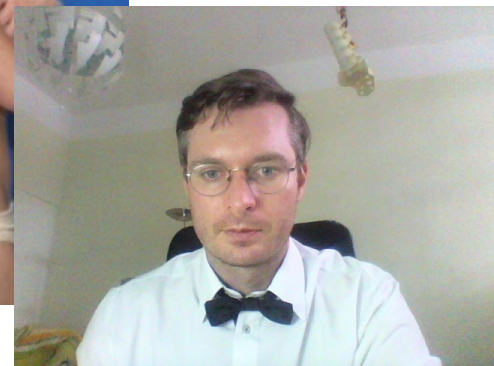
Lenke 2

type	Proximal thoracic	Main thoracic	Thoracolumbar/lumbar	Description
2	Structural	Structural (Major)	Non-Structural	DT (Double Thoracic)





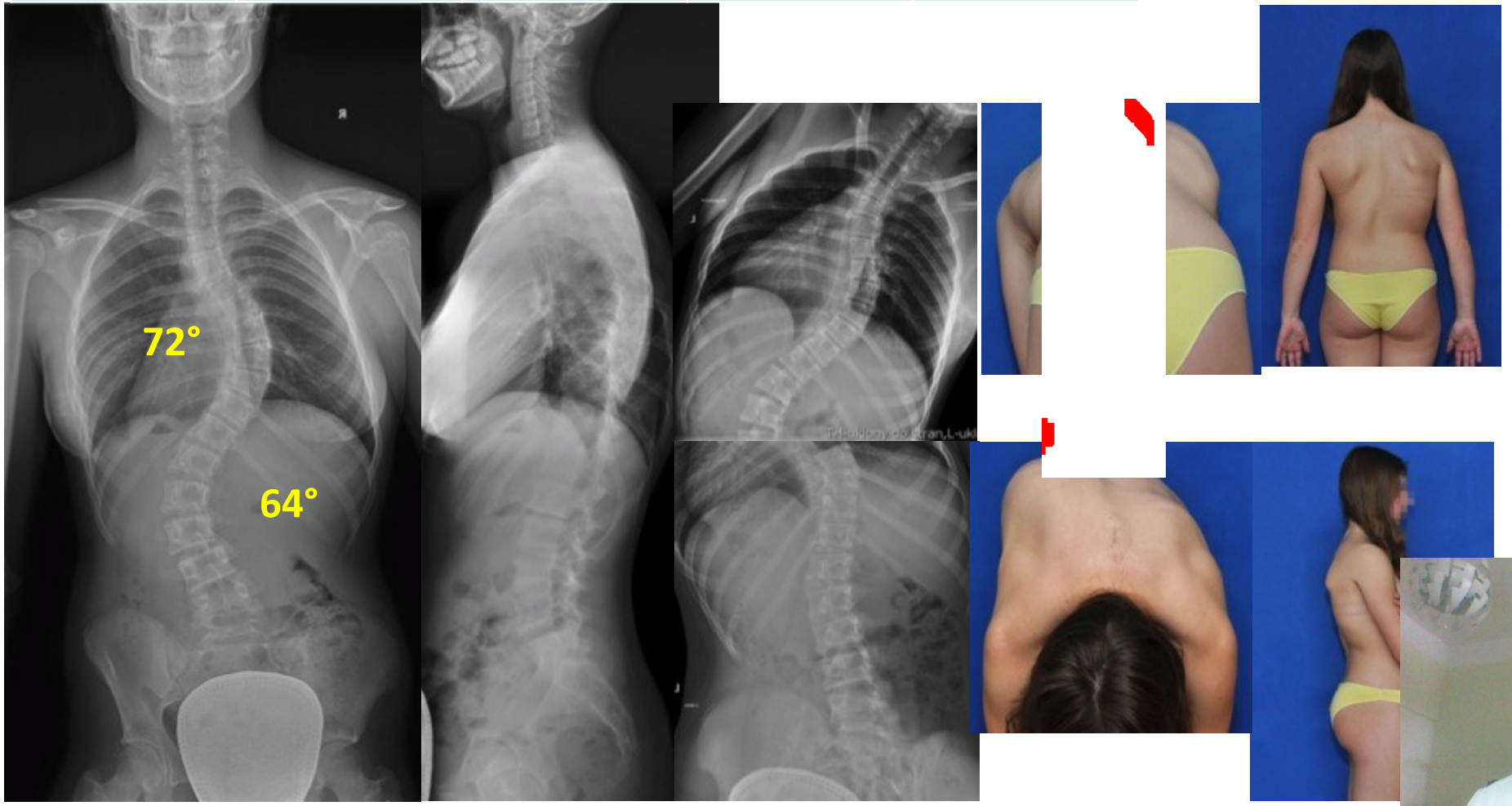


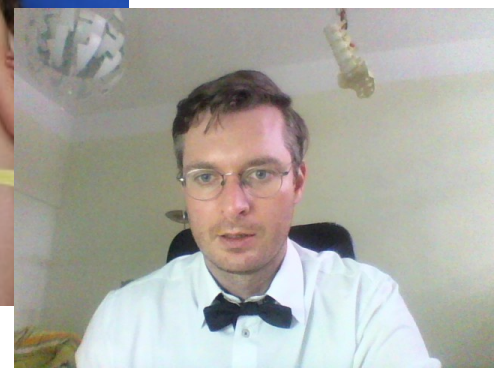


Girl 14+2

Lenke 3

type	Proximal thoracic	Main thoracic	Thoracolumbar/lumbar	Description
3	Non-Structural	Structural (Major)	Structural	DM (Double Major)

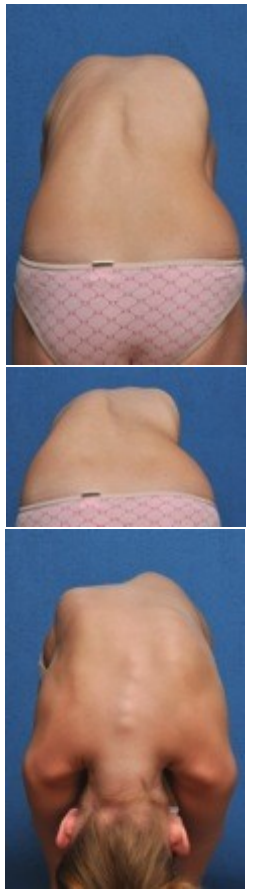


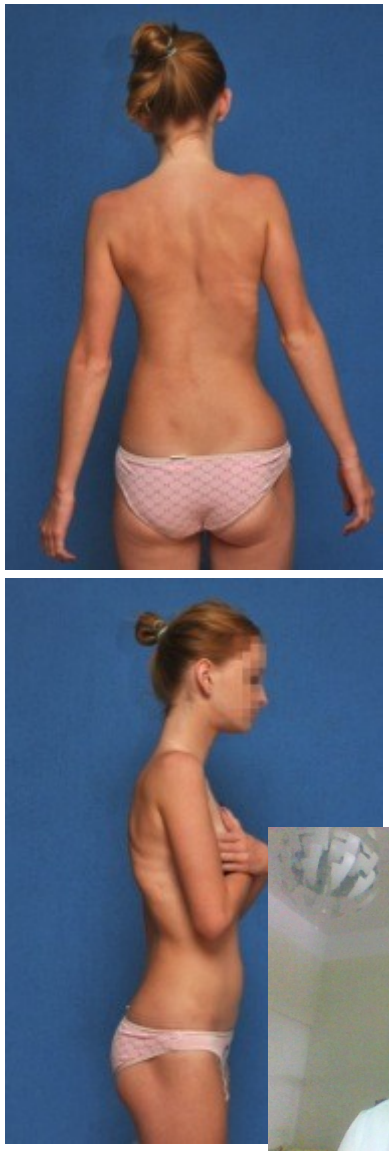


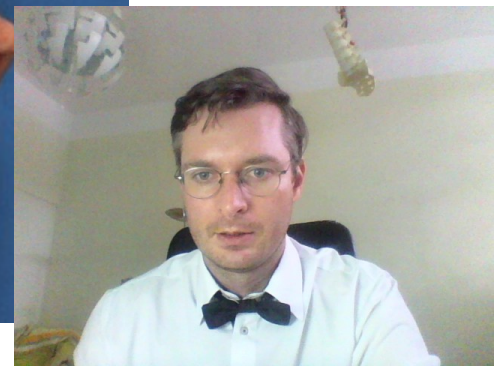
Girl 12+9

Lenke 4

type	Proximal thoracic	Main thoracic	Thoracolumbar/lumbar	Description
4	Structural	Structural (Major)	Structural (Major)	TM (Triple Major)



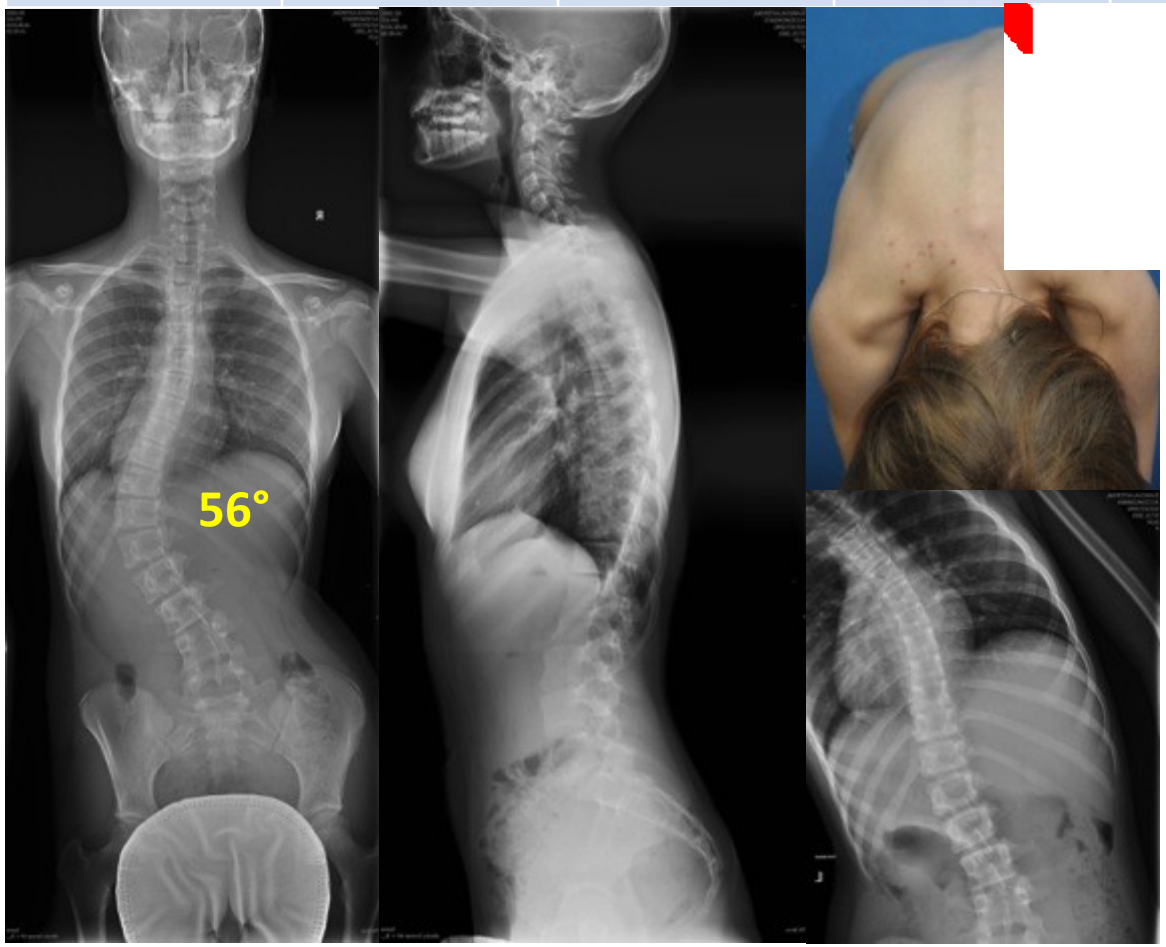


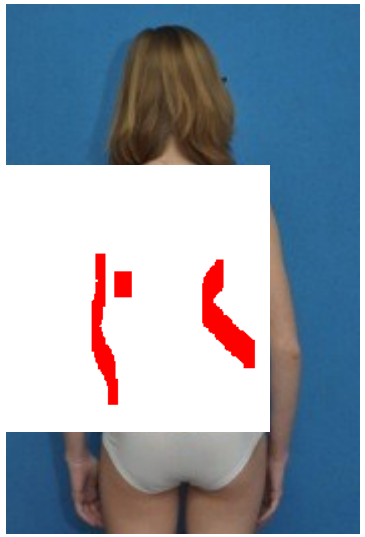


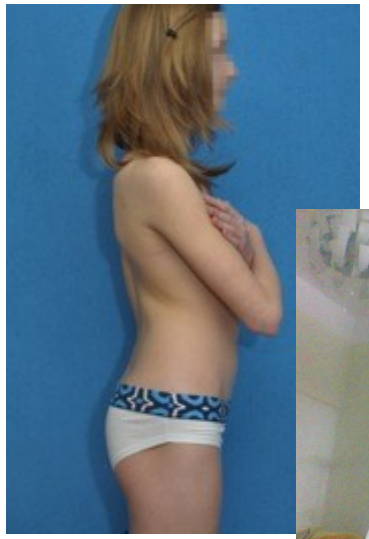
Girl 12+5

Lenke 5

type	Proximal thoracic	Main thoracic	Thoracolumbar/lumbar	Description
4	Non-Structural	Non-Structural	Structural (Major)	TL/T (Thoracolumbar/Lumbar)



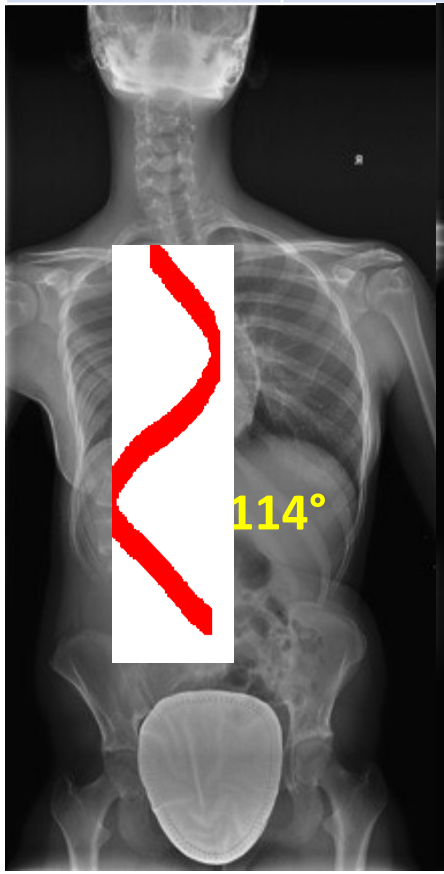


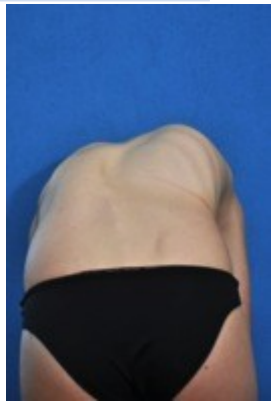


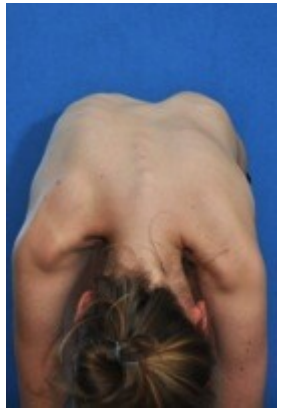
Girl 16+9

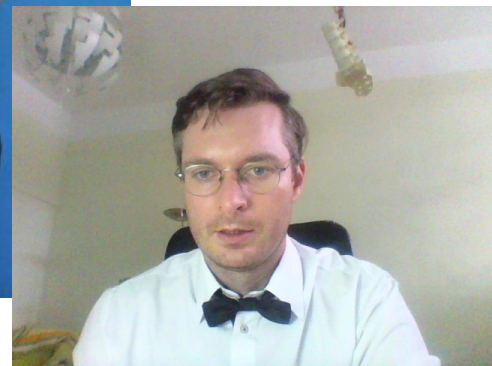
Lenke 6

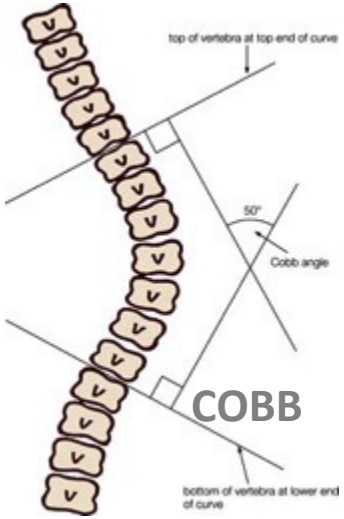
type	Proximal thoracic	Main thoracic	Thoracolumbar/lumbar	Description
4	Non-Structural	Structural	Structural (Major)	TL/T-MT (Thoracolumbar/Lumbar-Main Thoracic)











Therapeutic chart

observation **bracing** **surgery**

0-20° **>40°**

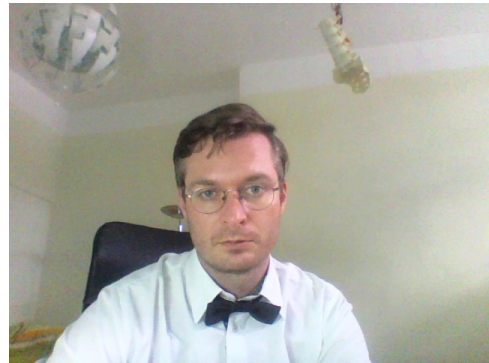
PHYSIOTHERAPY

Non-operative treatment

physiotherapy

casting

bracing

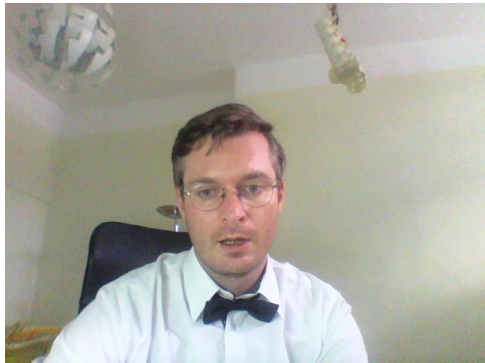


CASTING

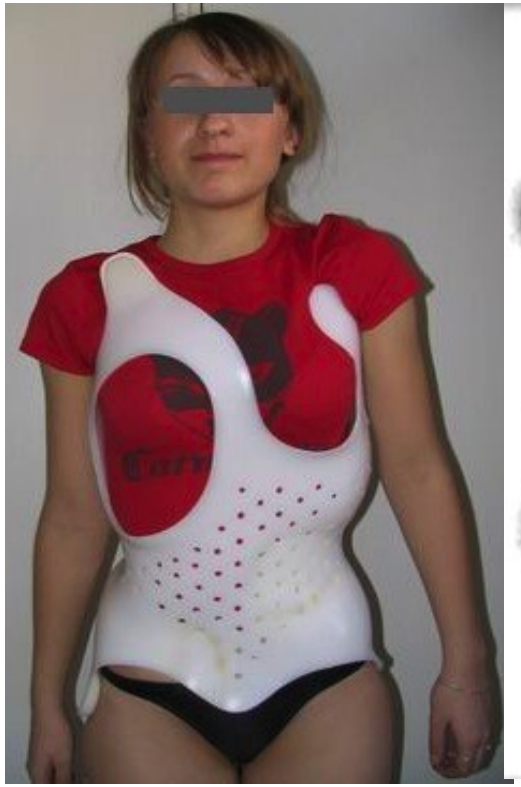
Indication: INFANTILE scoliosis

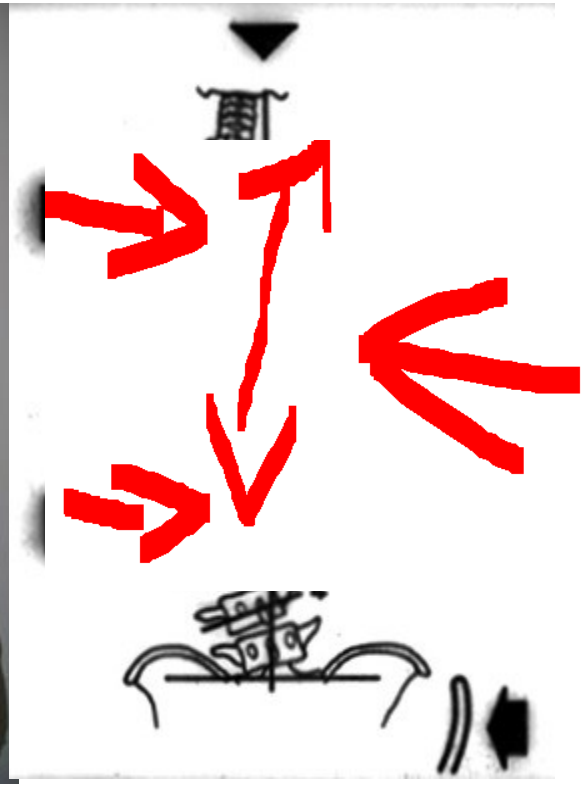
Applying under the general anesthesia

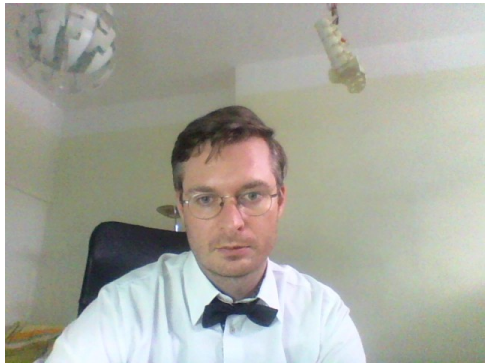
Changing each and every 2 month



BRACING



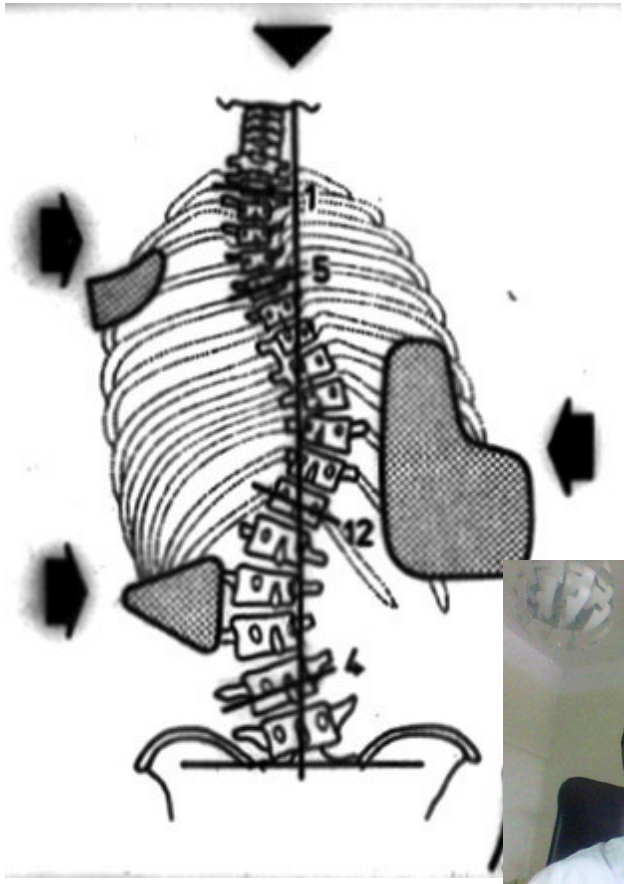


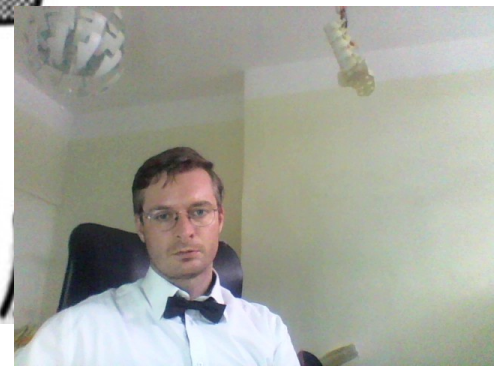


BRACING

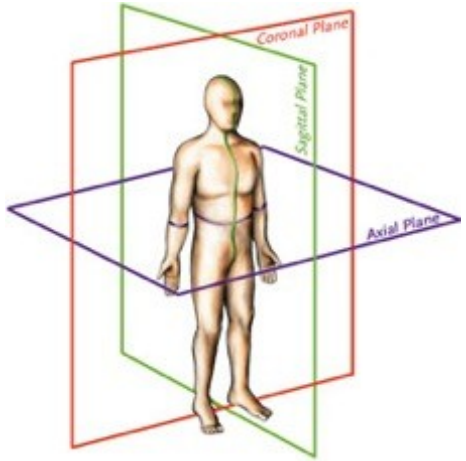
Indication for bracing:

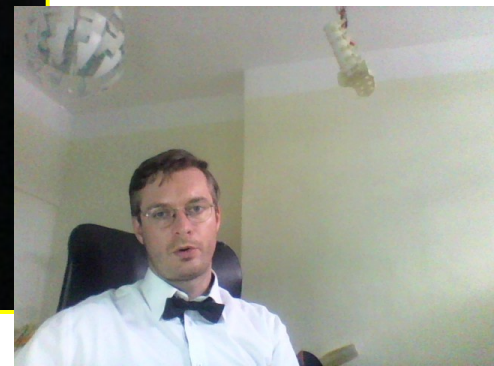
progressive scoliosis
poor or no casting toleration
unable to undergo surgery



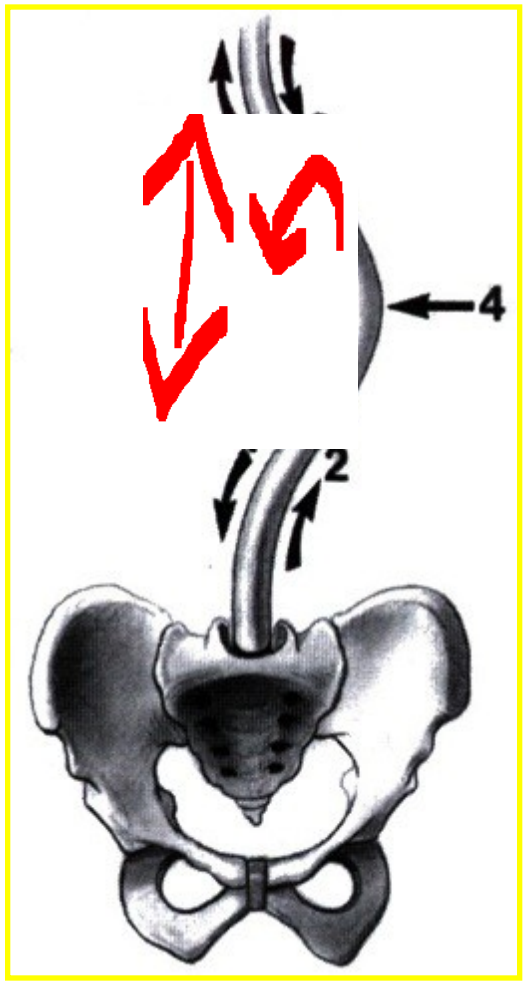


3D
scoliotic correction





Corrective methods

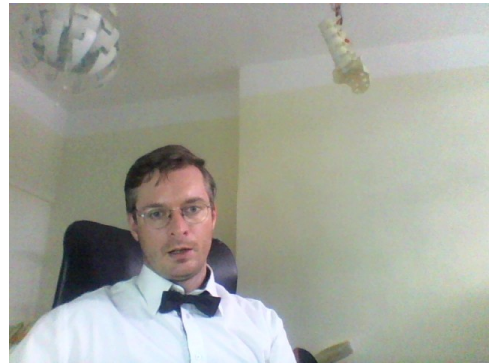


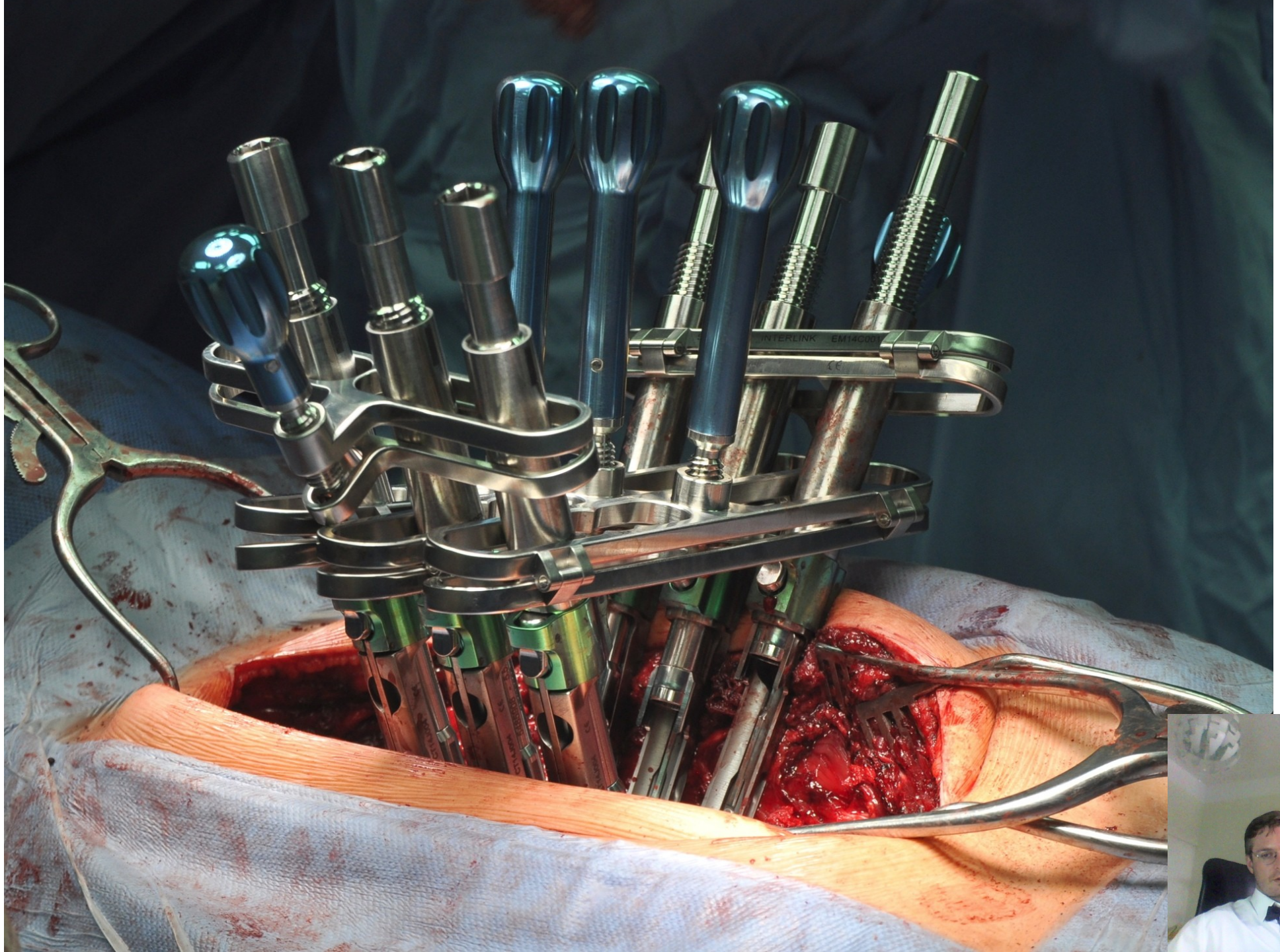
1-distraction

2-compression

3,4-translation

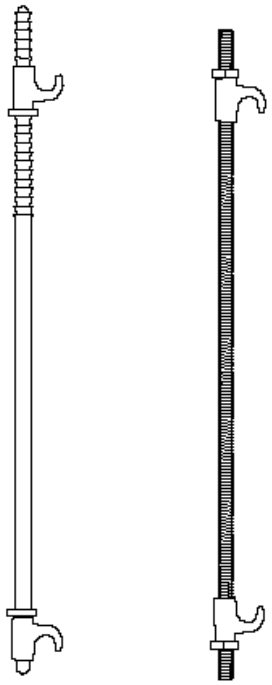
5-derotation



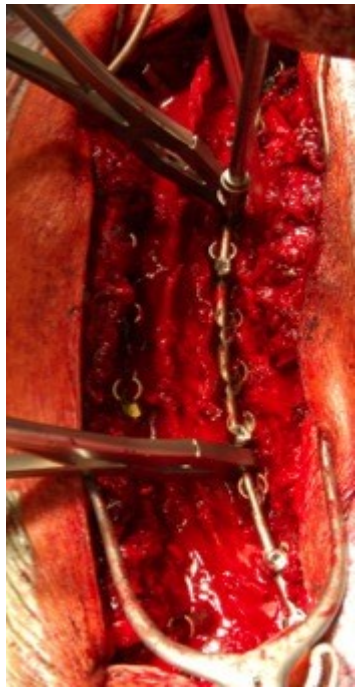

NTERLINK
EM14C00

EVOLUTION
in corrective maneuvers

DISTRACTION → TRANSLATION → VCM → Rod Reduction



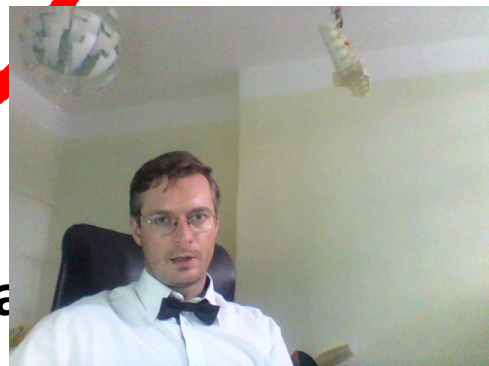
1D
frontal



1D
frontal

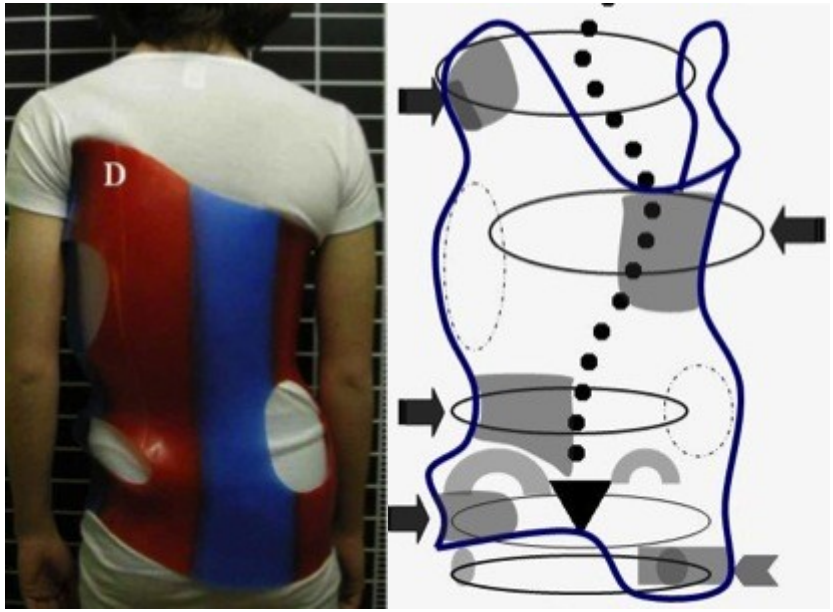
2D
frontal, axial

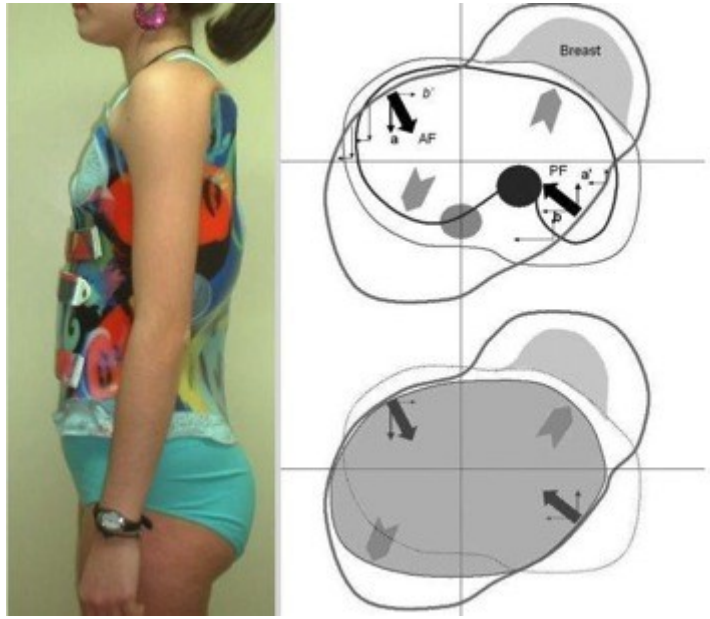
3D
frontal, axial, sagitta



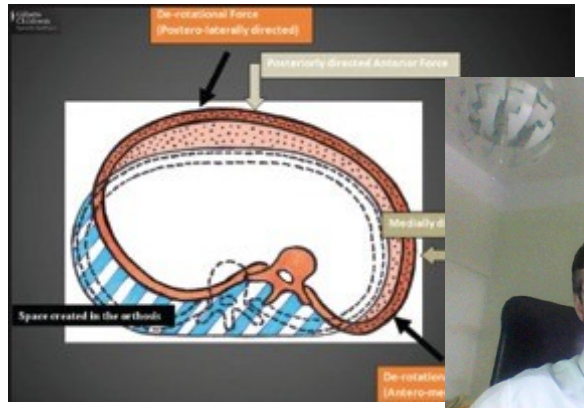
EVOLUTION
in corrective maneuvers

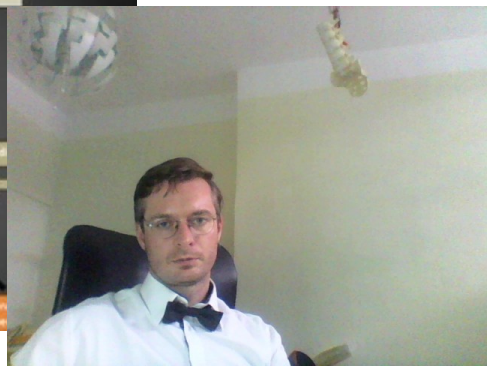
BRACING





Source: Rigo et al, Scoliosis 2010





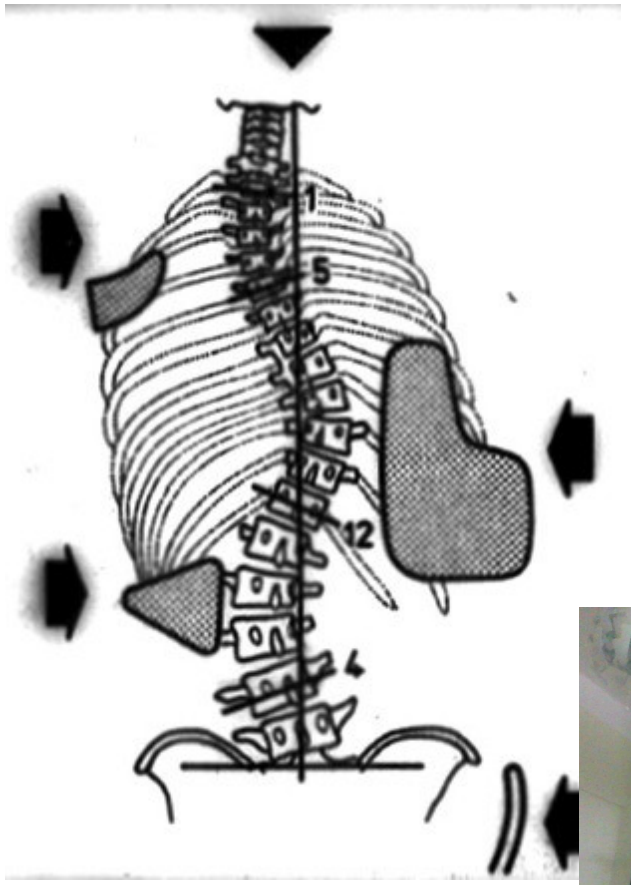
BRACING

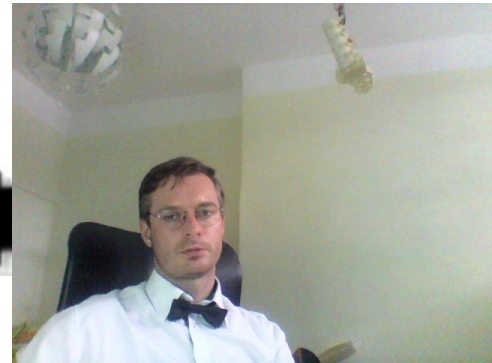
Advantages:

asing

Problems:

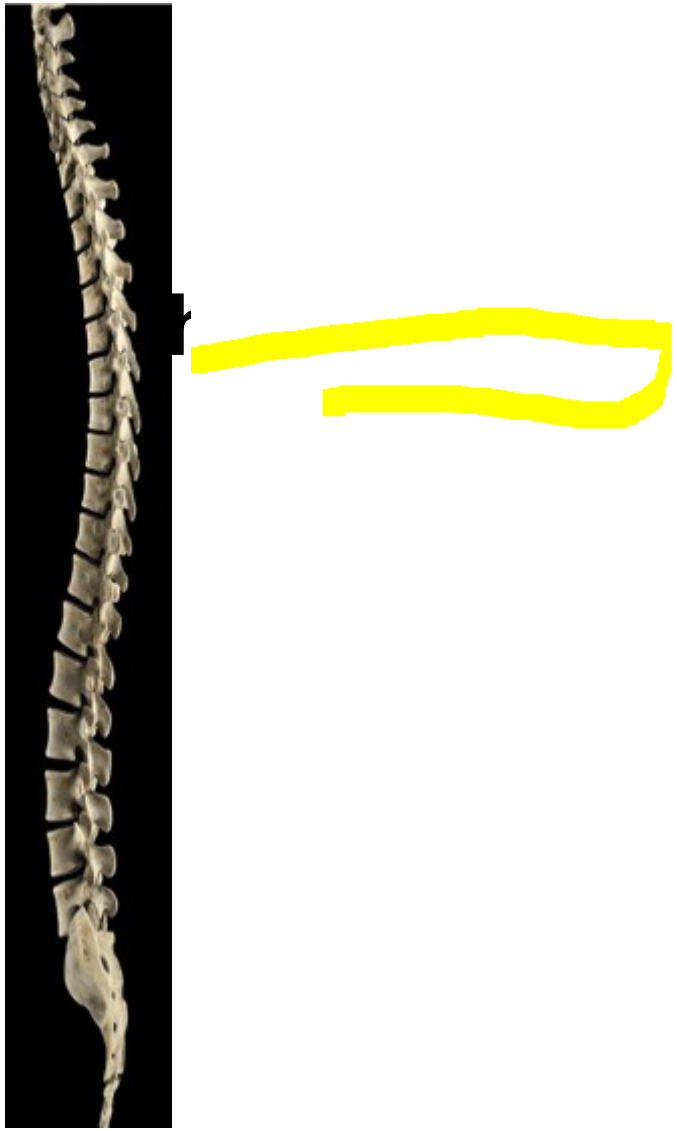
- HYPOKYPHOSIS
- POOR DEROTATION

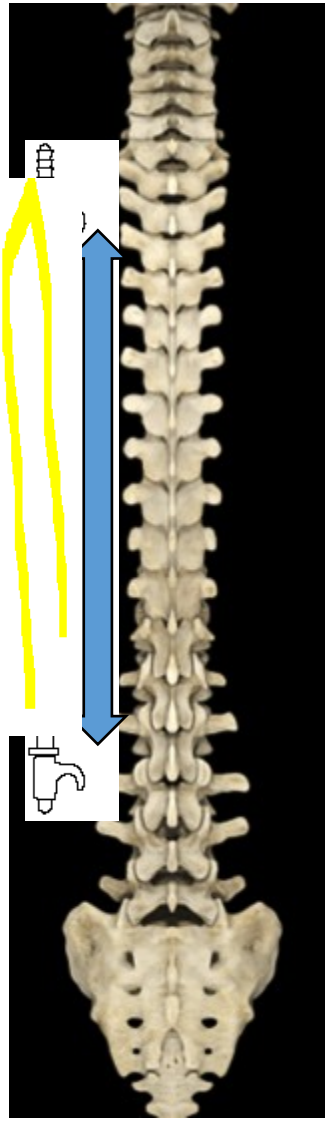


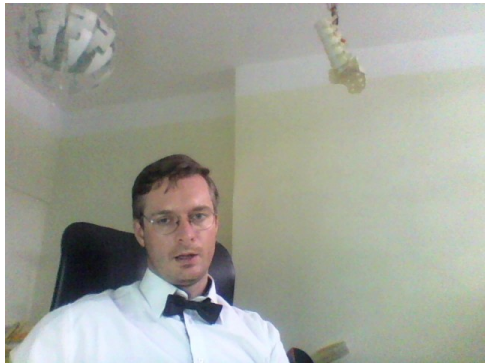


DISTRACTION

EVOLUTION
in corrective maneuvers







DISTRACTION

Advantages:

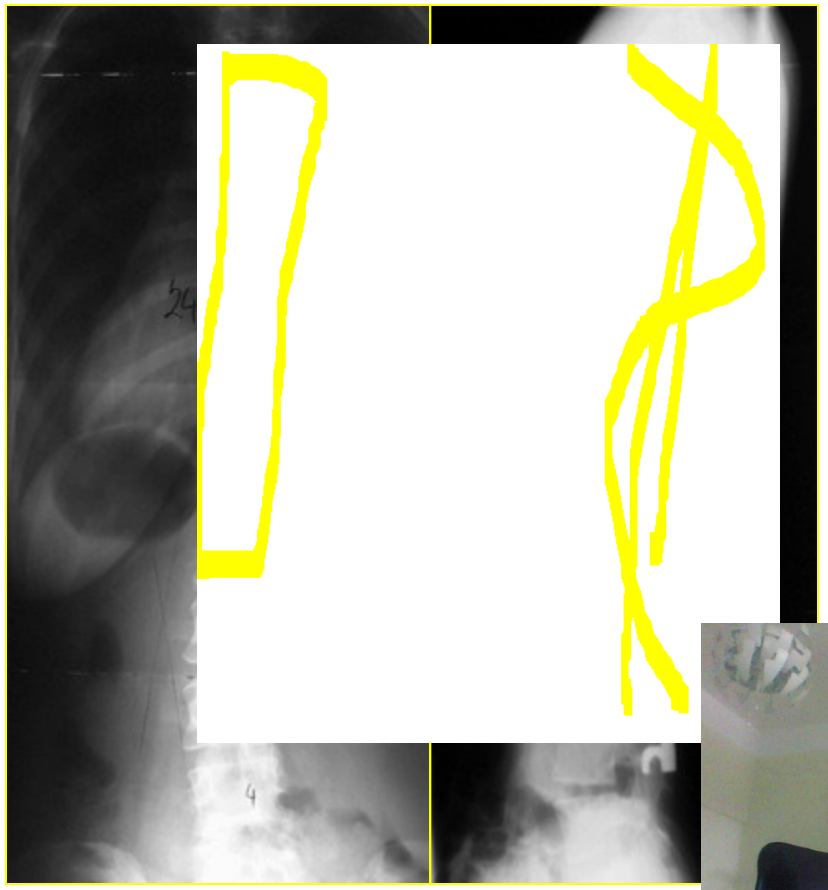
- Simple implantation
- Possibility of spine growth
- Miniinvasive approach

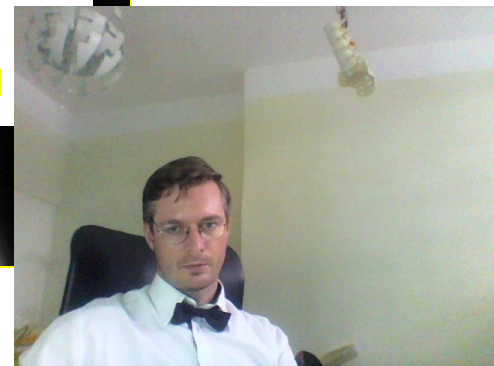
Disadvantages:

- Uniplanar correction (frontal)
- High rate of complications

Problems:

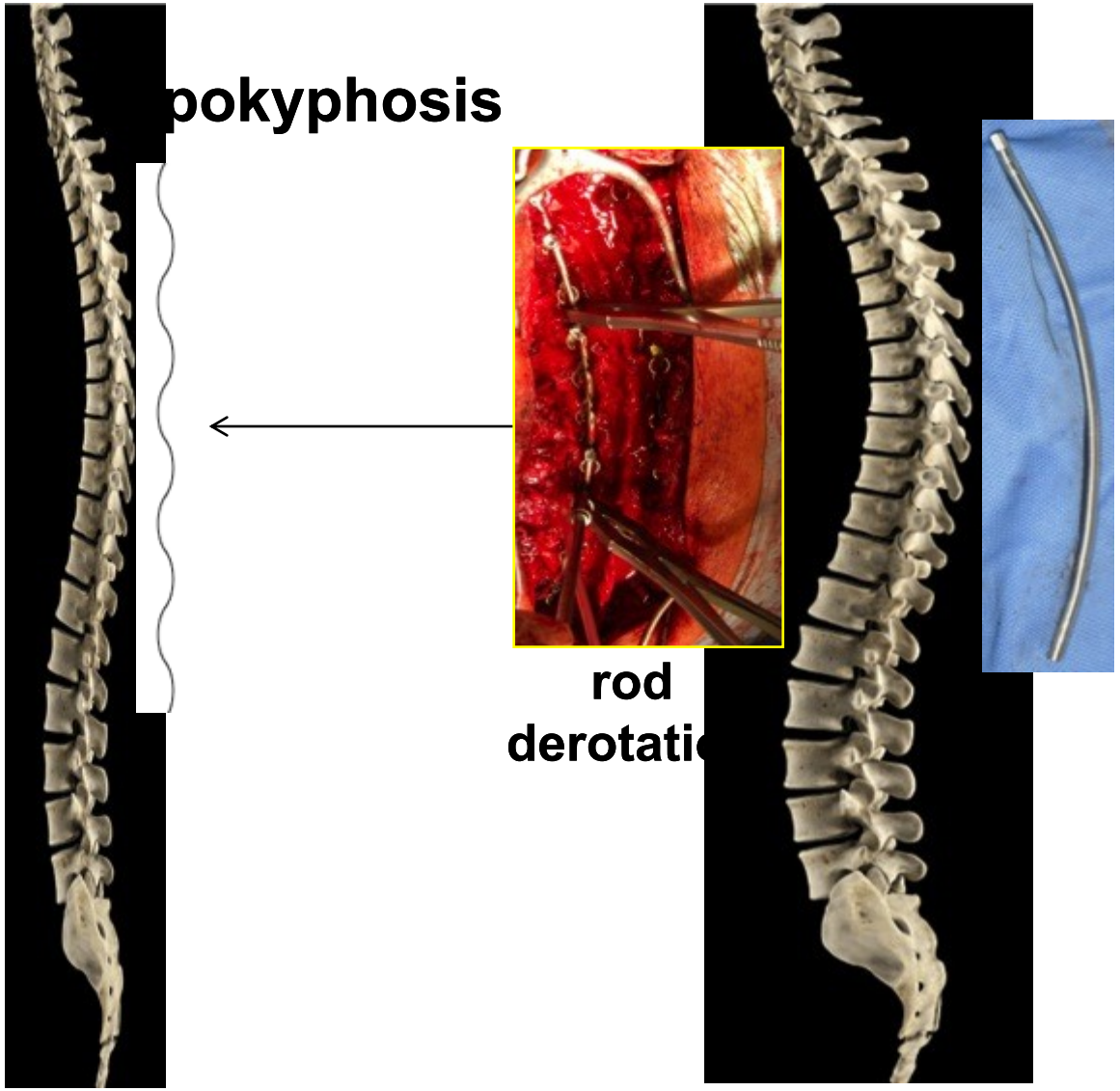
- **HYPOKYPHOSIS**
- **NO DEROTATION**

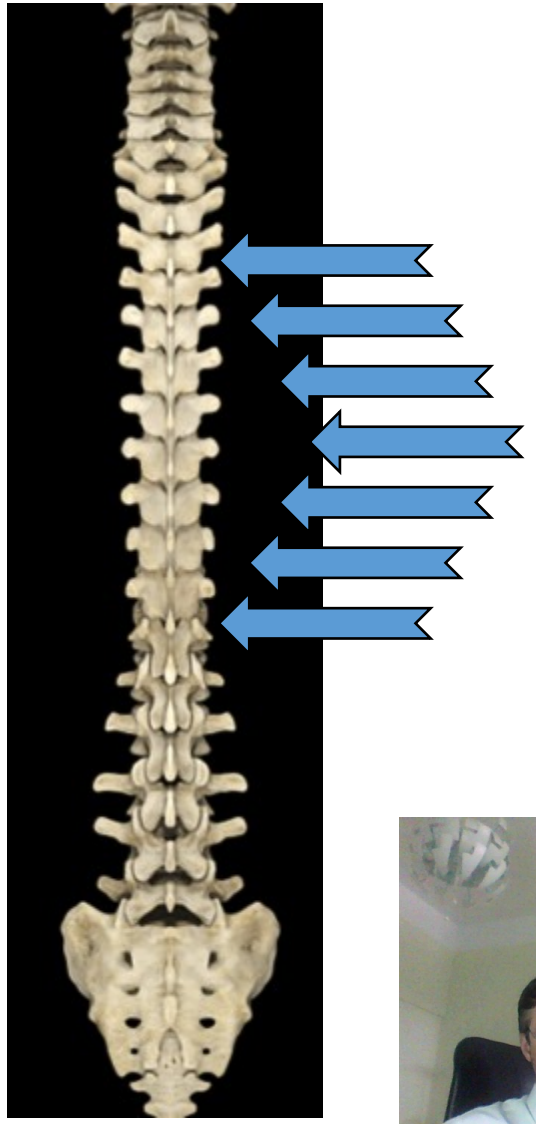


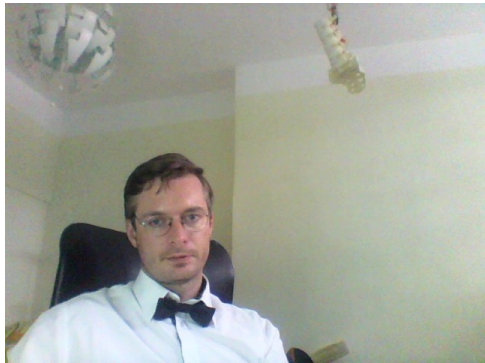


TRANSLATION

EVOLUTION
in corrective maneuvers







TRANSLATION

Advantages:

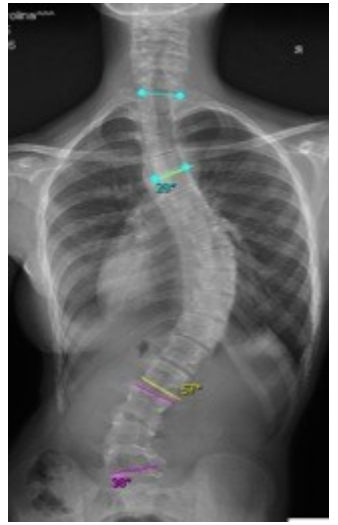
- Good frontal correction

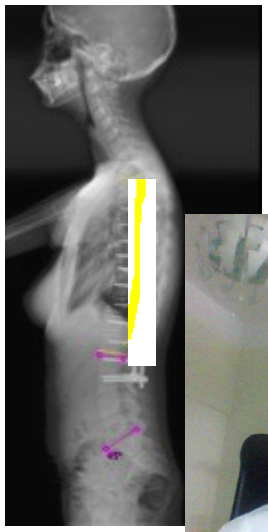
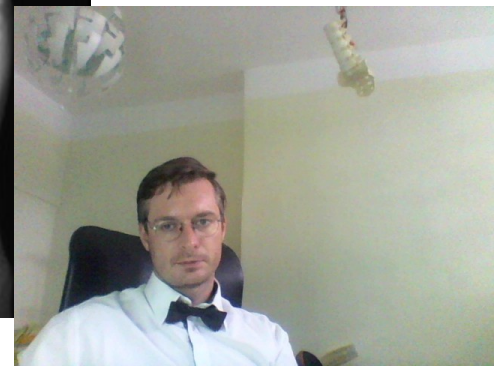
Disadvantages:

- Uniplanar correction (frontal)

Problems:

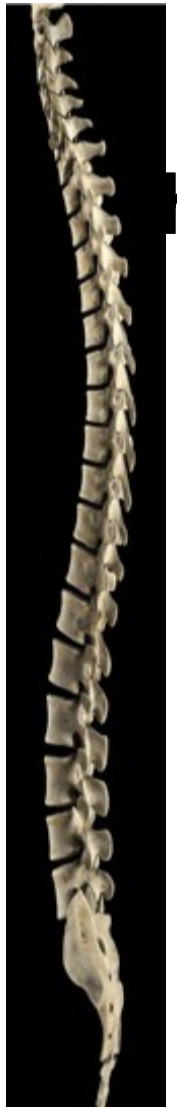
- HYPOKYPHOSIS
- NO DEROTATION



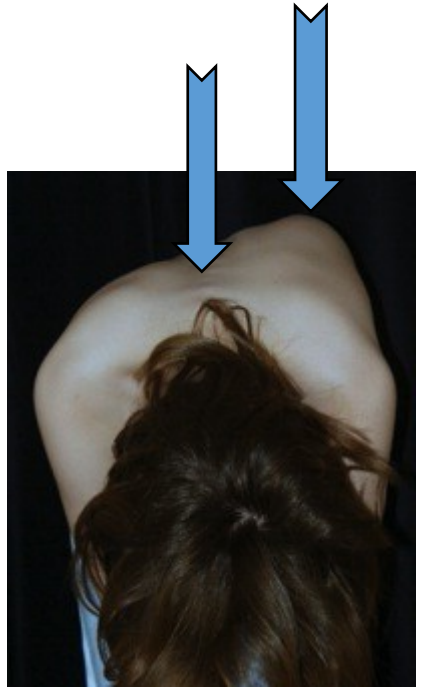




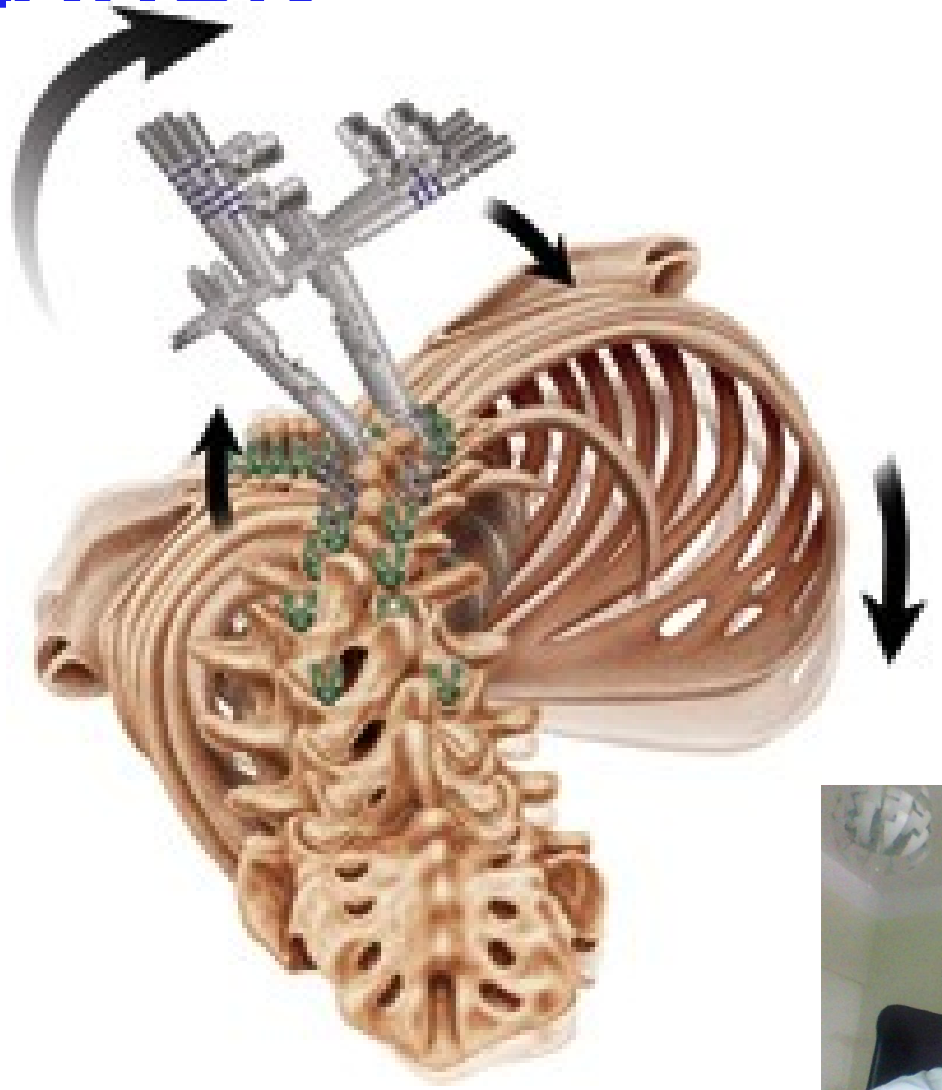
VCM
VERTEBRAL COLUMN MANIPULATION

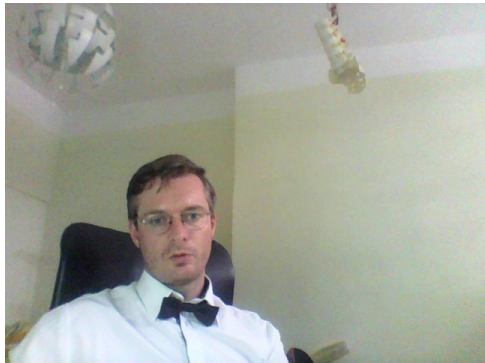
EVOLUTION
in corrective maneuvers



hypokyphosis





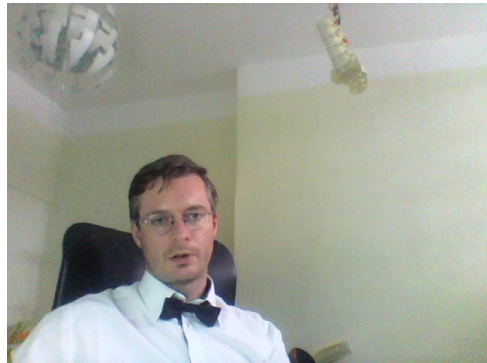


Derotation

WHY derotation?

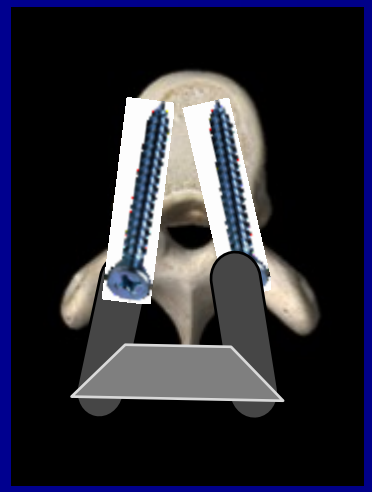
- 3D scoliotic correction
- Correction of Rib Hump prominence
- Secondary curve correction in selective fusion

Balanced spine



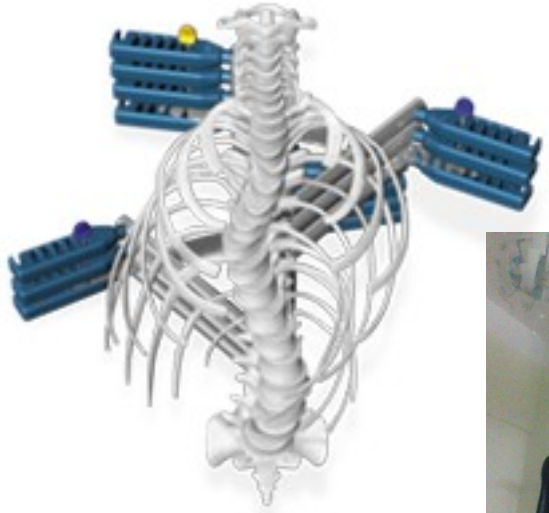
Transpedicular screw constructs

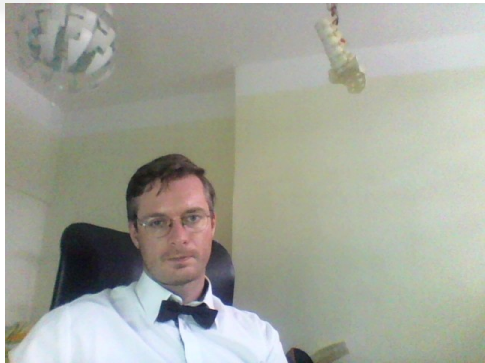
- Allows effective derotation of single vertebra



Derotation instruments

- Allows safe and effective derotation of single vertebra as well as the whole apical area.





VCM
Vertebral column manipulation

Advantages:

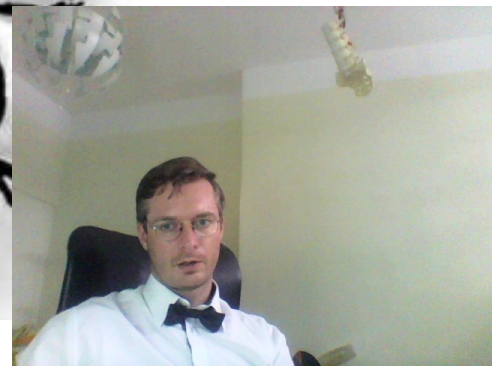
- Good frontal and axial correction

Disadvantage:

- little too forced isolated technique

Problem:

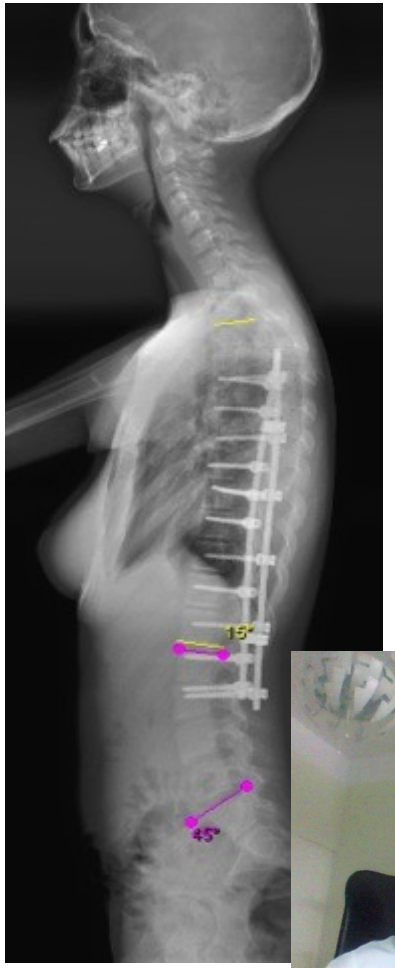
- HYPOKYPHOSIS

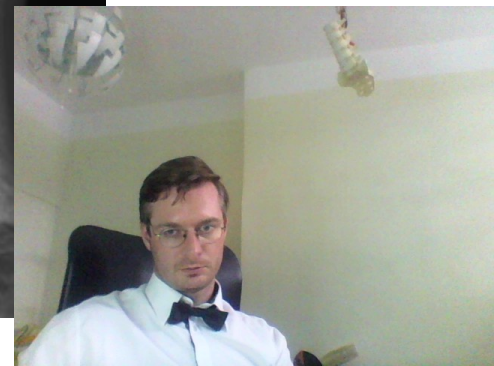


RESULT
of most correction maneuvers

- **HYPOKYPHOSIS**

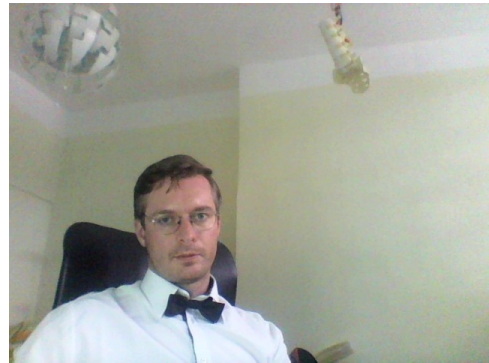
- **ABSENCE or RESTRICTIVE DEROTATION**

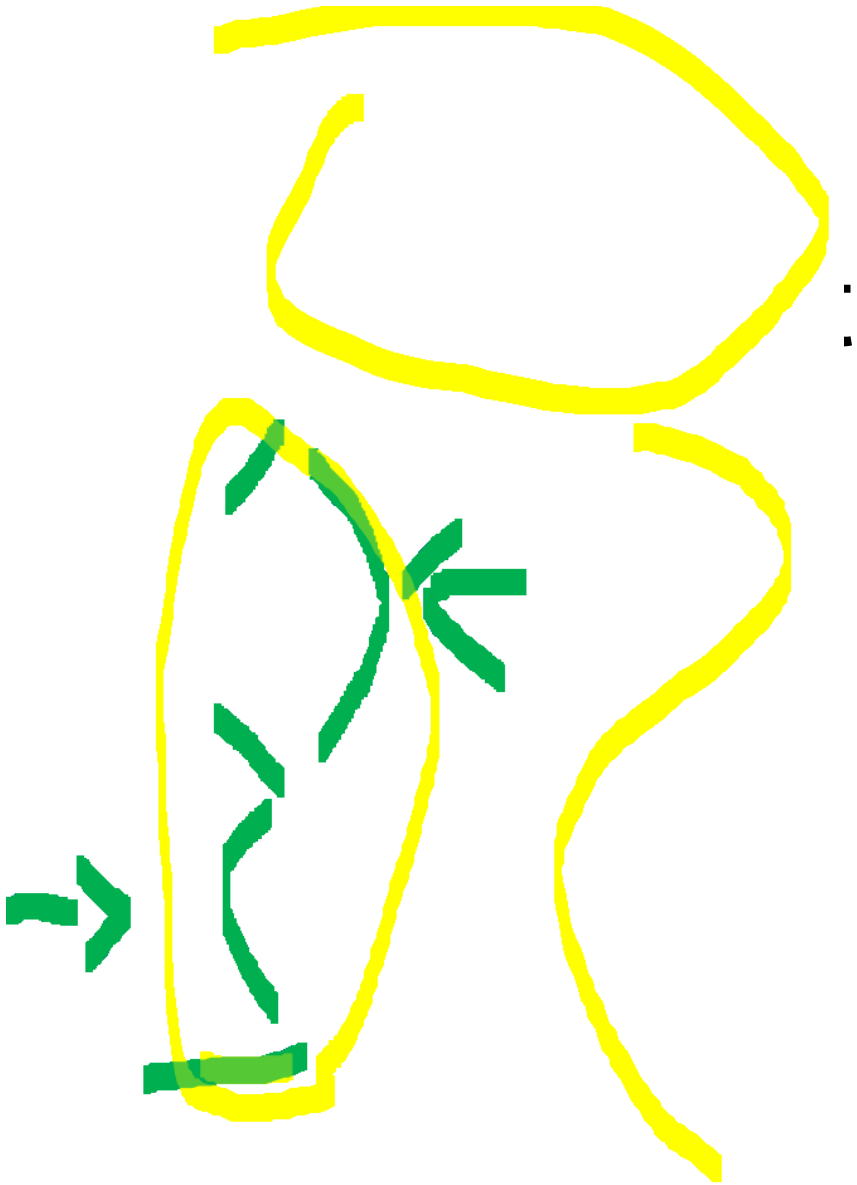


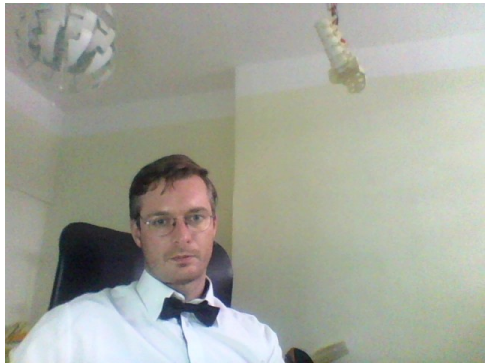


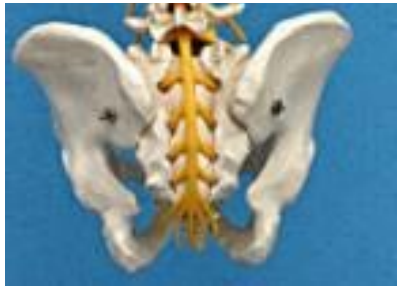
DEROTATION

Transversal plane

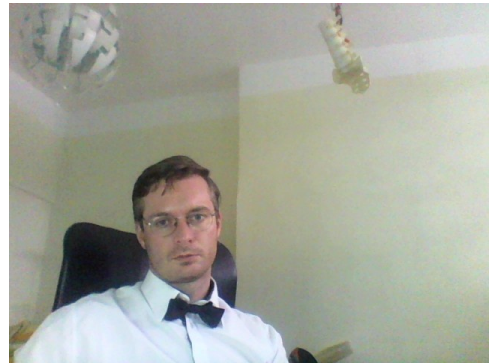




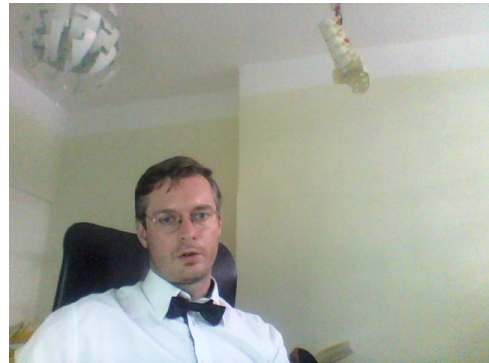




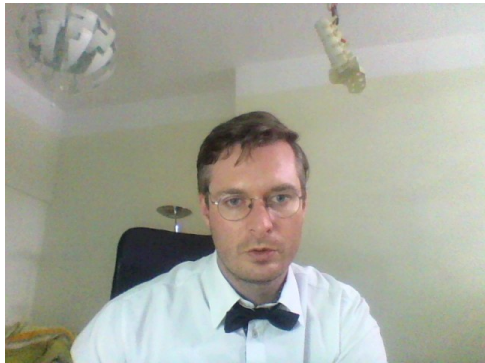
3D geometrical changes

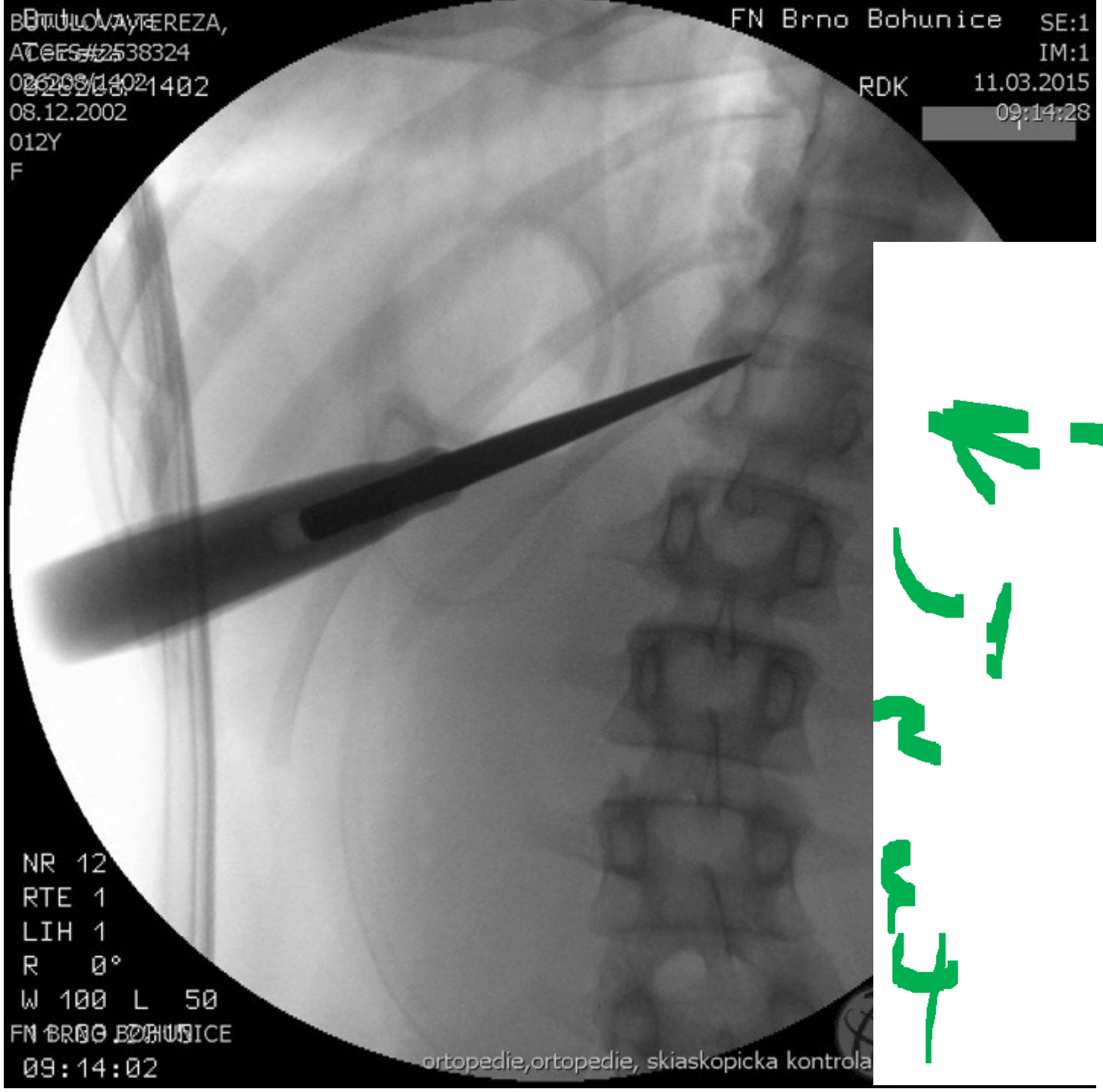


Surgical posterior approach



level checking

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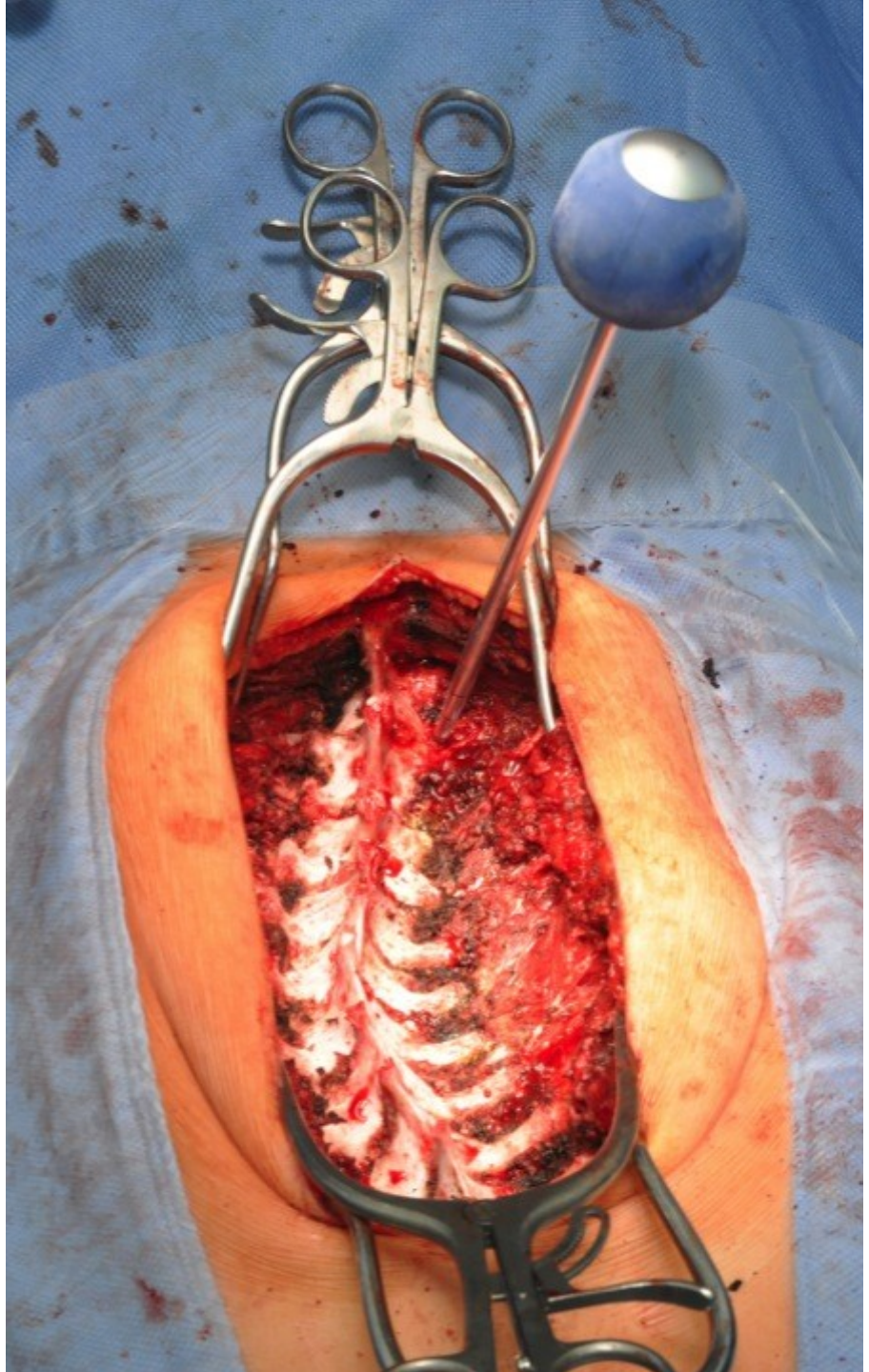
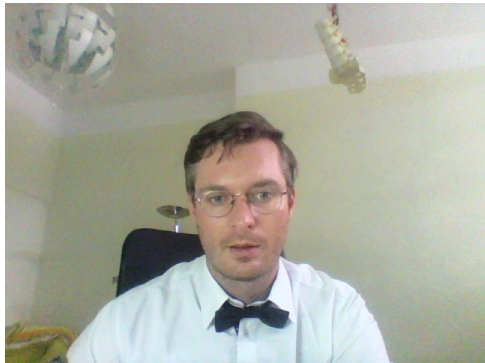
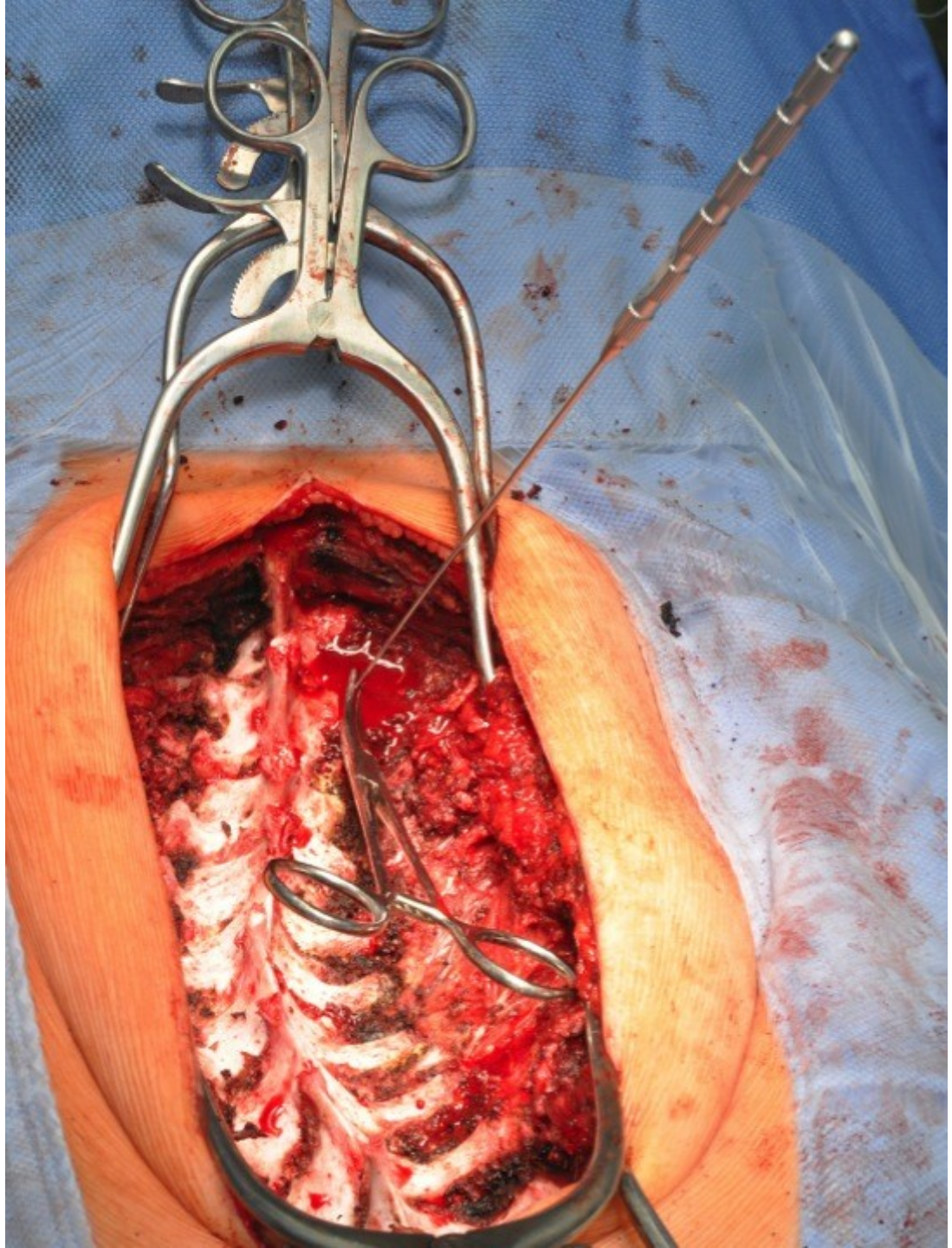


Probe
-
pedikle finding





Sound

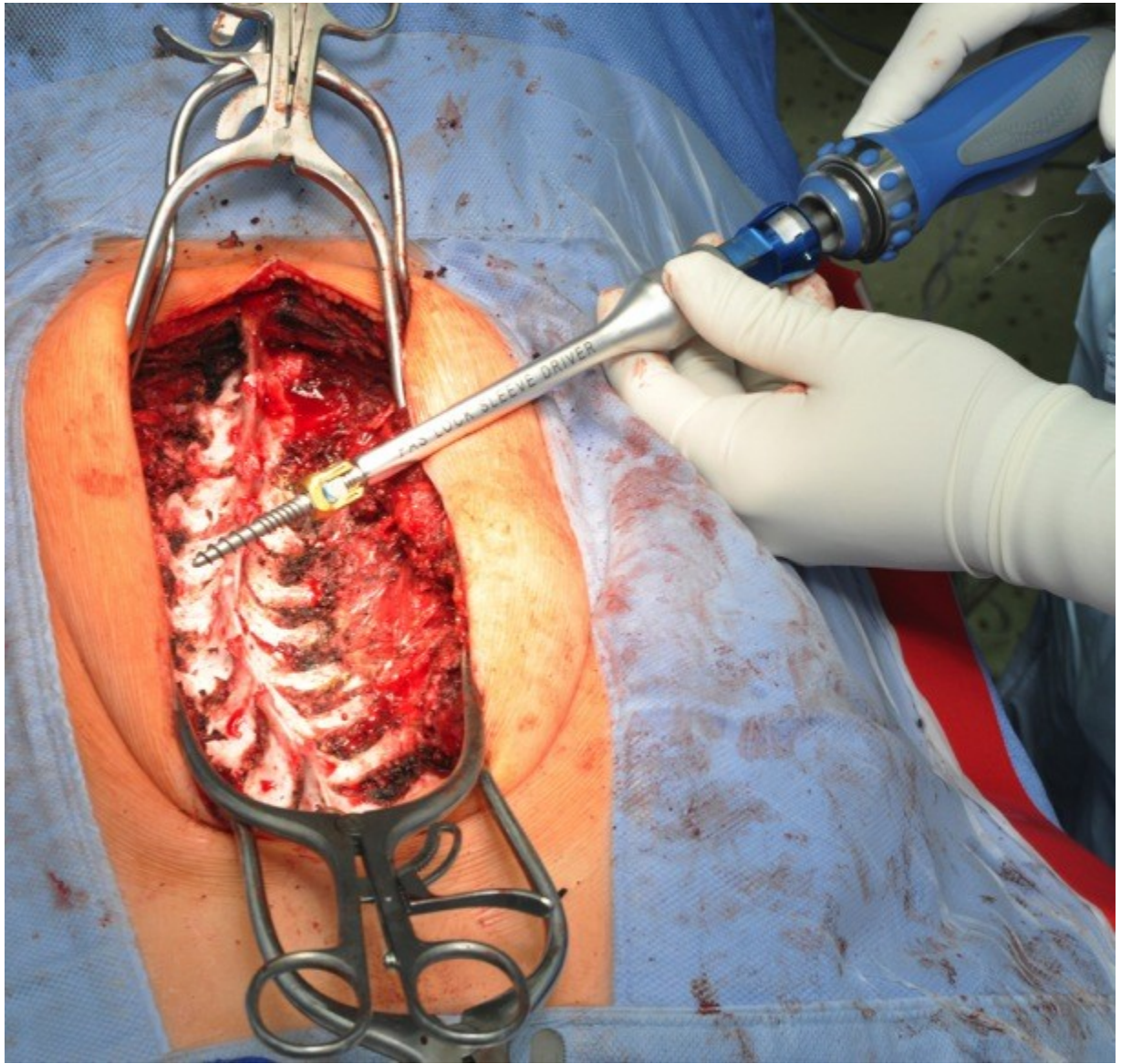
-

pedikle hole checking

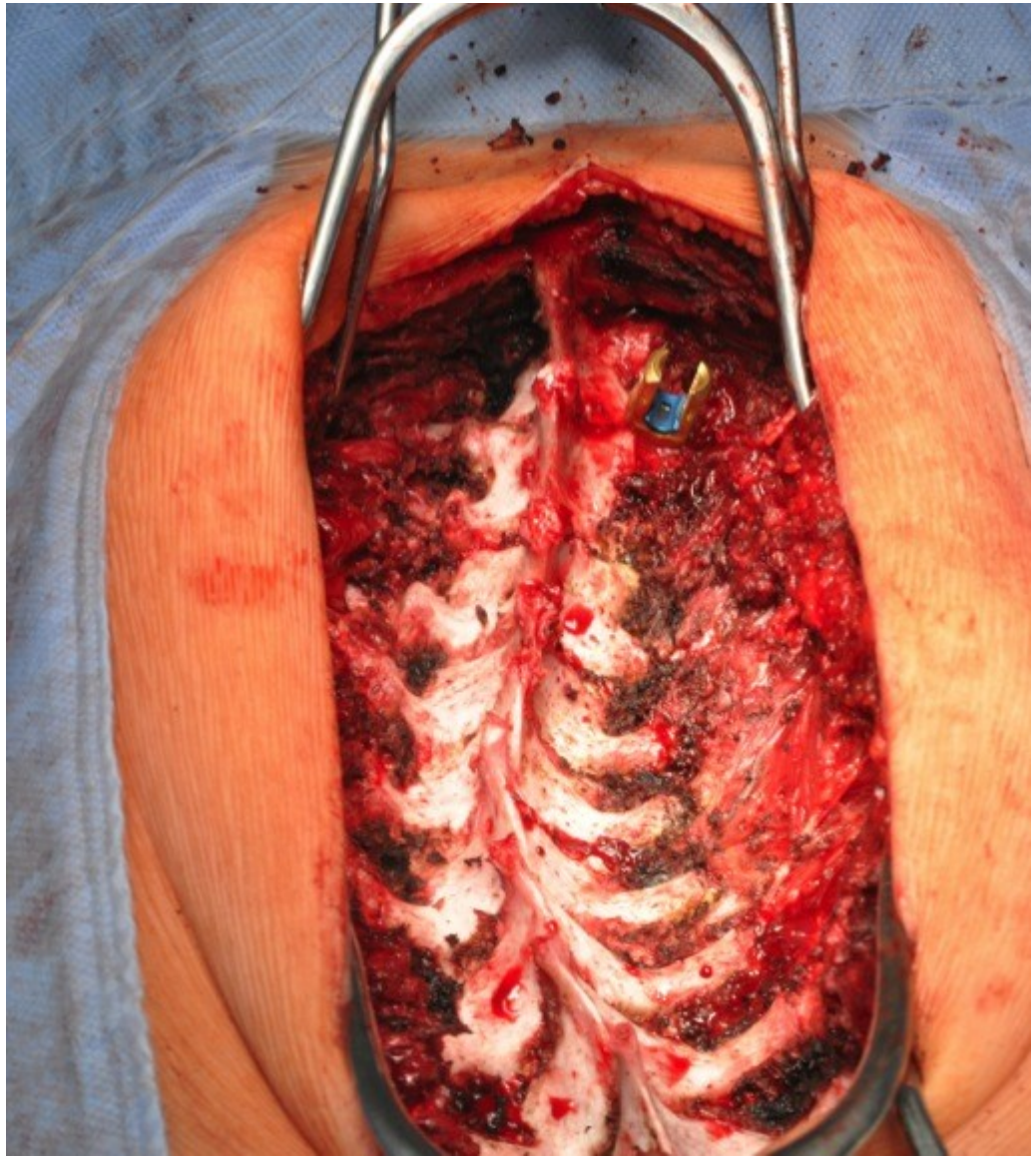
-

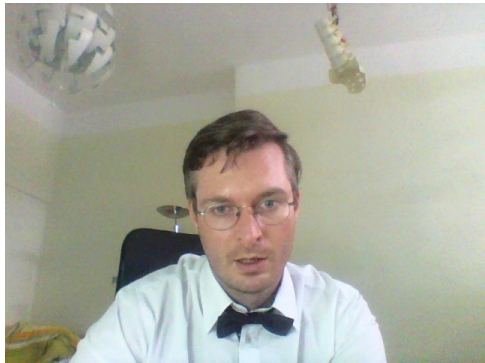
screw length measuring

Screwdriver - screw insertion

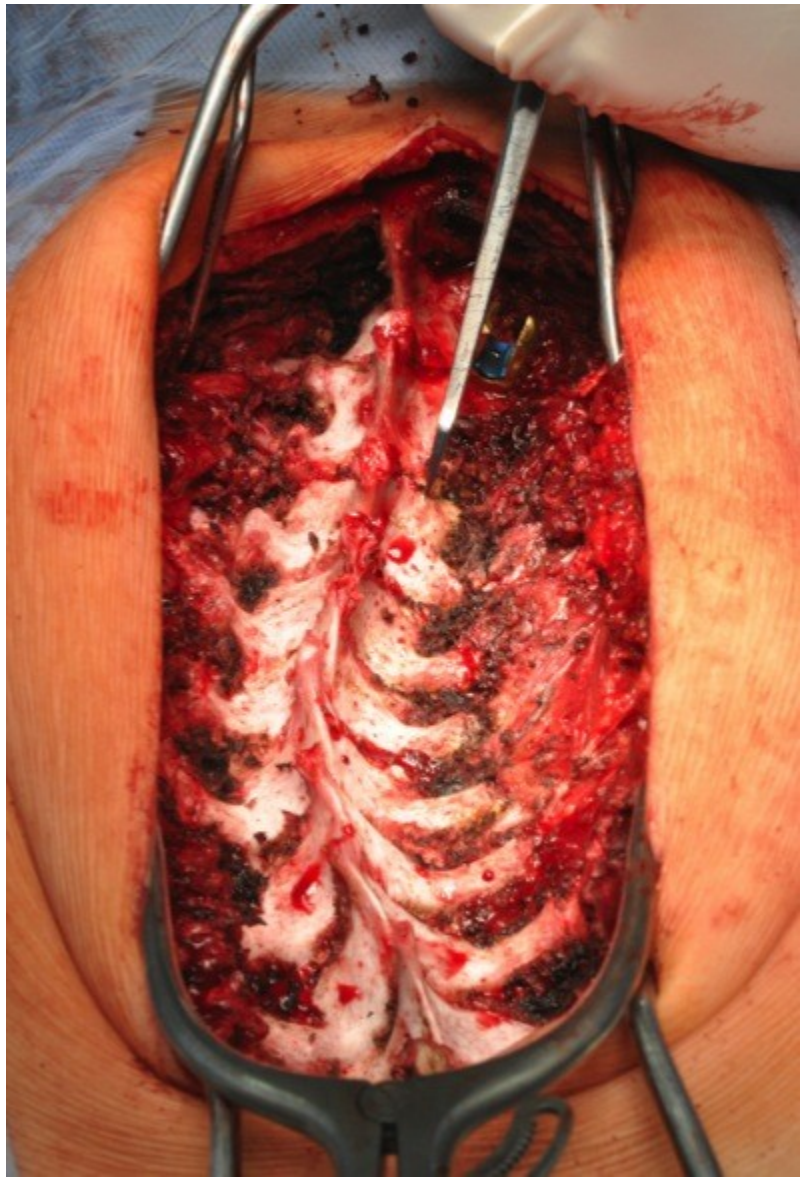


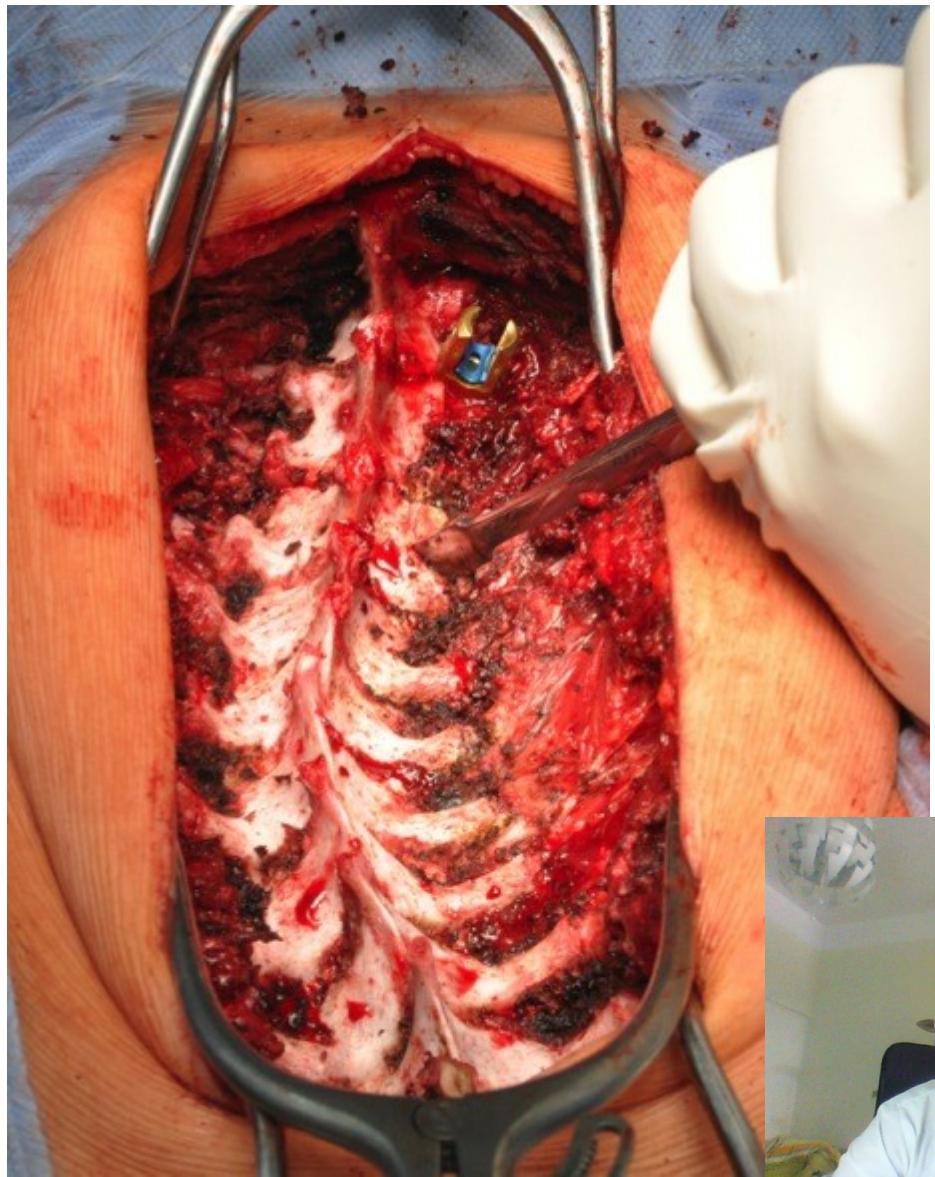
Screwdriver - screw insertion

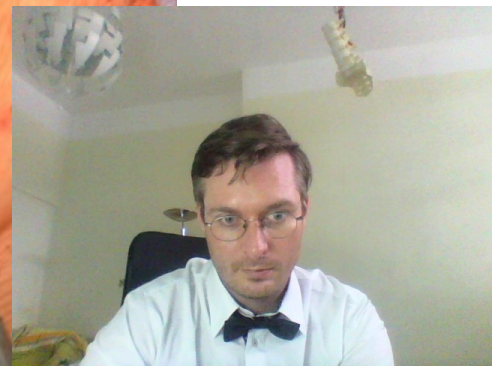




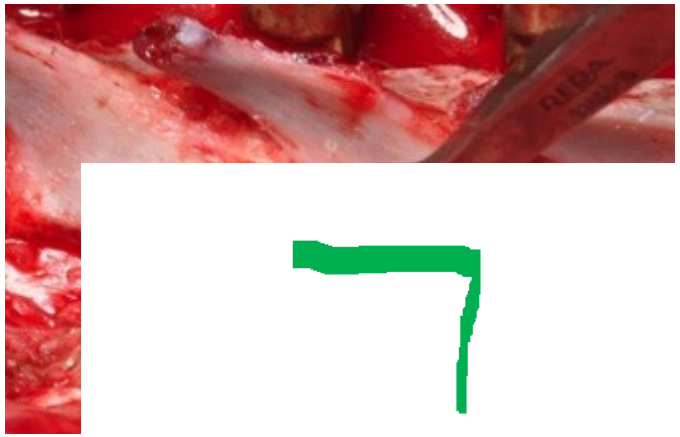
Chisel – facet resection

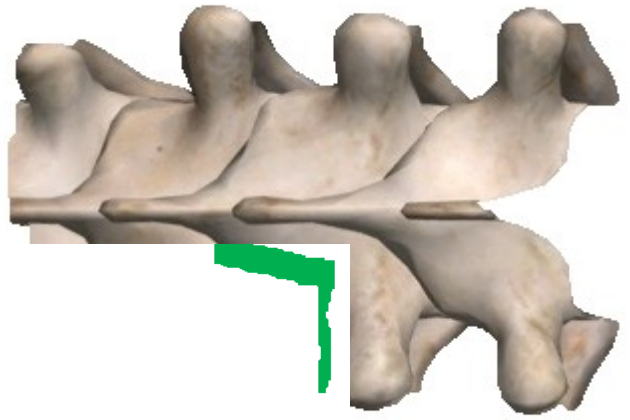


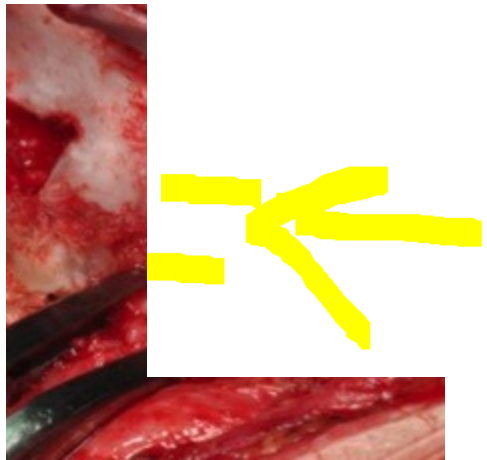


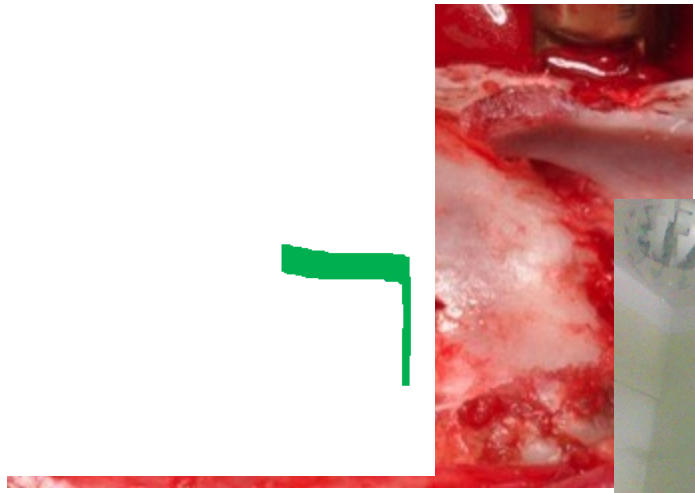


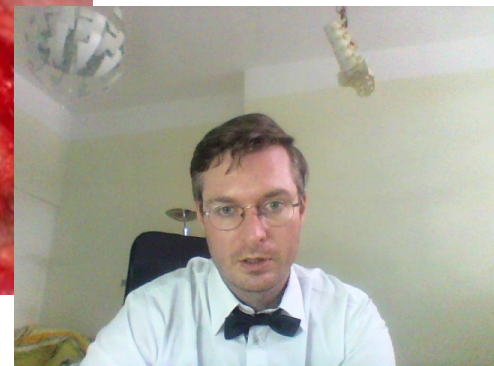
Chisel – facet resection



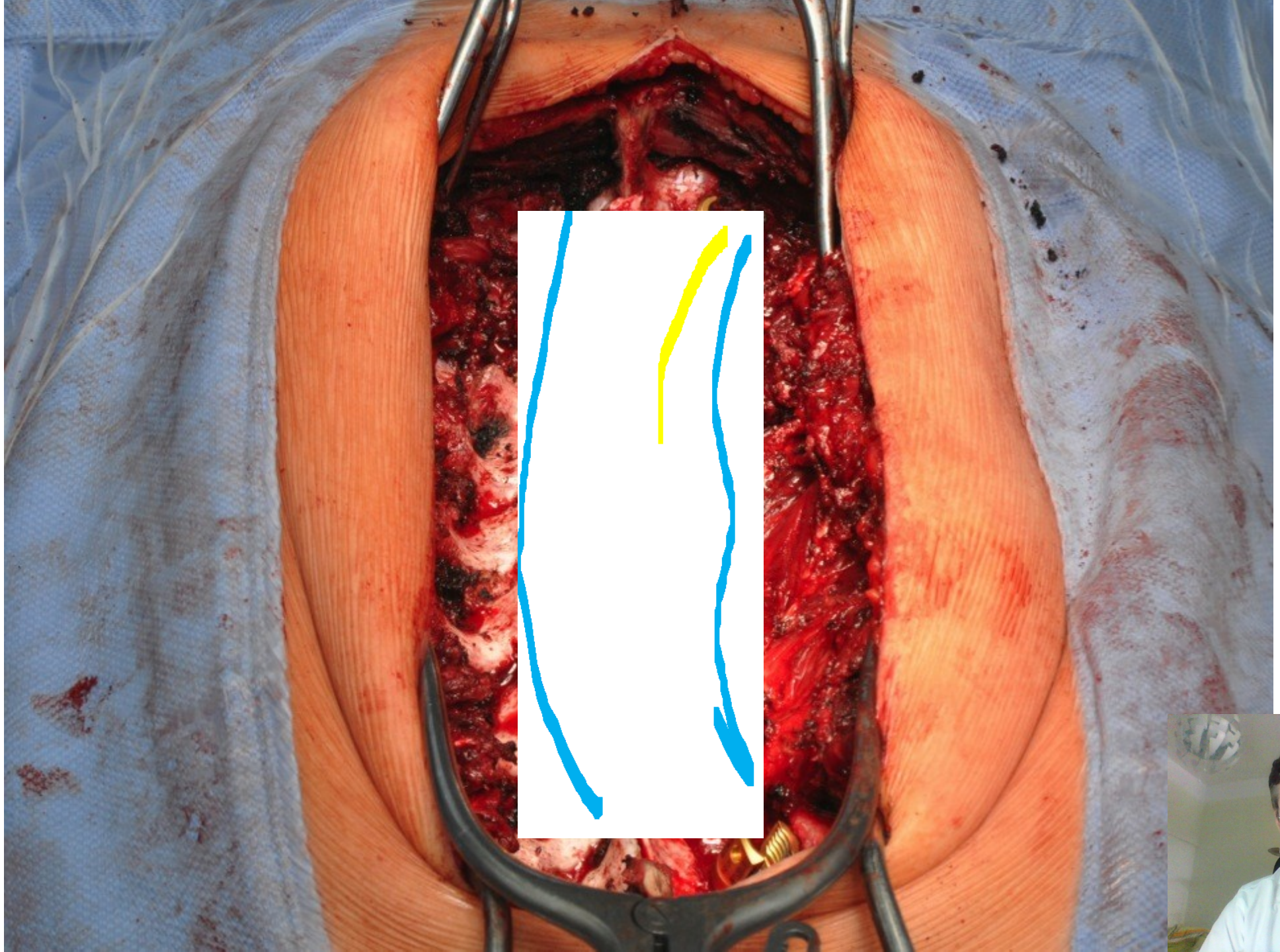


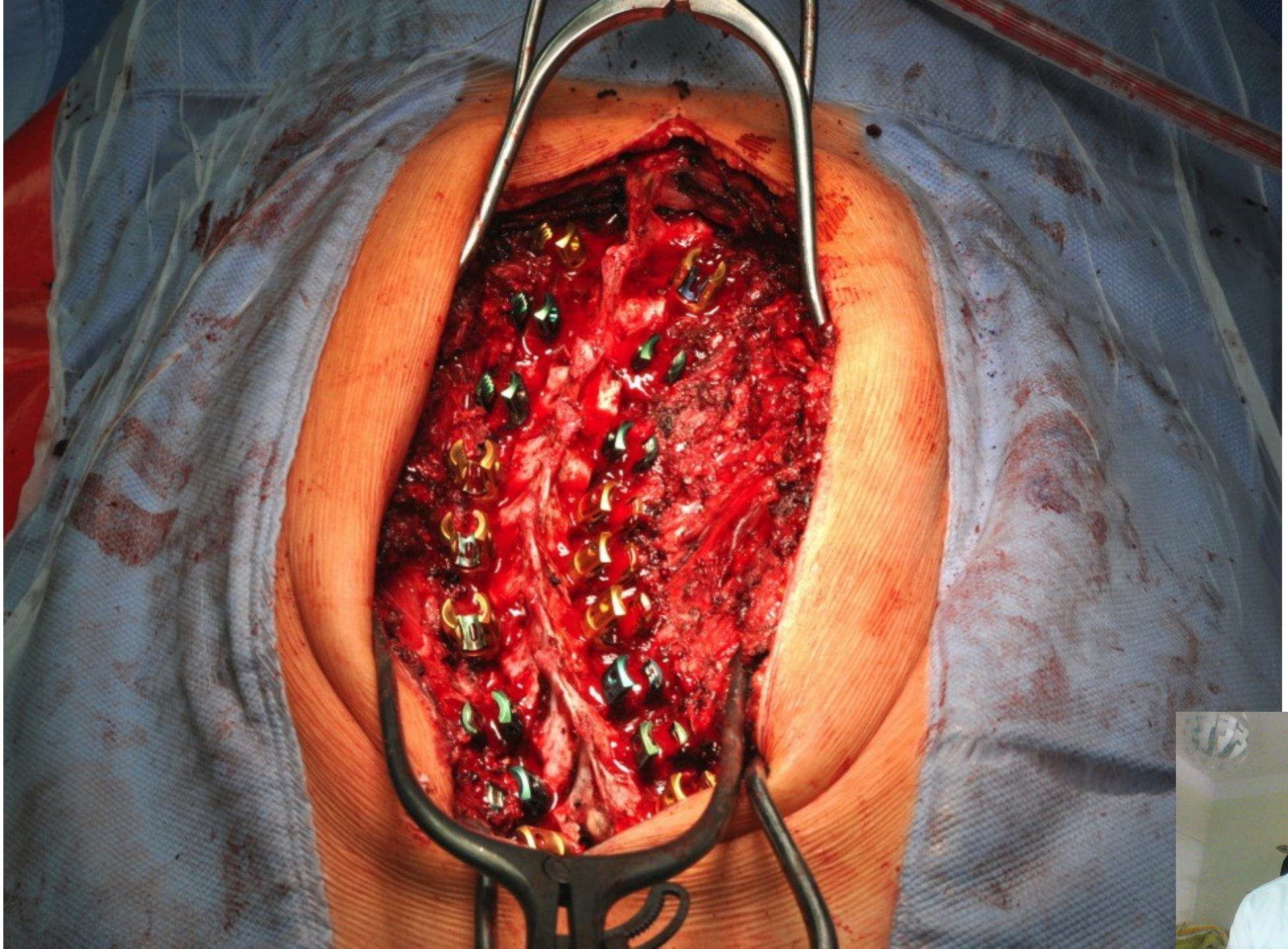




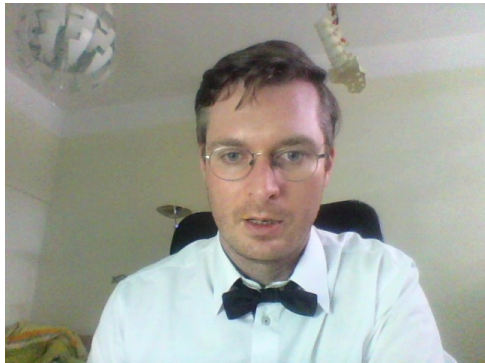


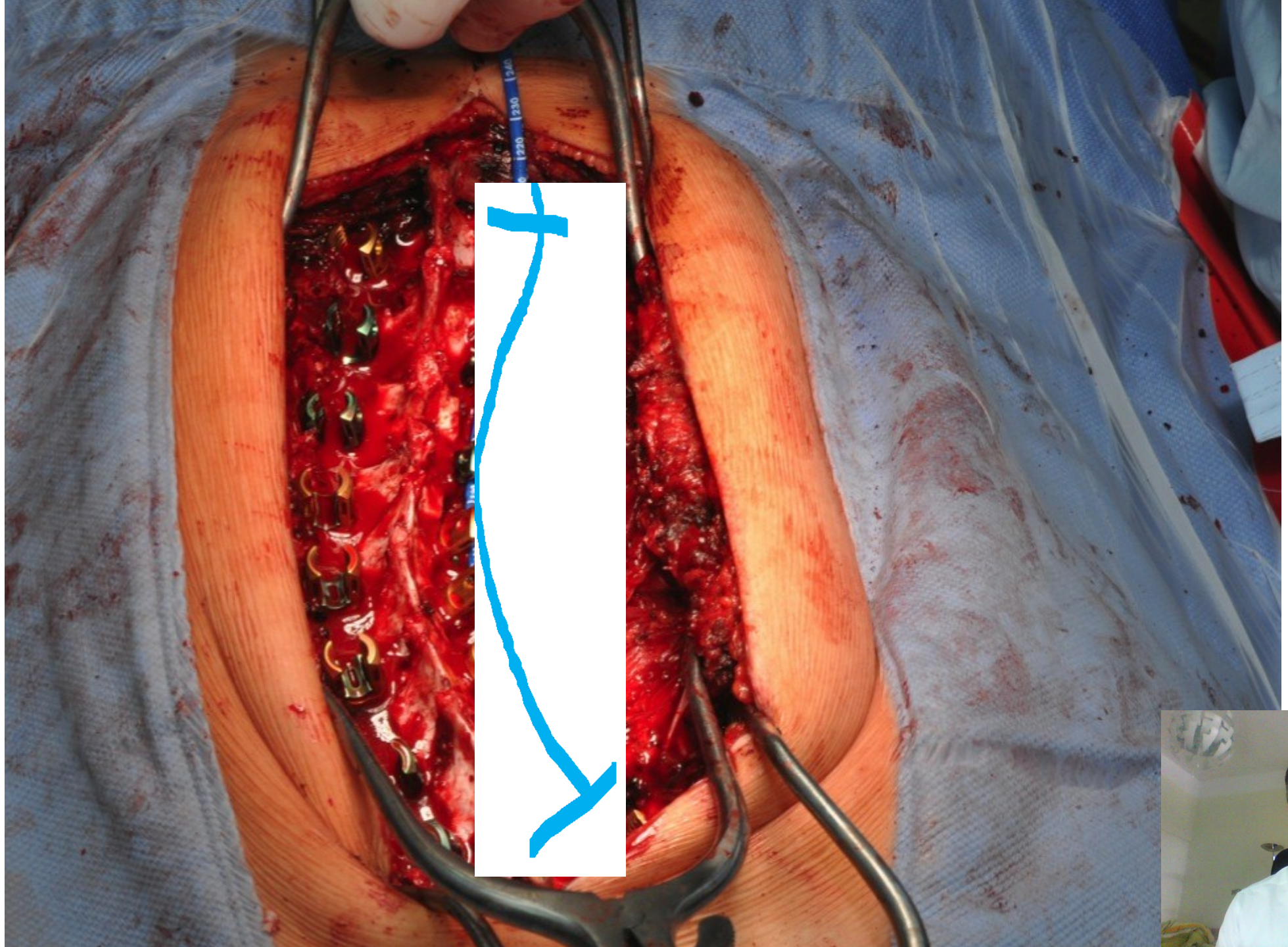
Luer – cortex resection

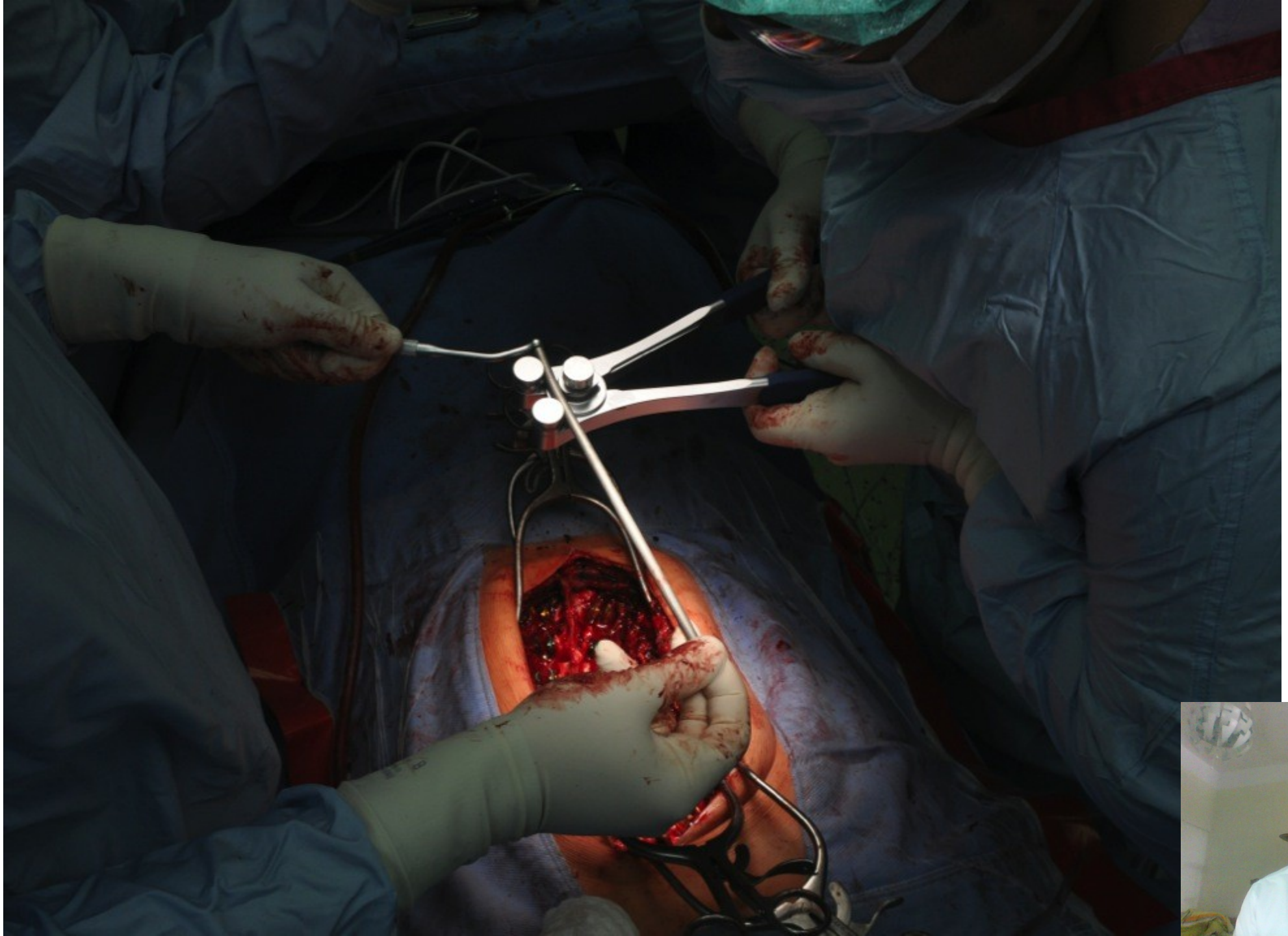


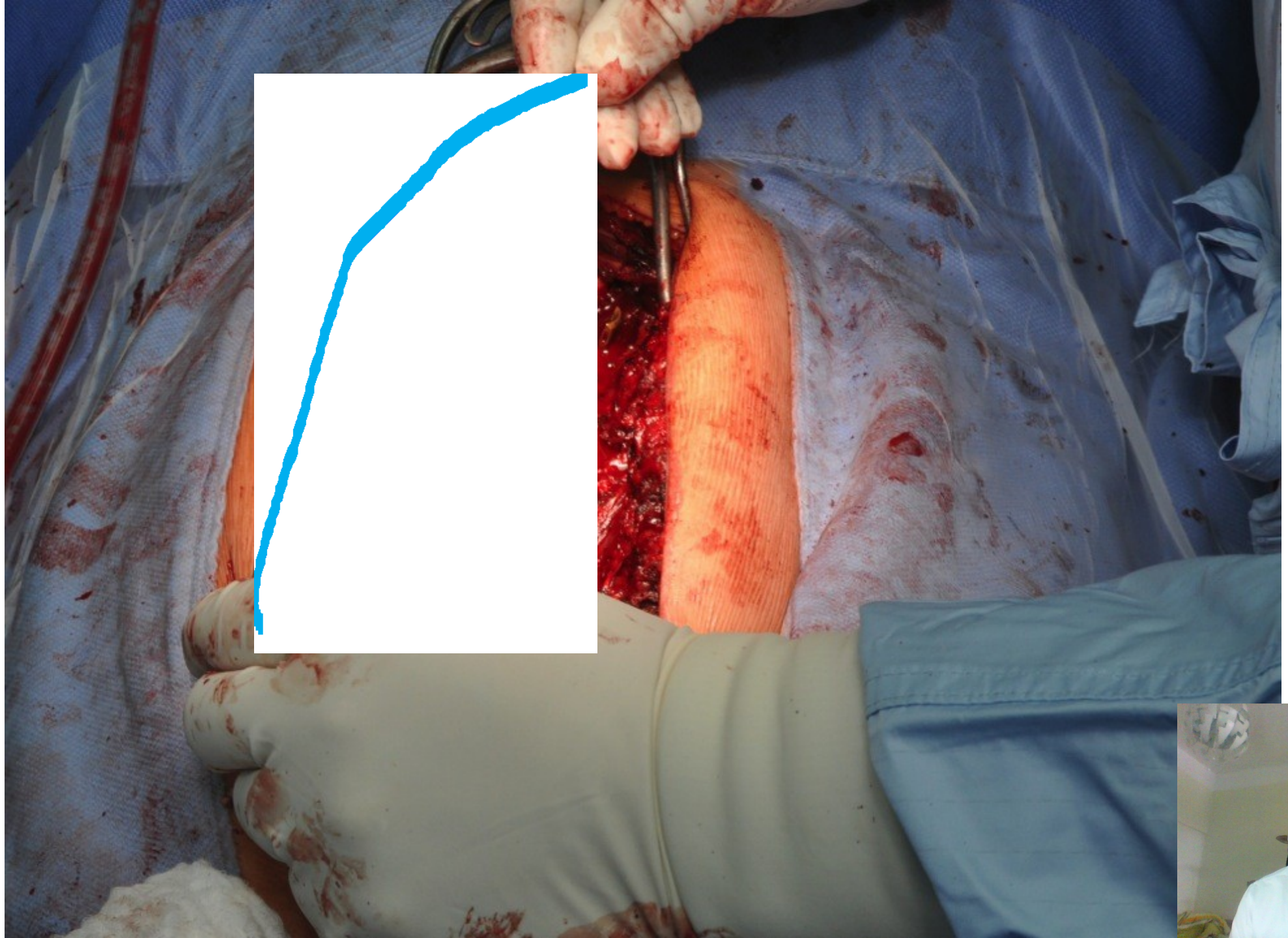


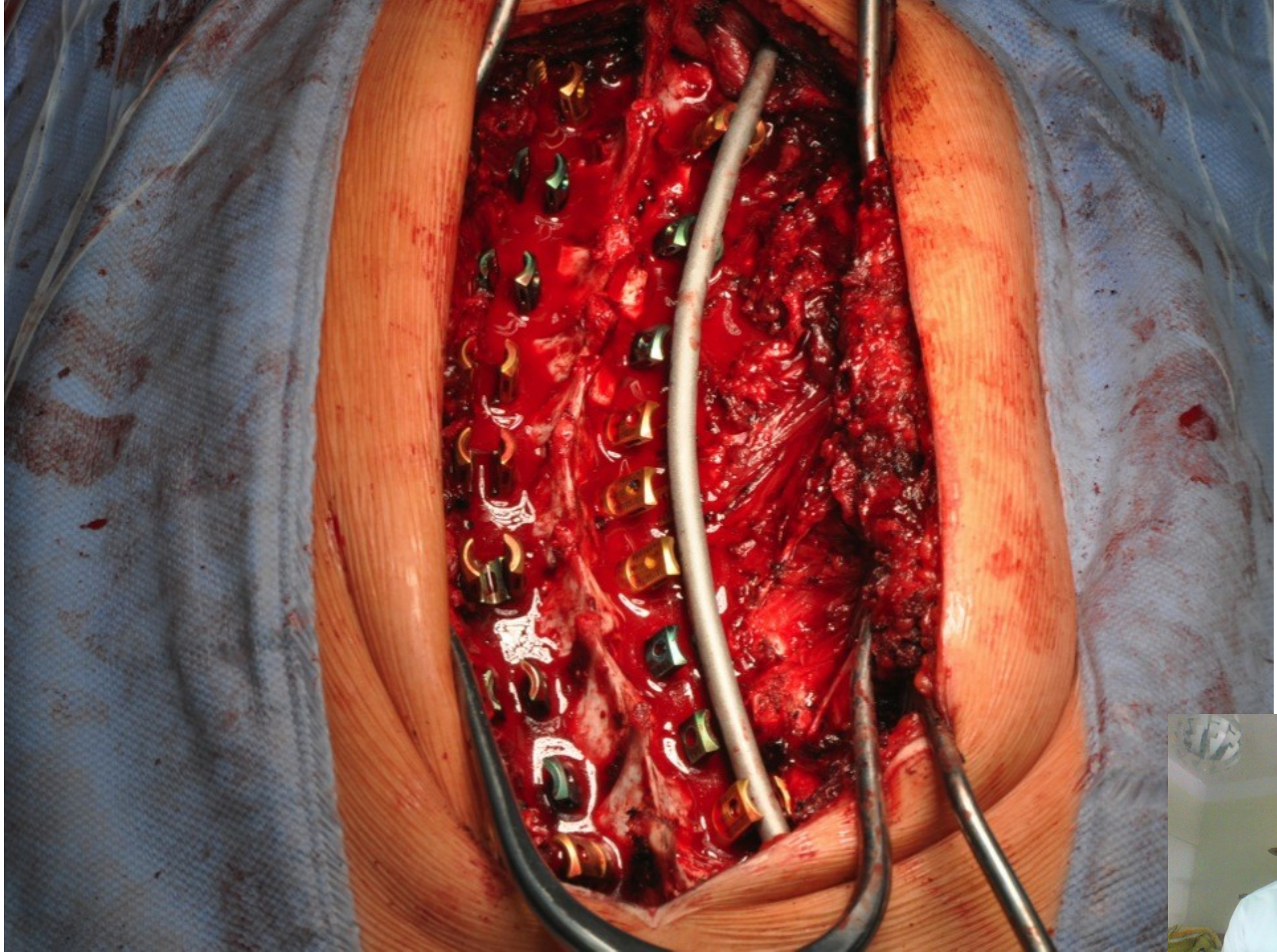

FN Brno Bohunice
SE:1
IM:2
RDK
11.03.2015
08.12.2002
012Y
F
NR 12
RTE 1
LIH 1
R 0°
W 100 L 50
11:14:30
BONE
MAG 0
kV 62
mA 5.8
cGy cm²
0.63
ortopedie,ortopedie, skiaskopicka kontrola radiodiagnostikem,

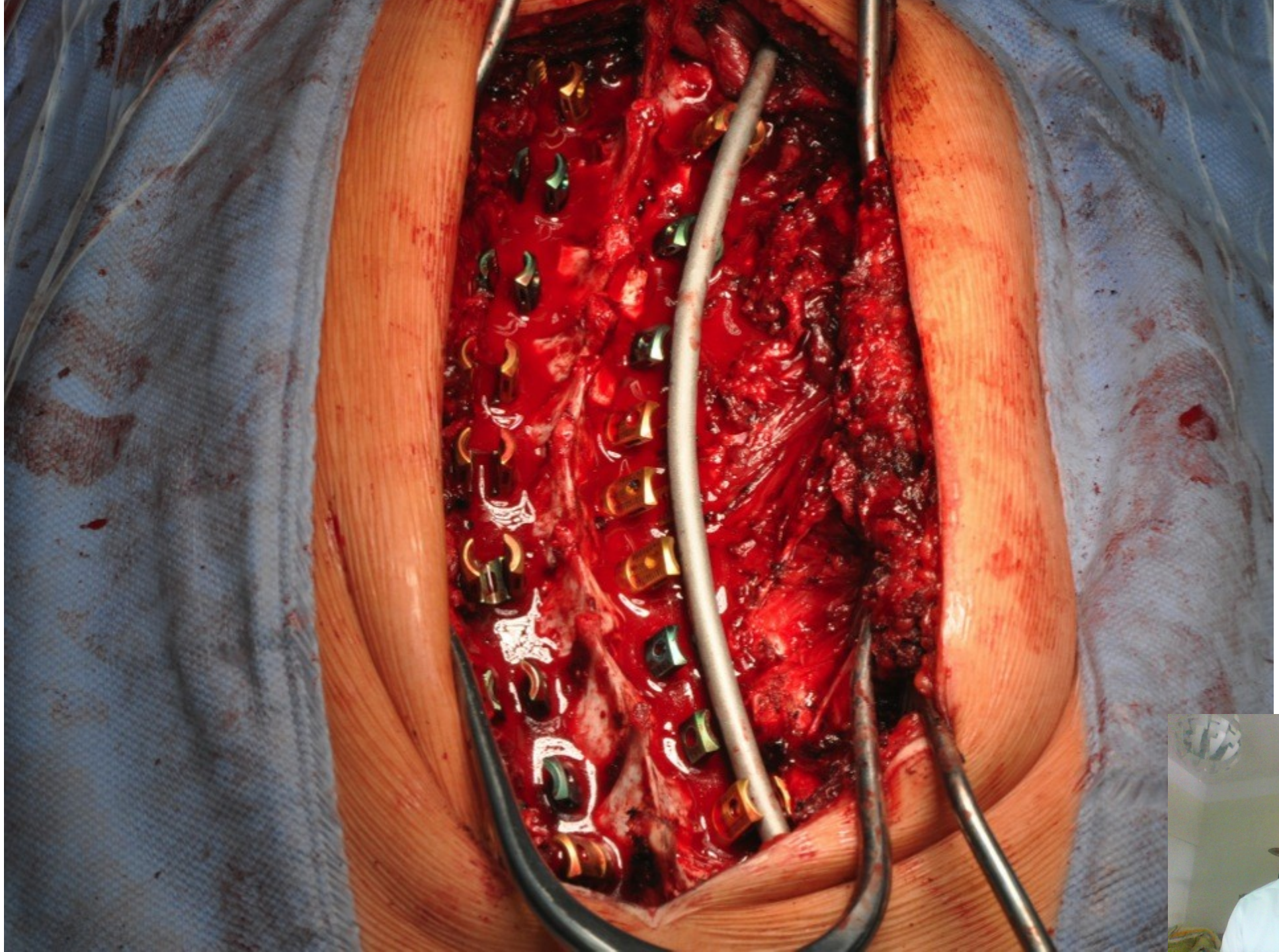


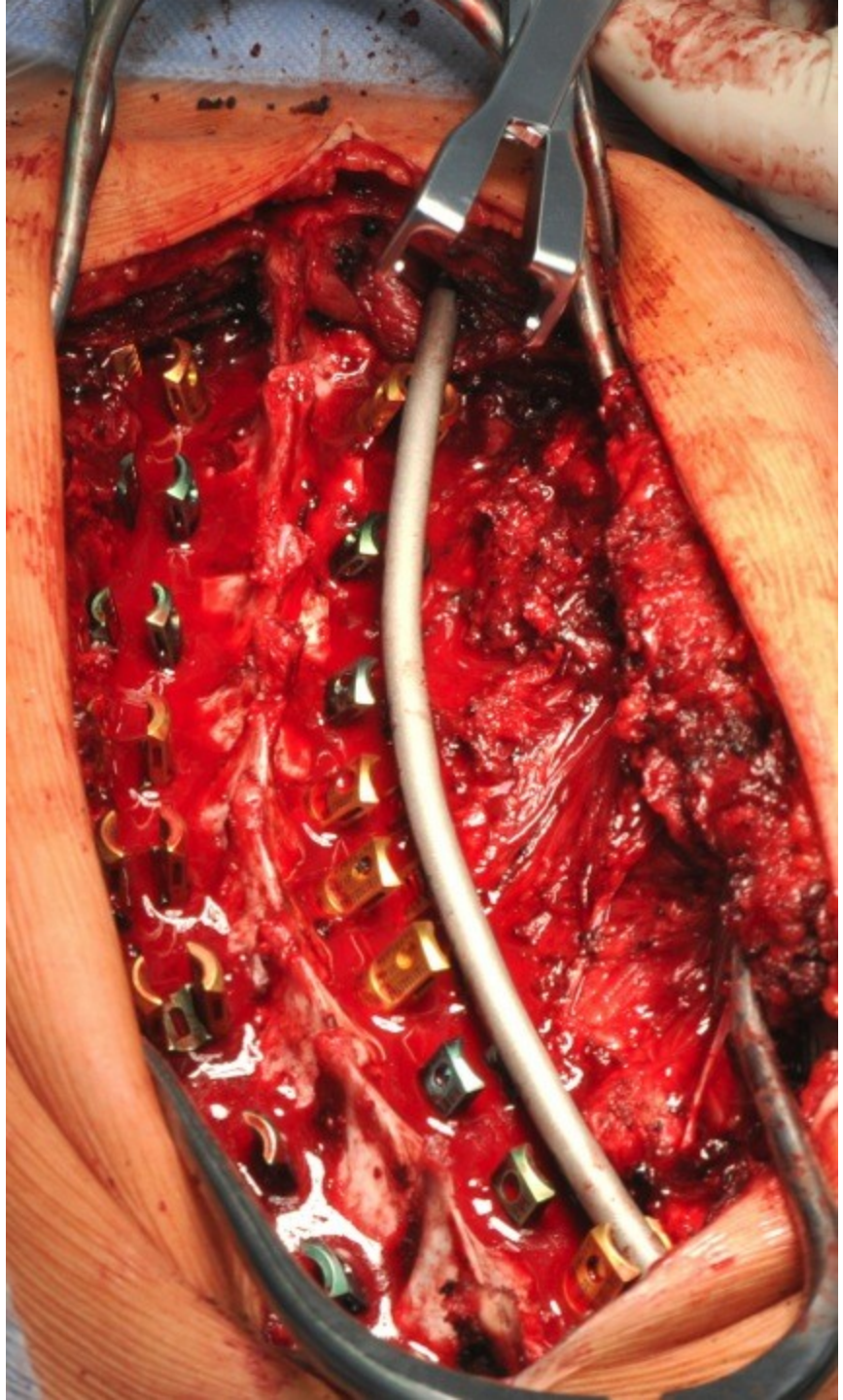


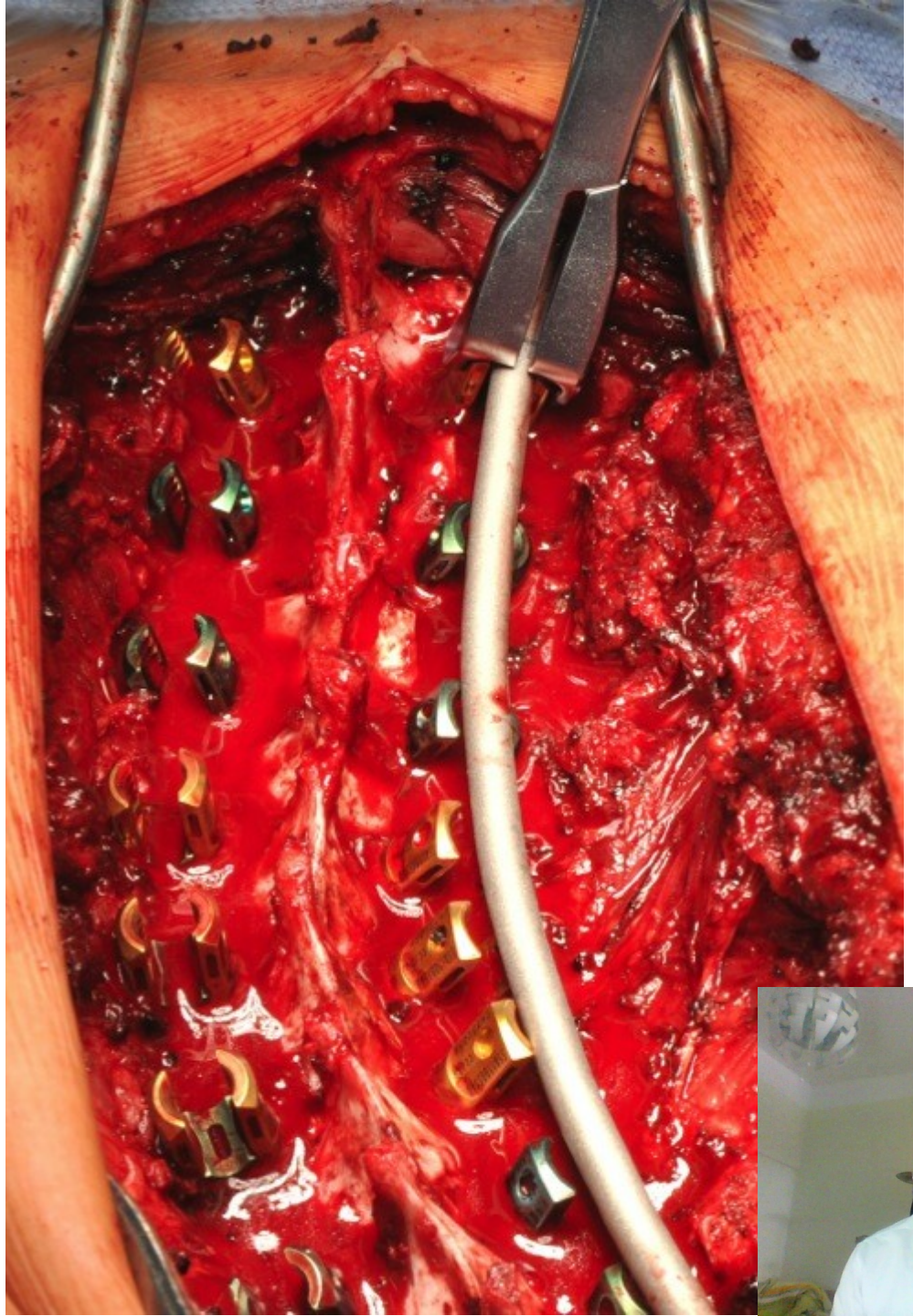


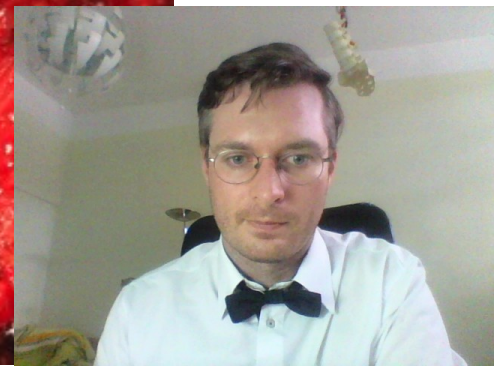


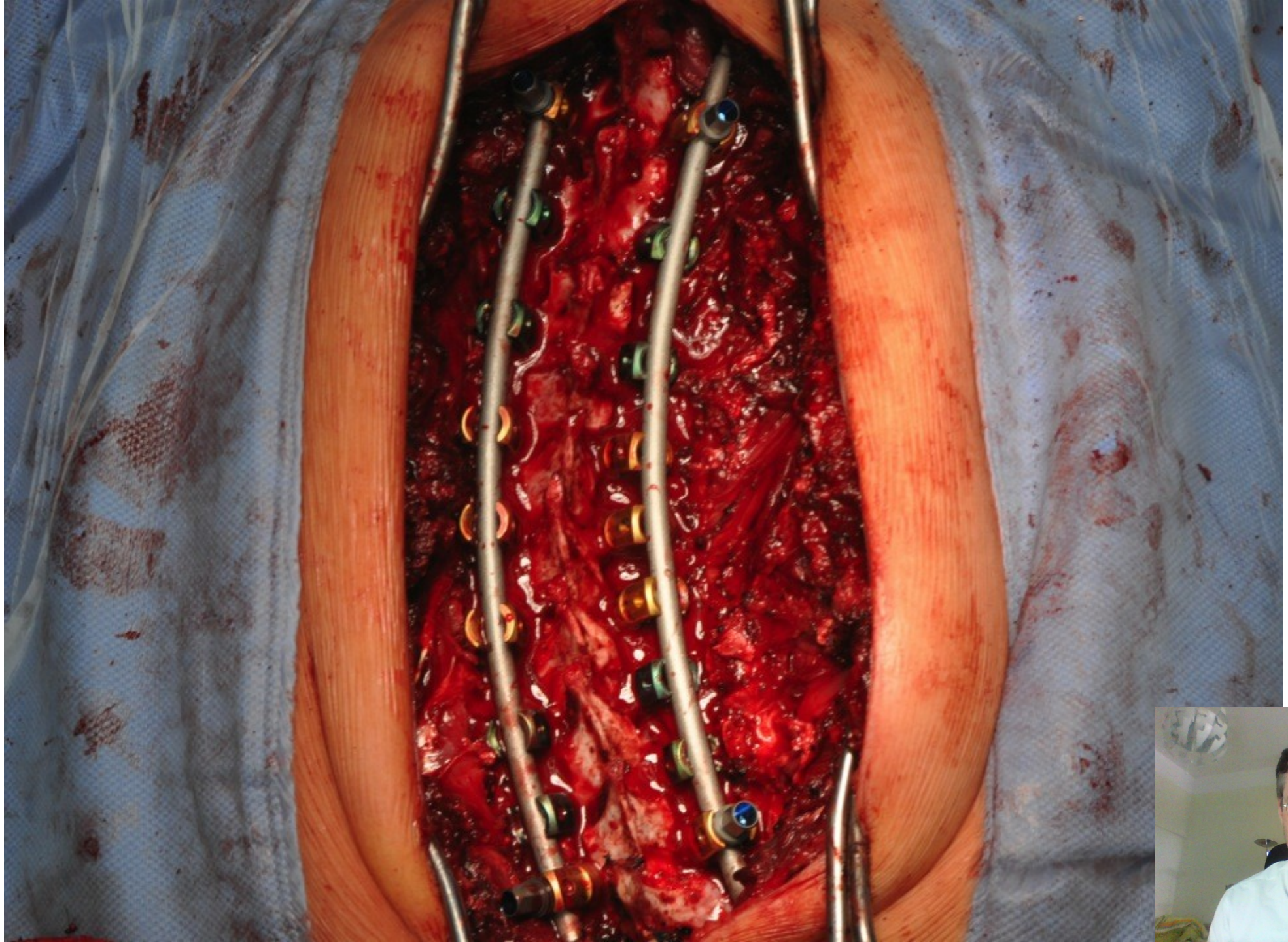


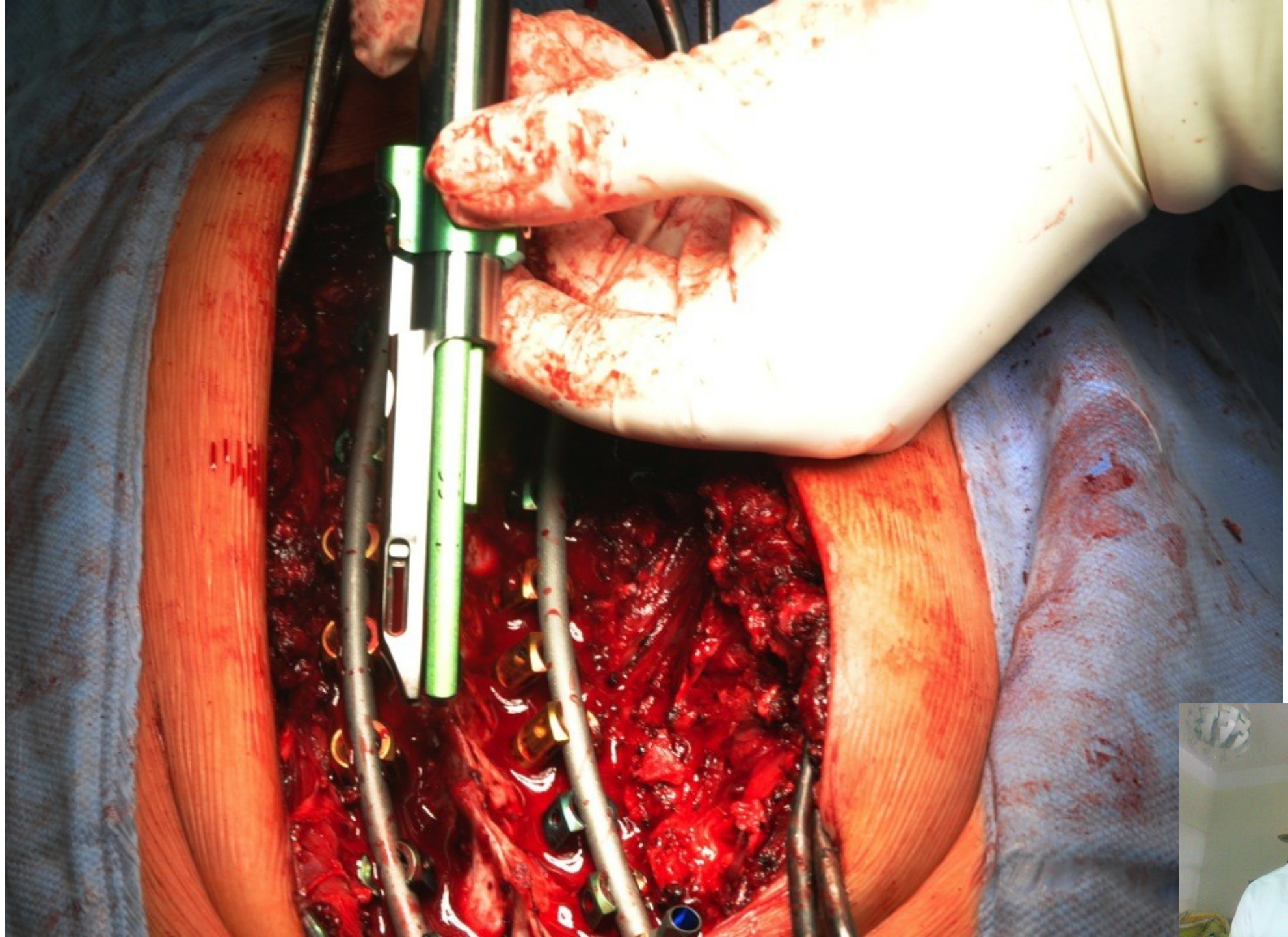


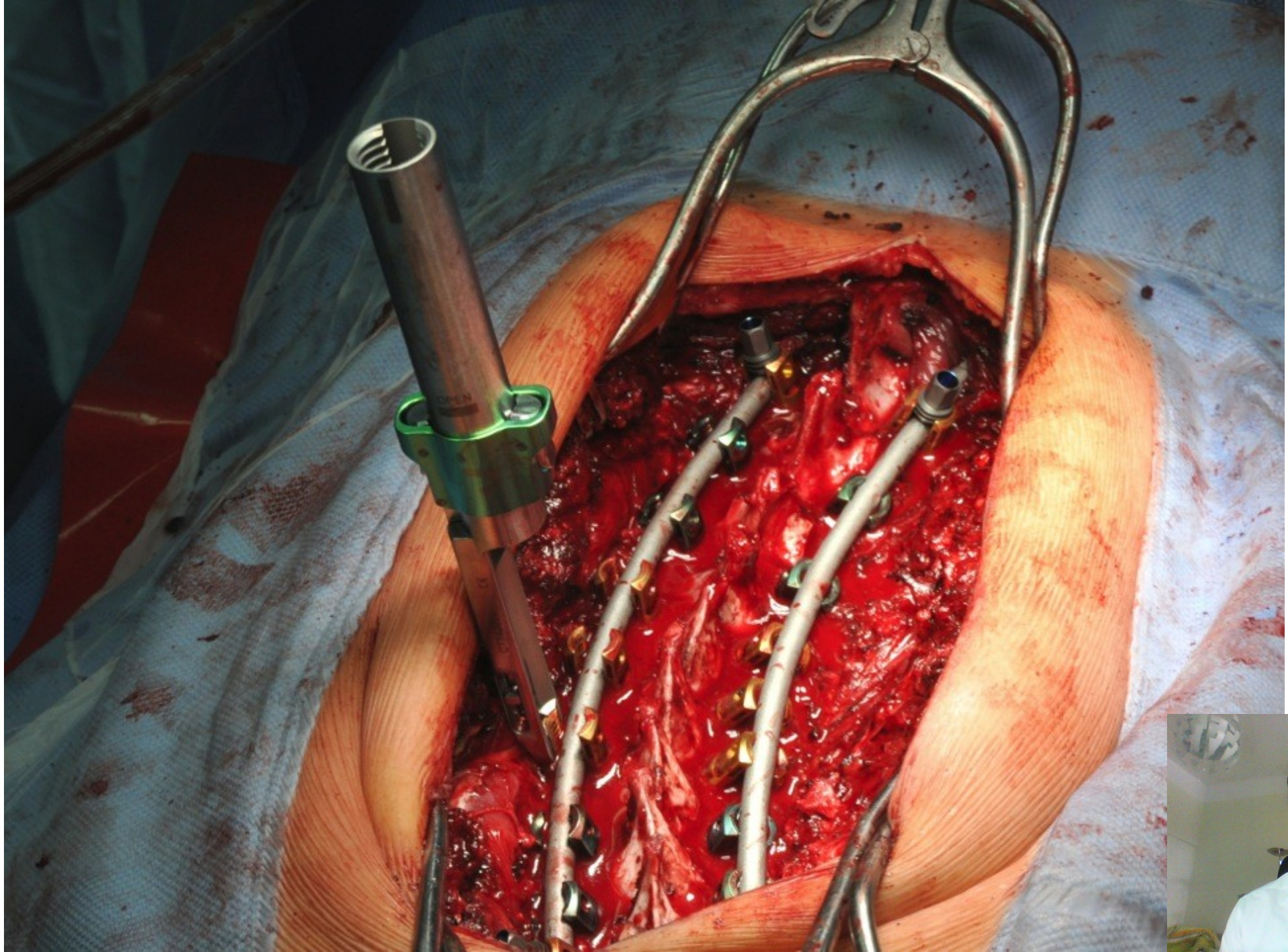


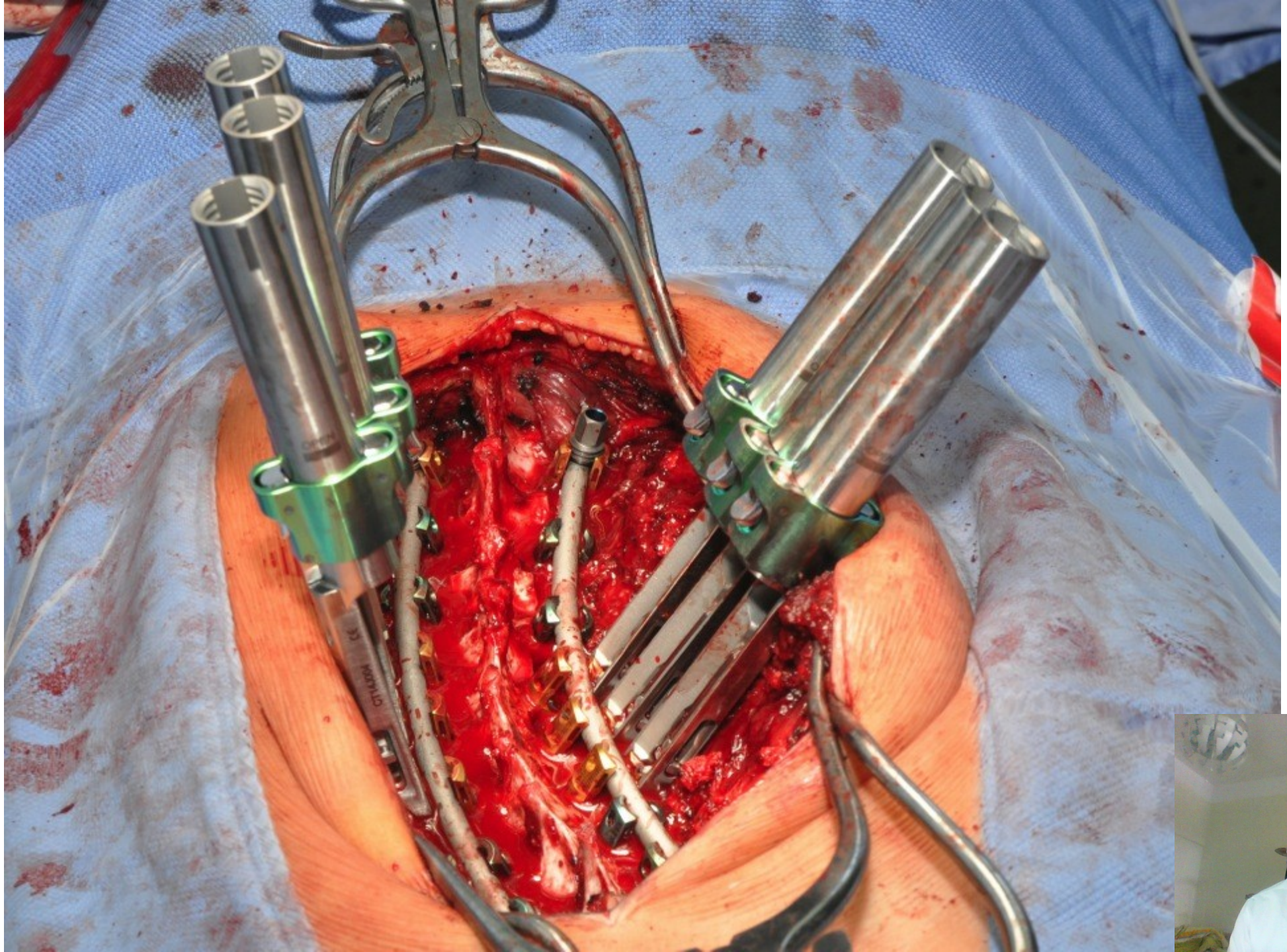


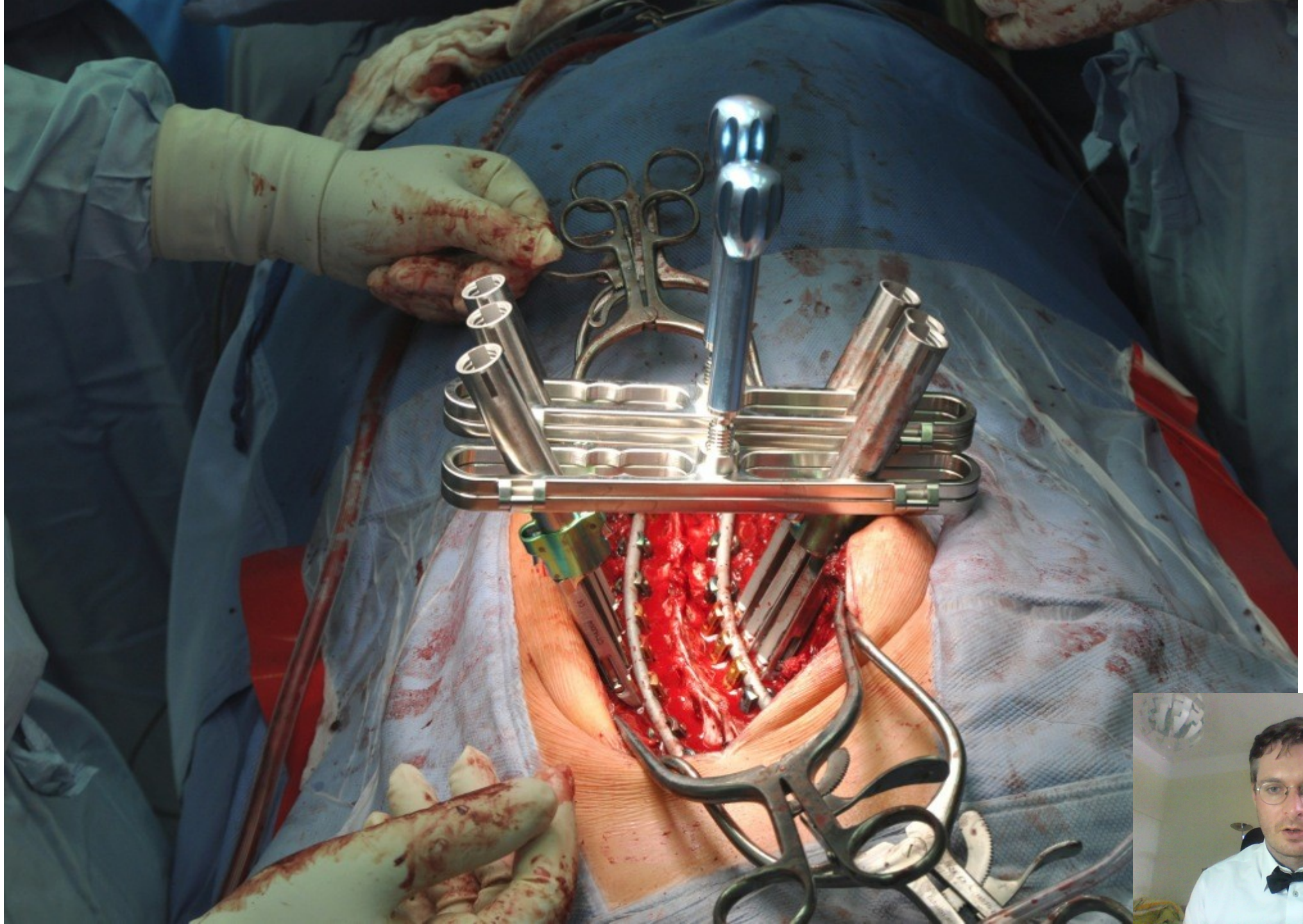


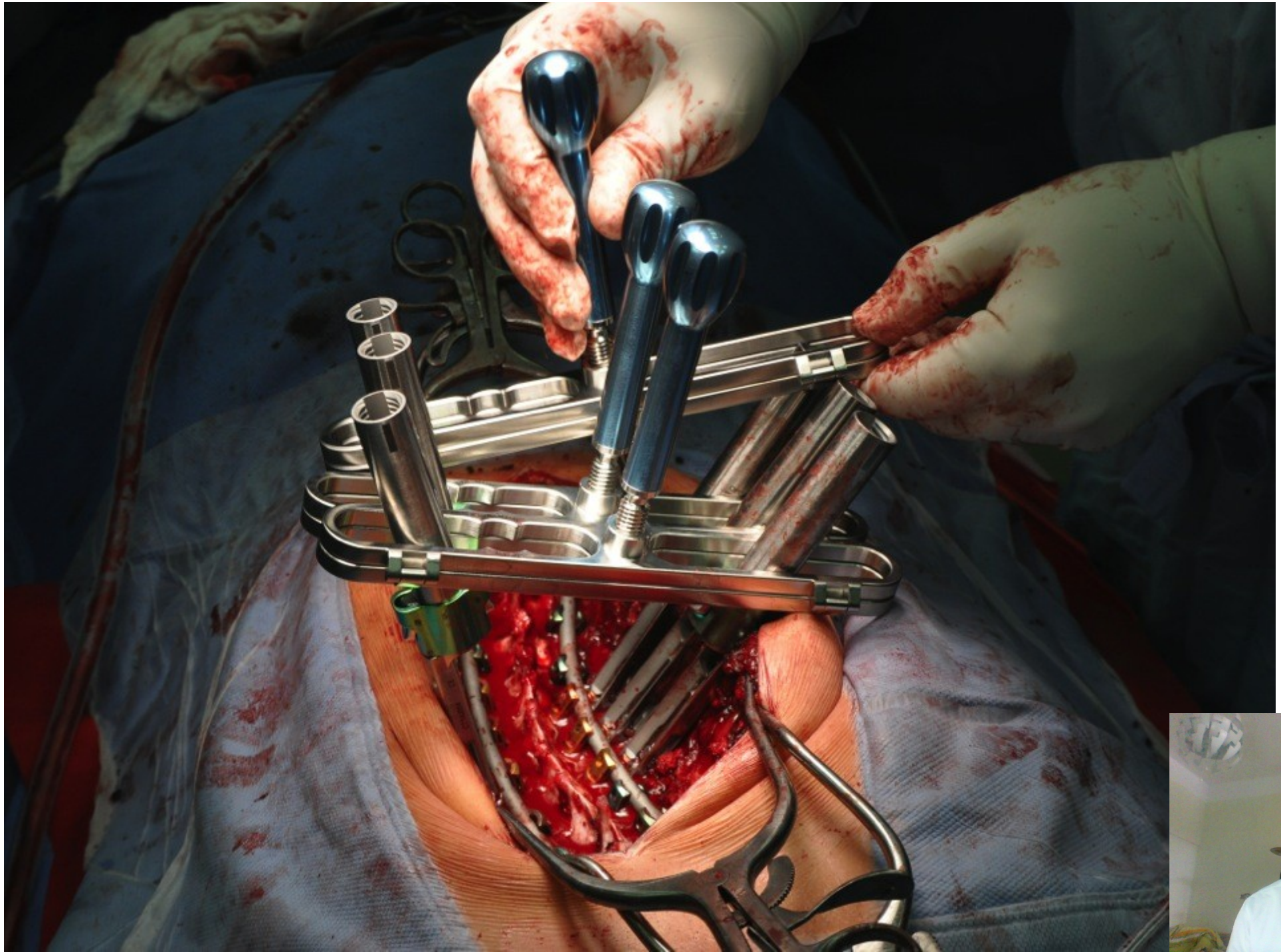


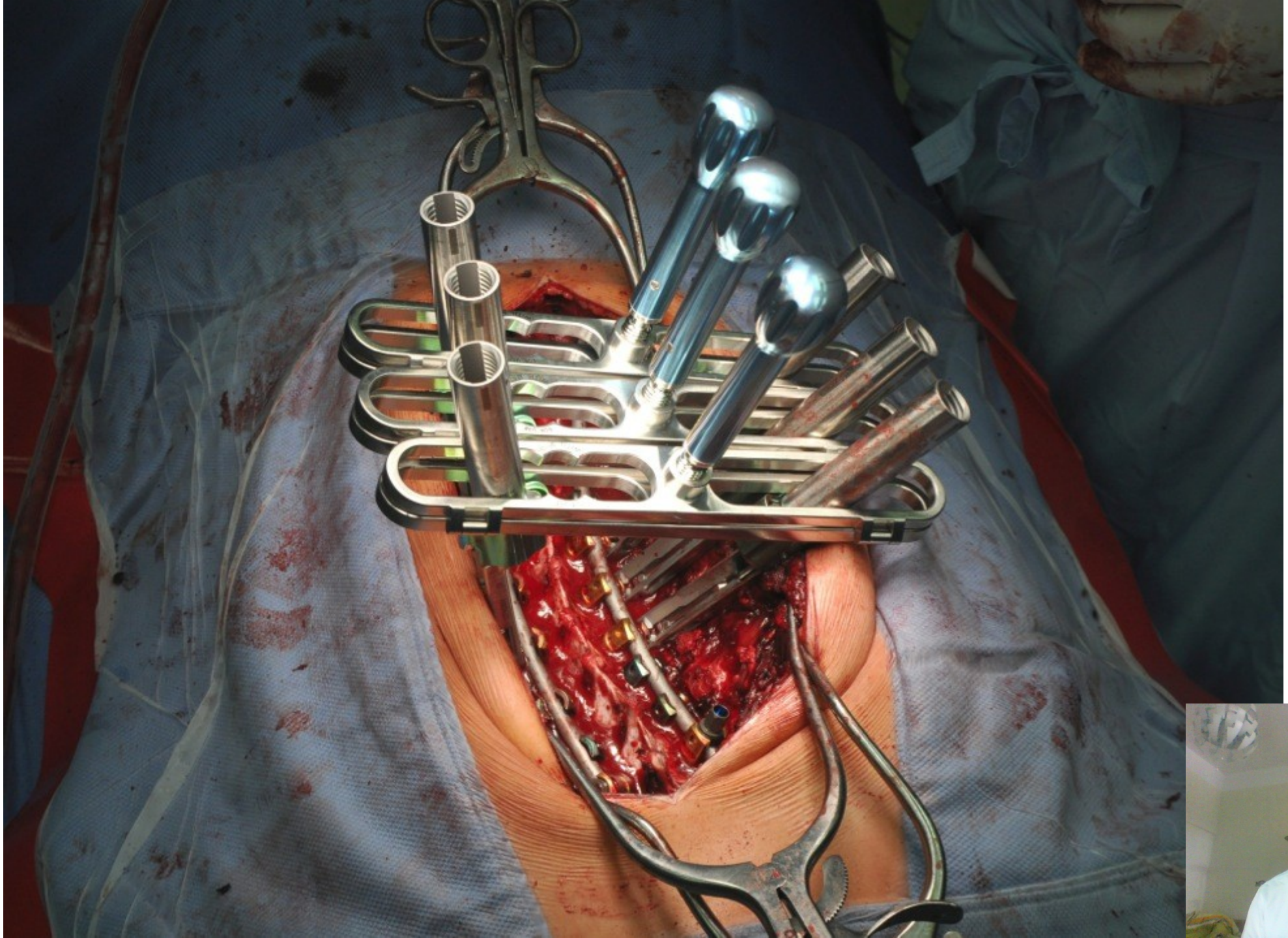


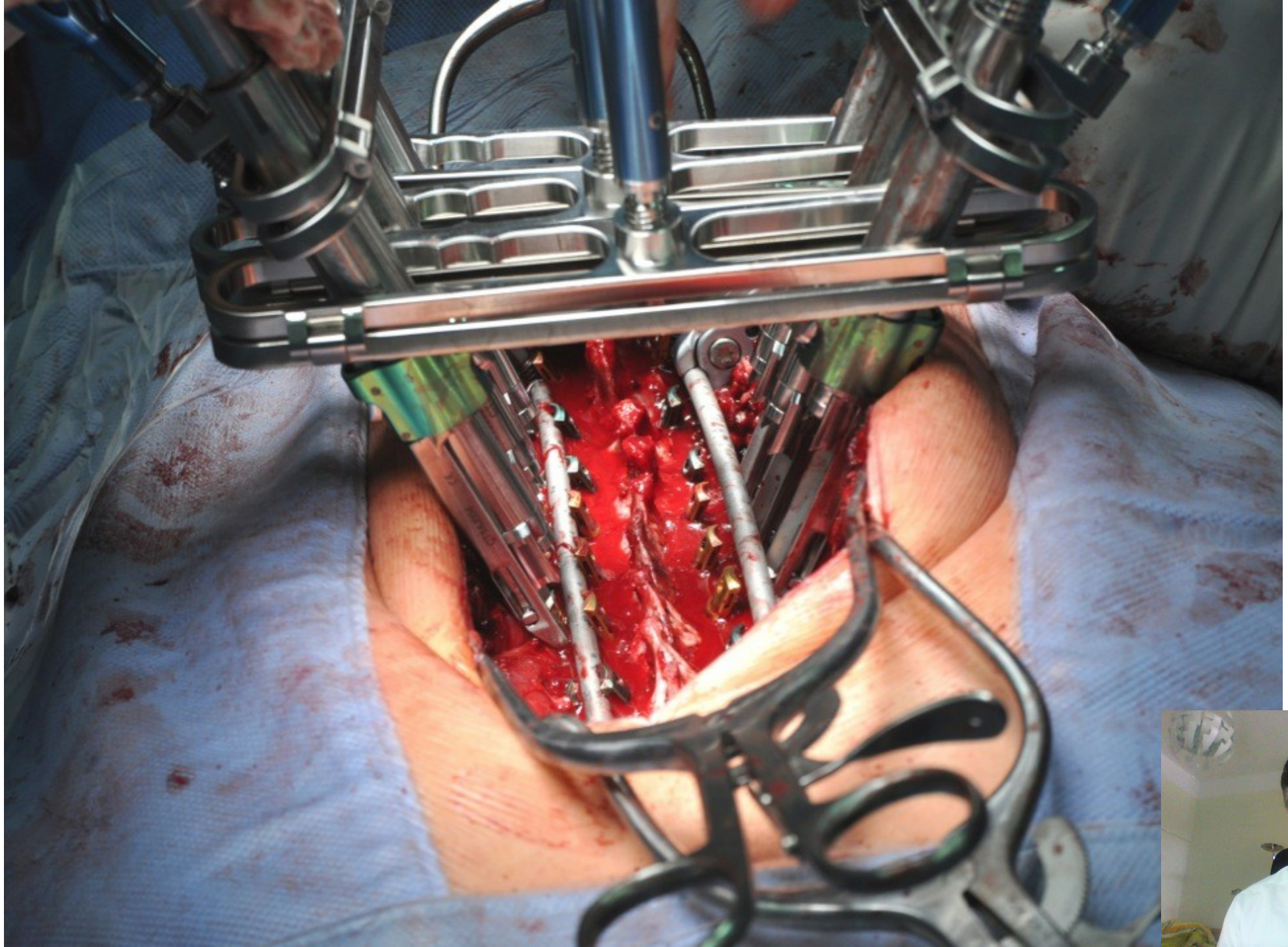


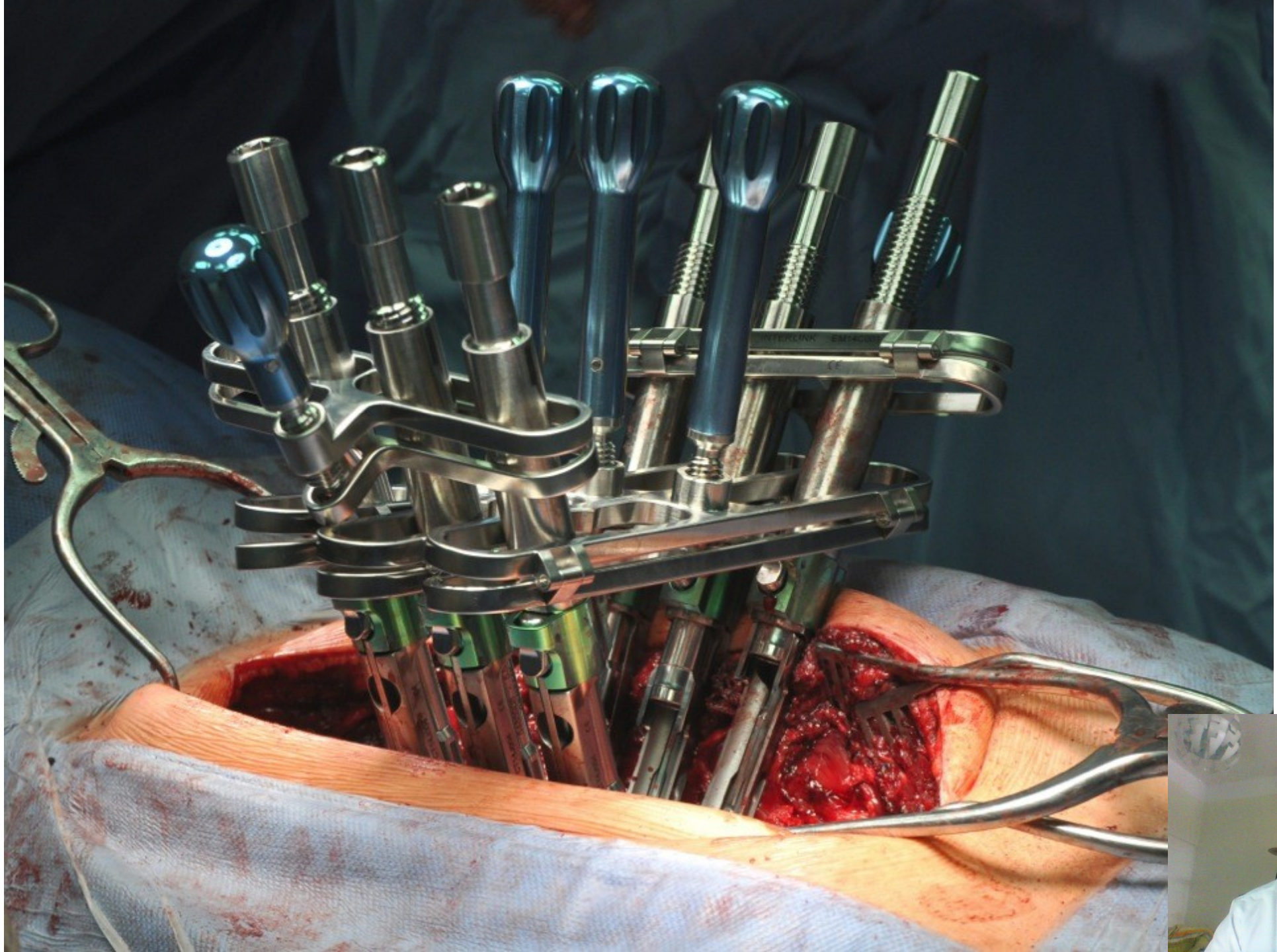


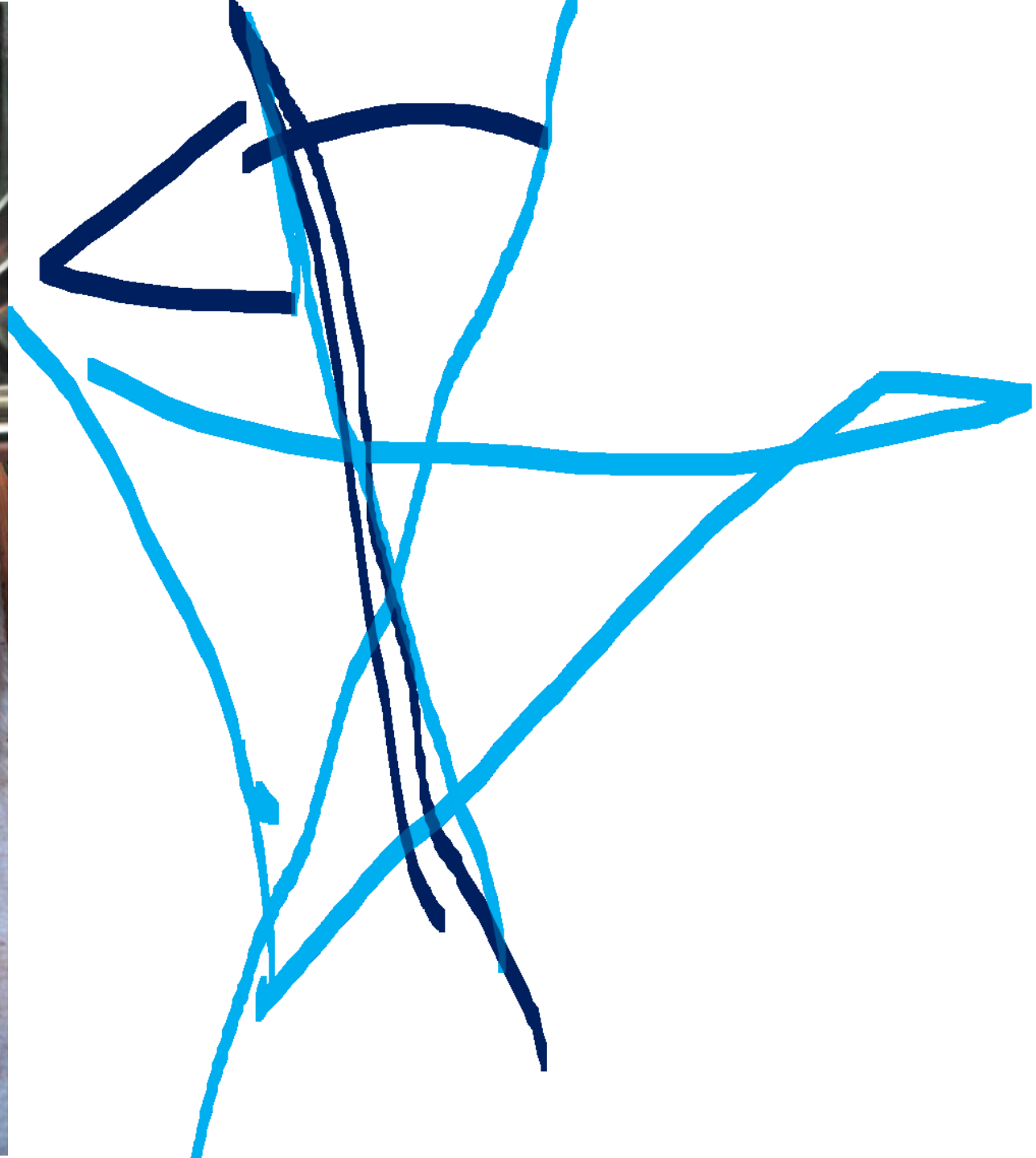


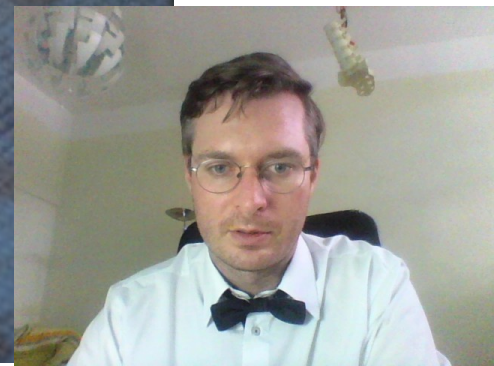


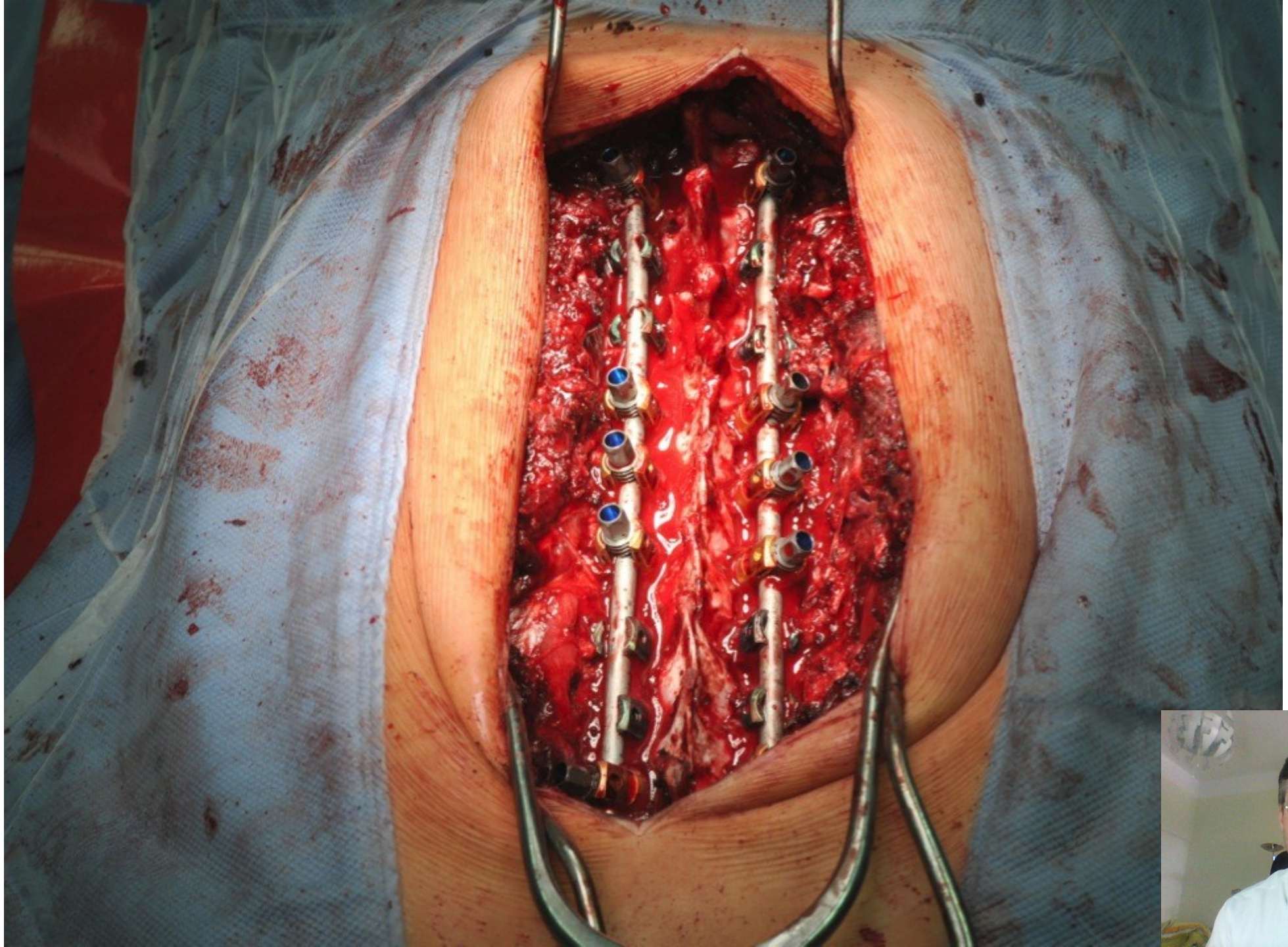


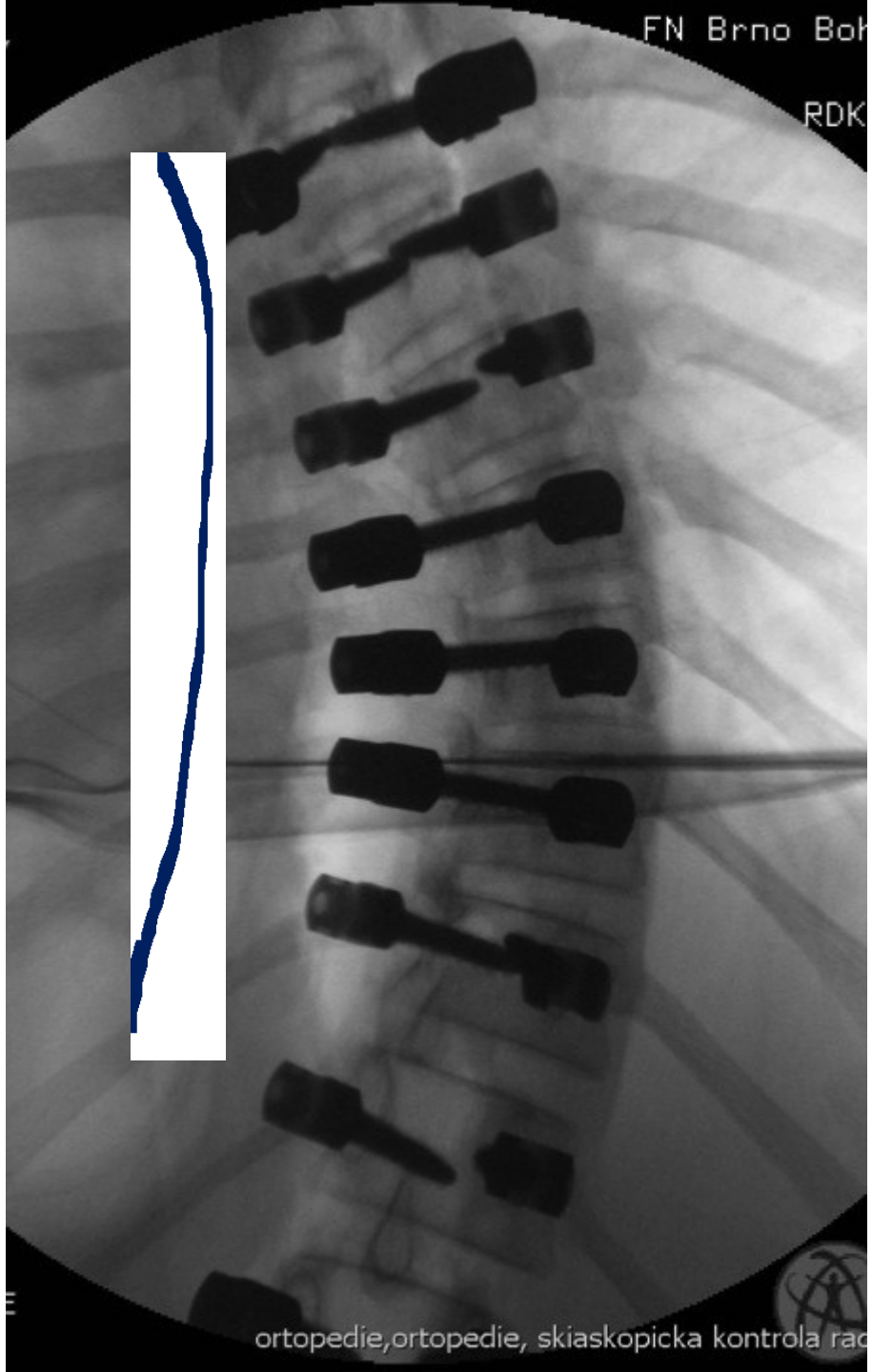








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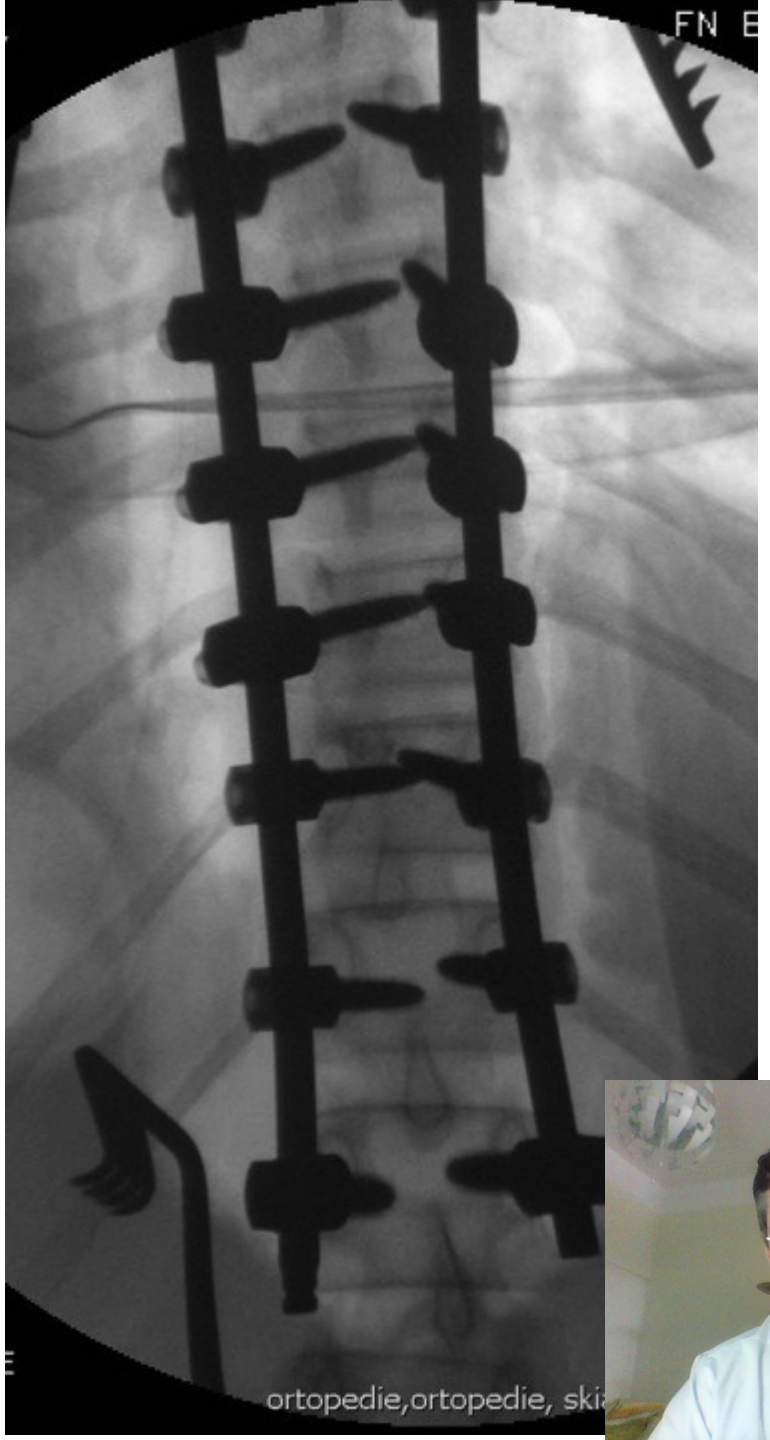
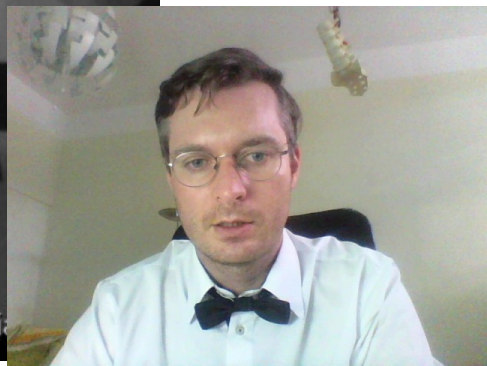
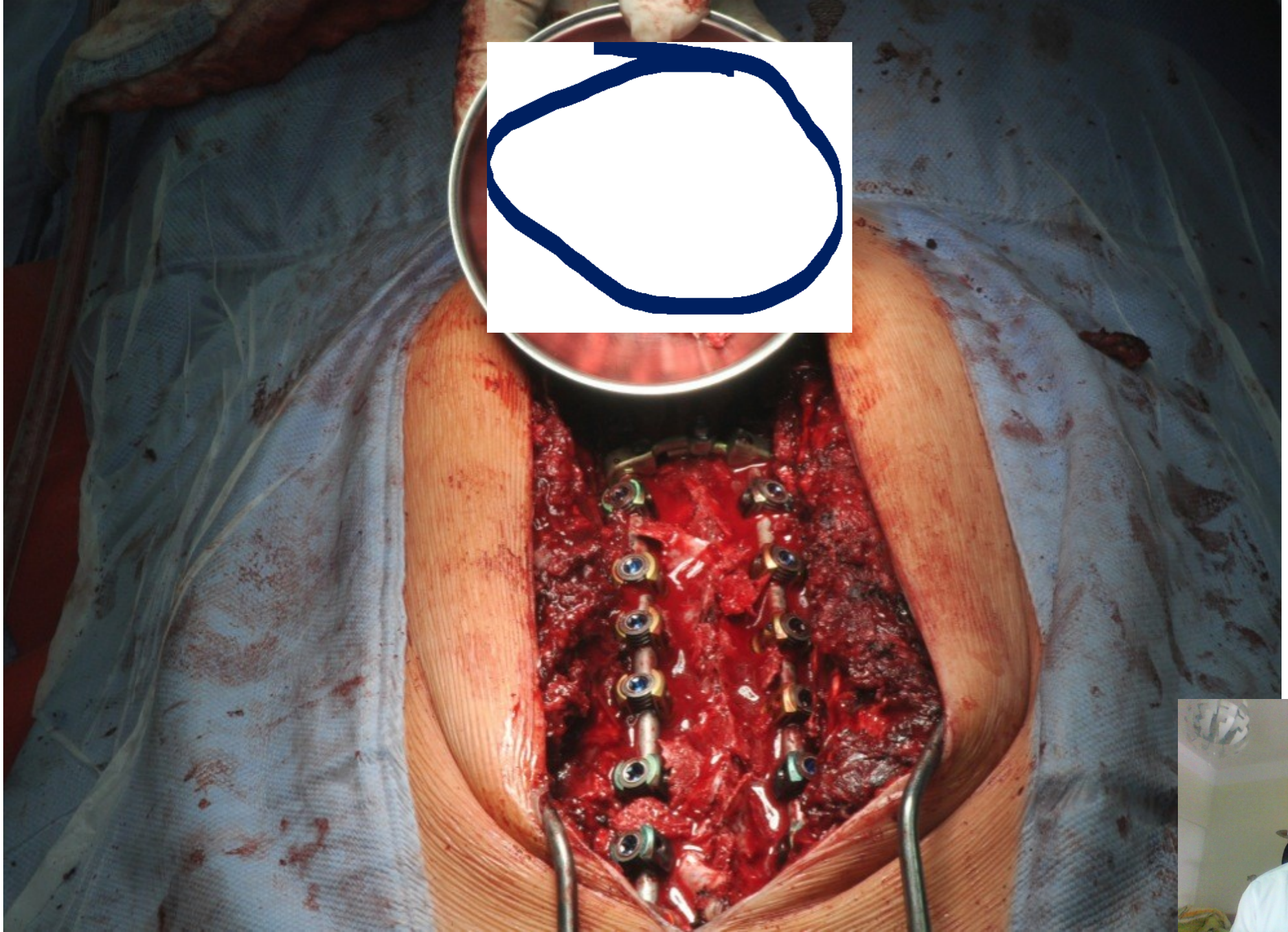
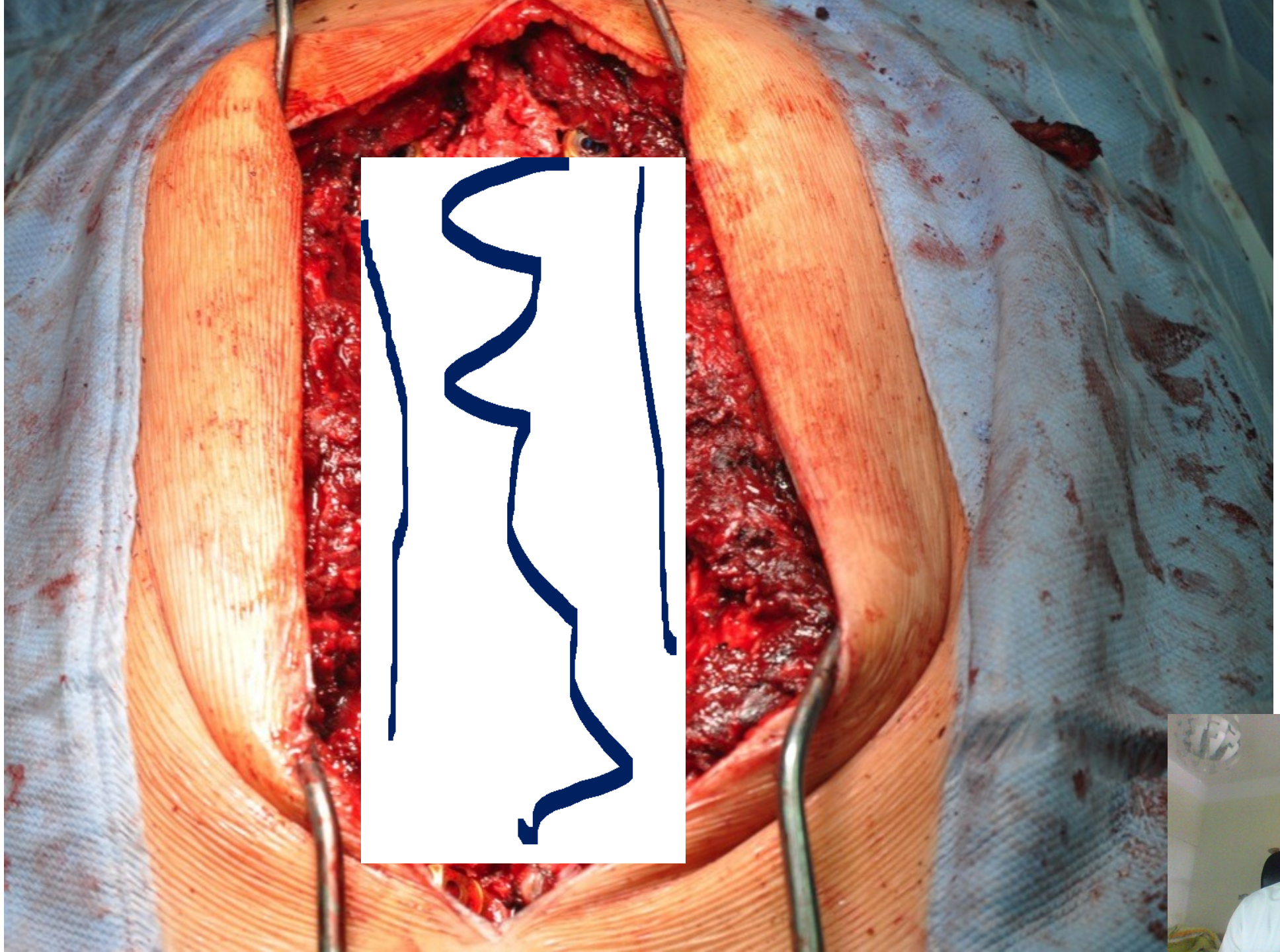
RDK
ortopedie,ortopedie, skiaskopicka kontrola rac


FN B
ortopedie,ortopedie, ski





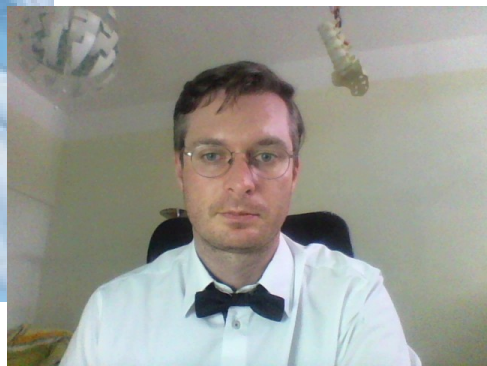


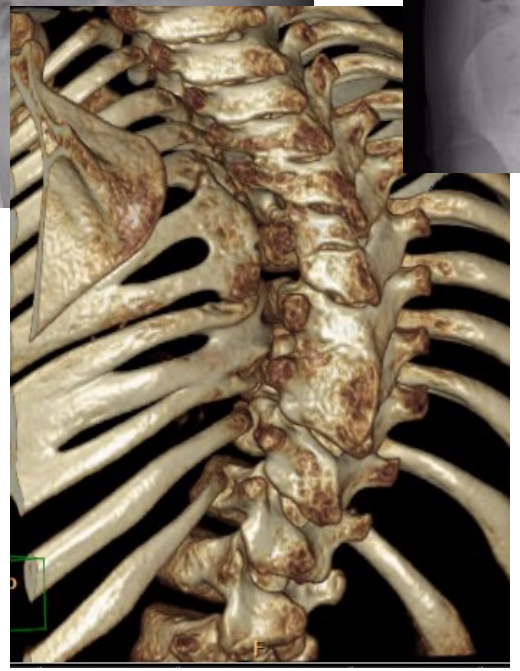
Nonfusion surgery methods

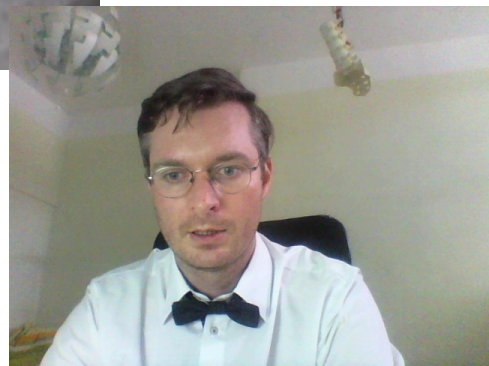


VEPTR
= vertical expandable prosthetic titanium rib

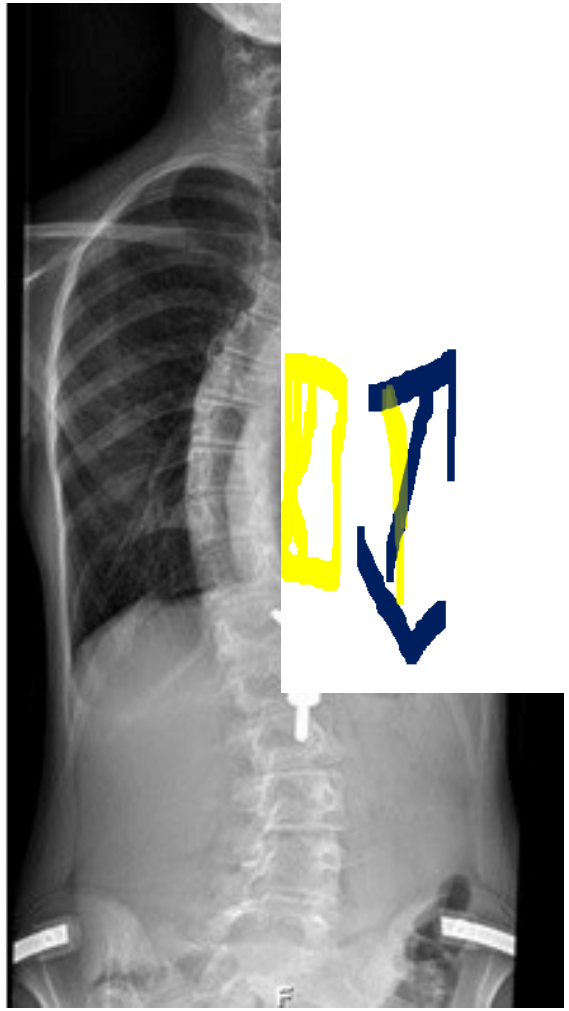
- Indikace: kong. def. + thoracic insufficiency syndrom
  + kostní nezralost
- Cíl: zvětšení objemu hrudníku + korekce deformity
- Nutné opakované redistrakce

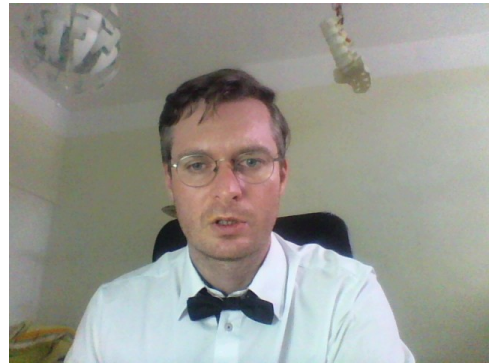




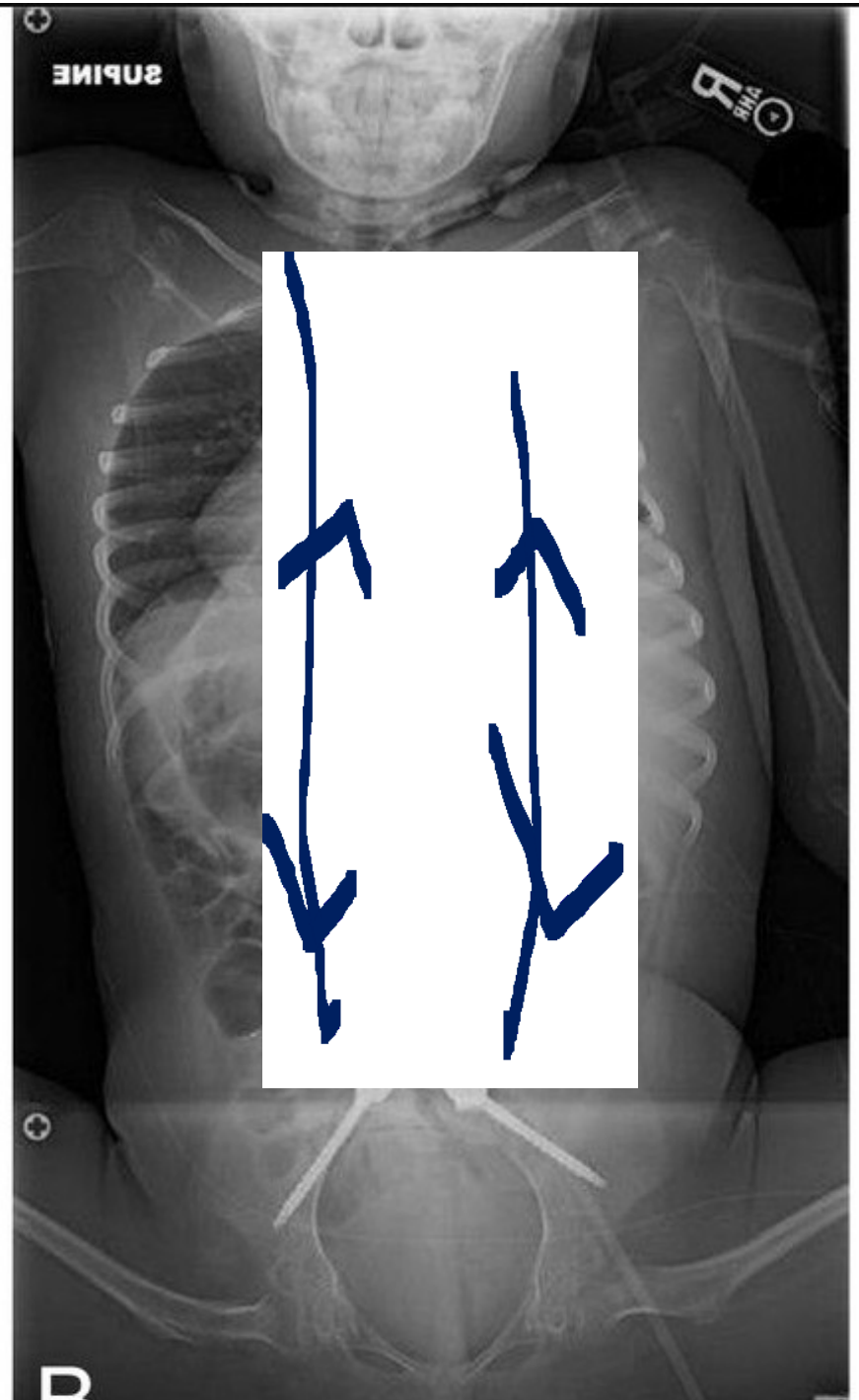


Magnetické tyče (Magnetic rods)



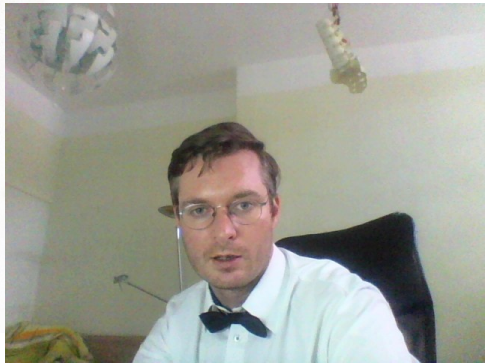


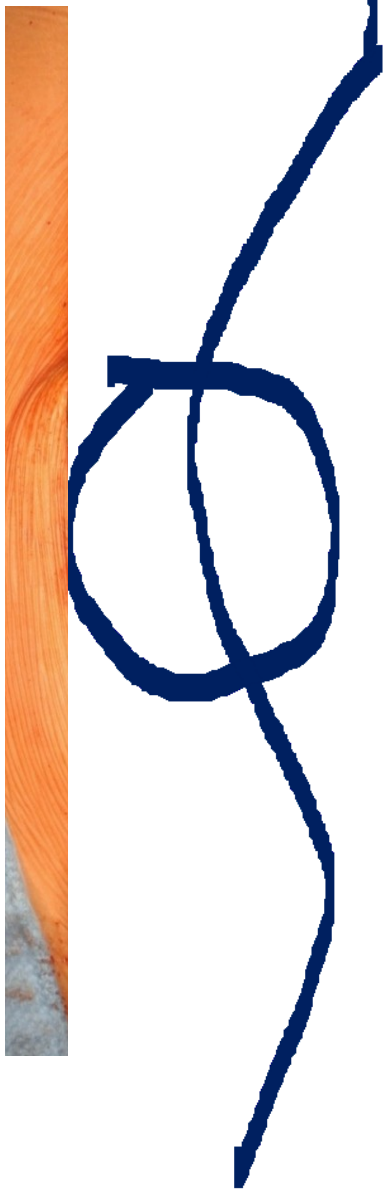

AP
103 °

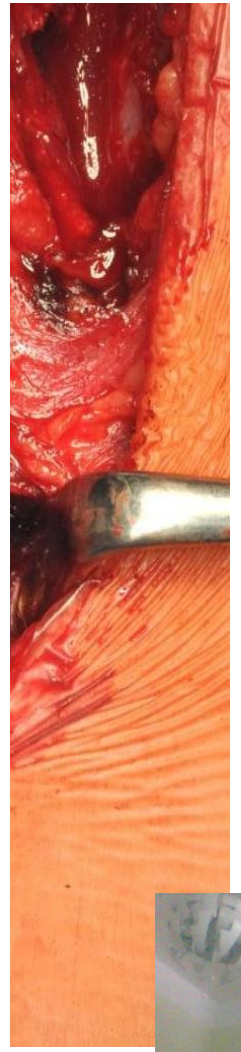

SUPINE

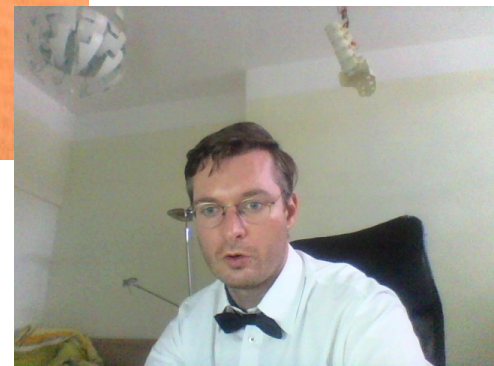
Growth Guided System

- Deformity correction + growth enabled
- Fusion of the apex of the curve
- The rest of spine grows guided along the rods

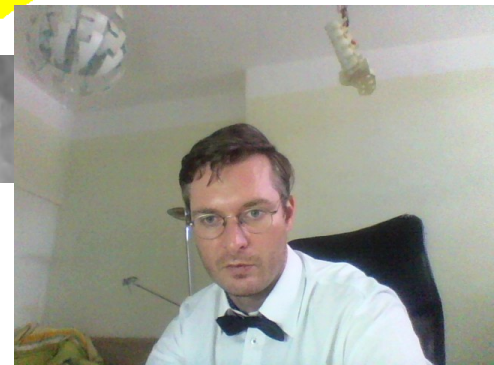


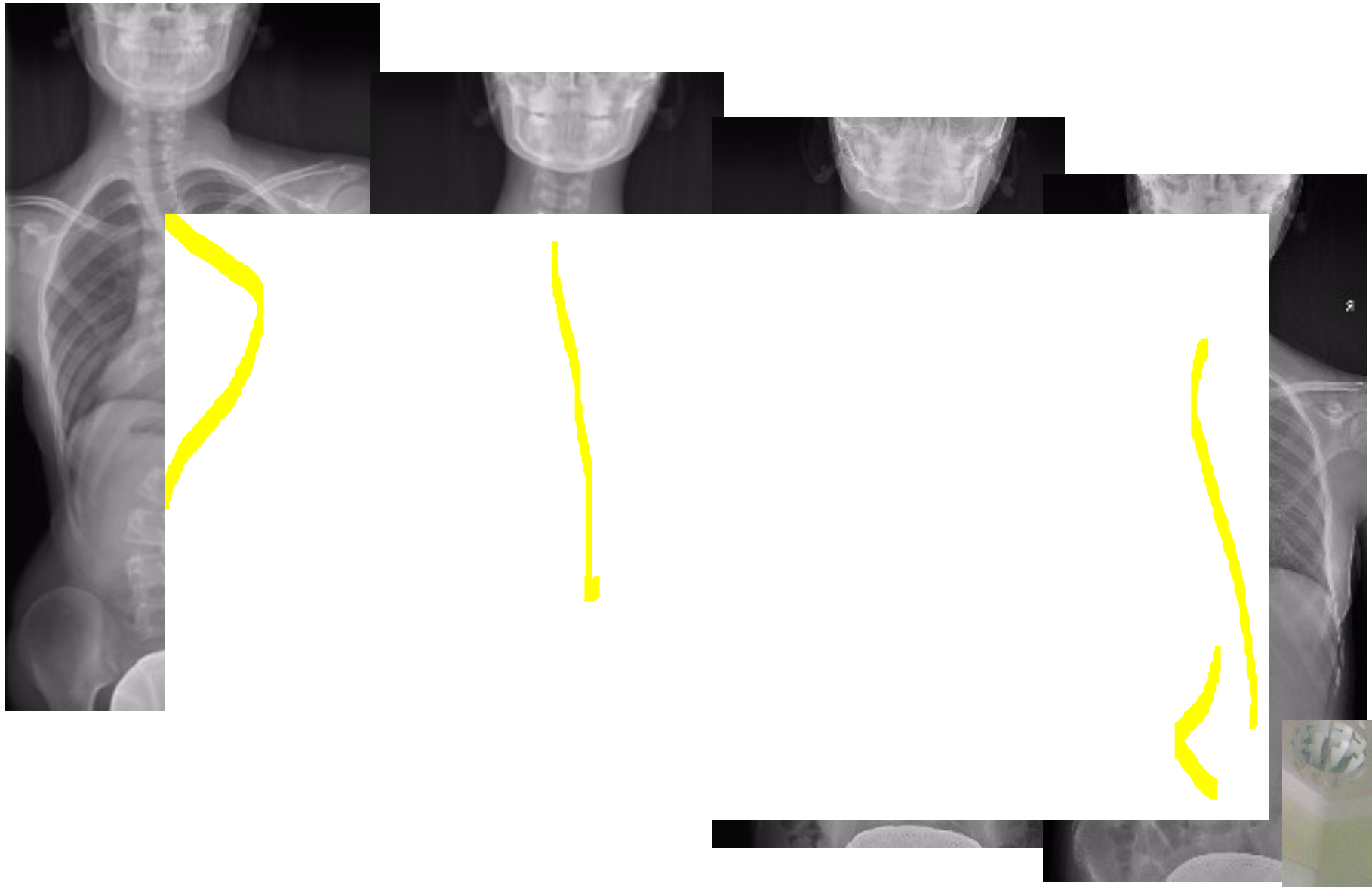




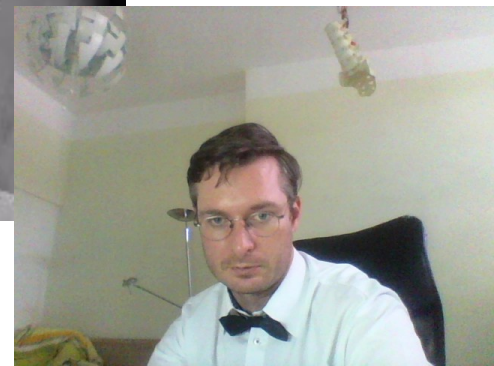


3+9 3+10 5+10 7+5





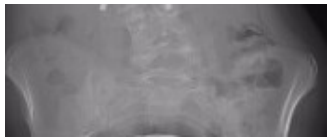
10 +9 poop 13+8 15+1

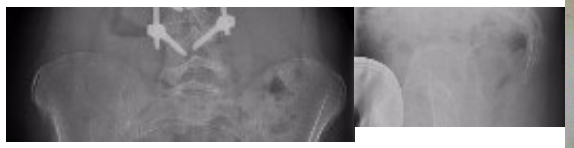


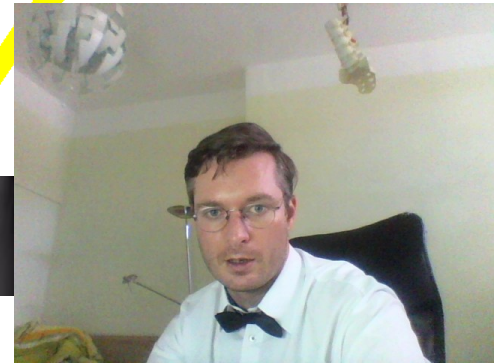
GGS requires definitive fusion !

Pts need

Convertic







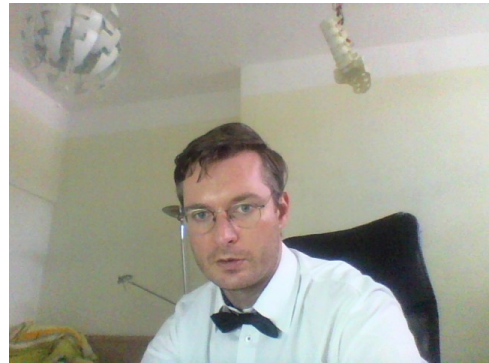
Scoliosis types due to ethiology

Deformity type

- Idiopathic
-
- Neuromuscular

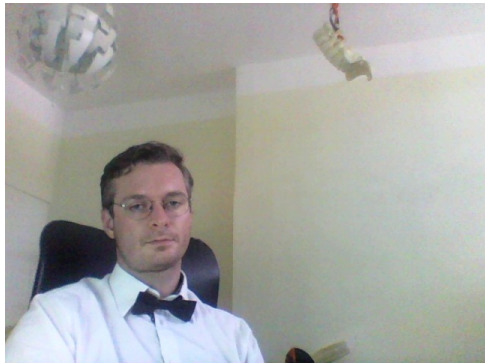
Age

- Infantile
  < 3 y
- Juvenile
  4-10 y
- Adolescent
  11-17 y
- Adult
  > 17 y



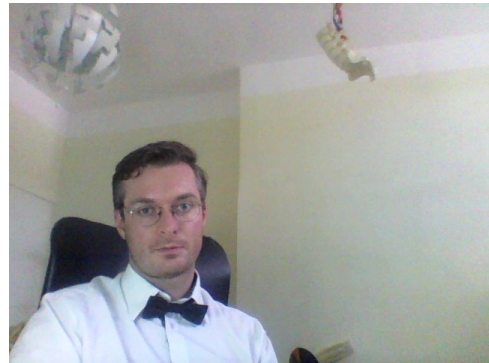
Congenital scoliosis

- Congenital Scoliosis- inborn spine deformity due to imperfect formation of vertebrae and their association.
- Hard to predict development and deformity progression …

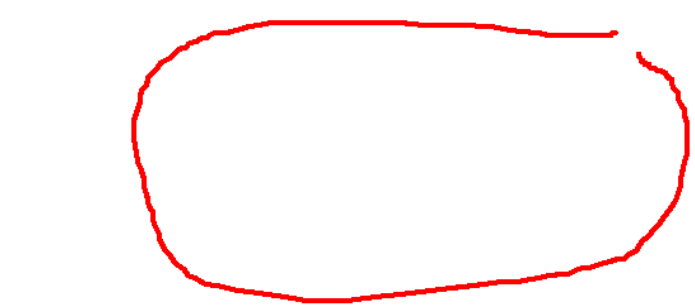


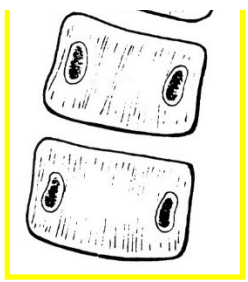
Congenital scoliosis

- deformity occurs during the first 6 weeks of embryonic development without hereditary burden, it is not hereditary
- wide diversity of severity of disability
- dg. newborns / toddlers, can occur at any time during growth



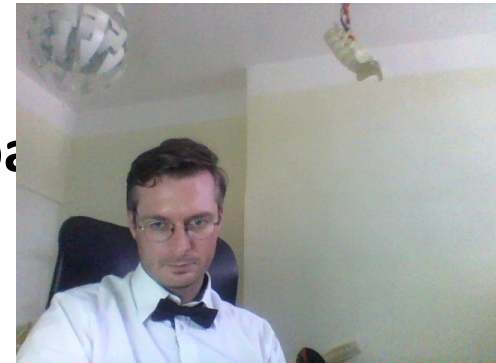
CONGENITAL scoliosis





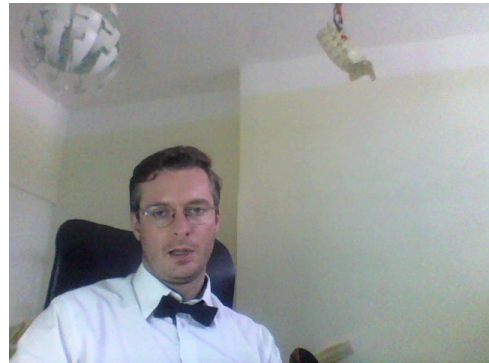
Hemivertebra

Unsegmented ba

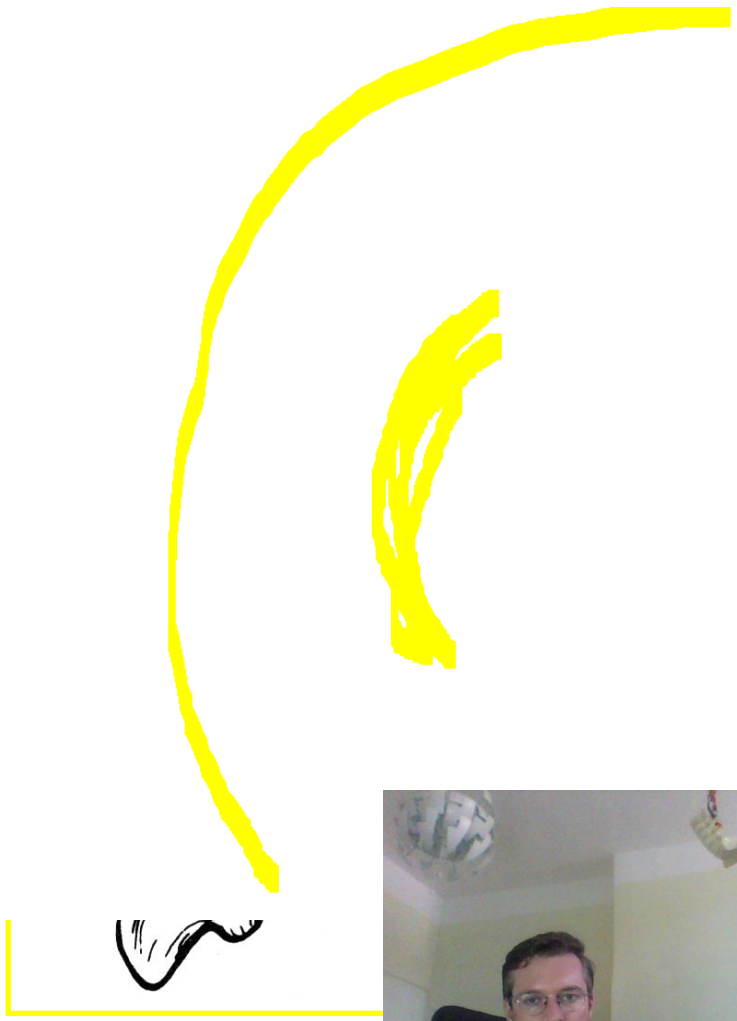


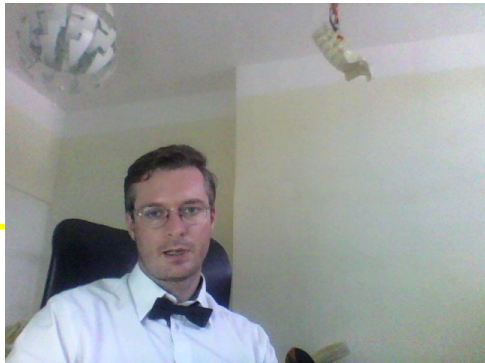
Congenital scoliosis

- Failure of SEGMENTATION- failure of the connection of one or more vertebrae on one side
- Failure of FORMATION- most often, disorder of vertebra formation, shape anomalies
- COMBINED failure



Failure of segmentation

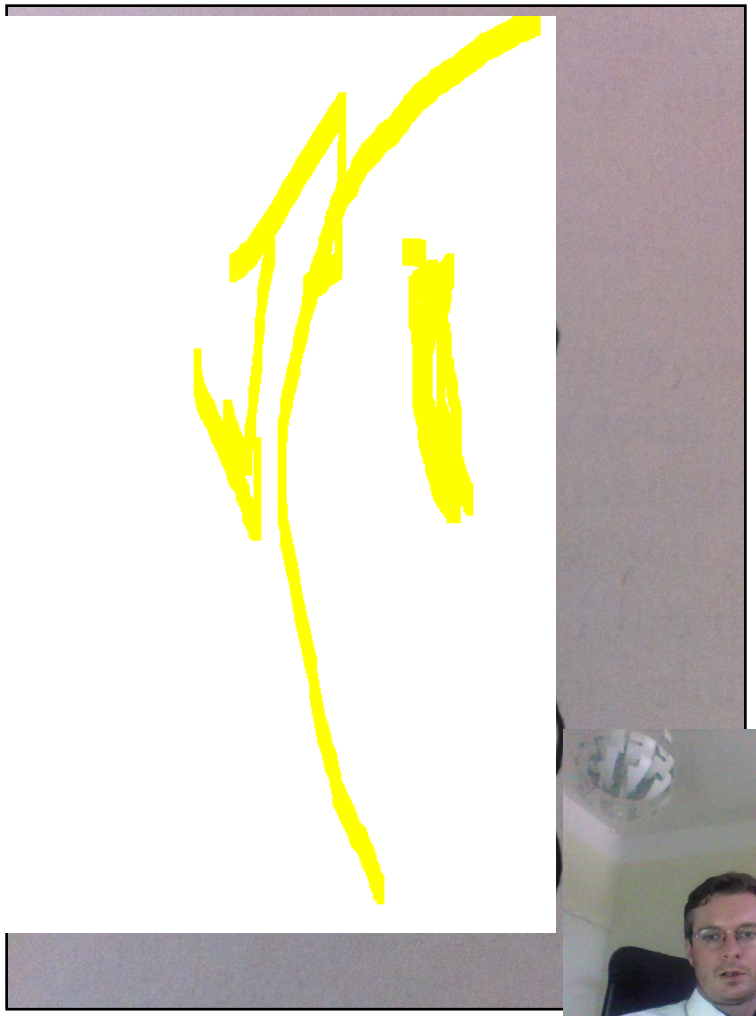




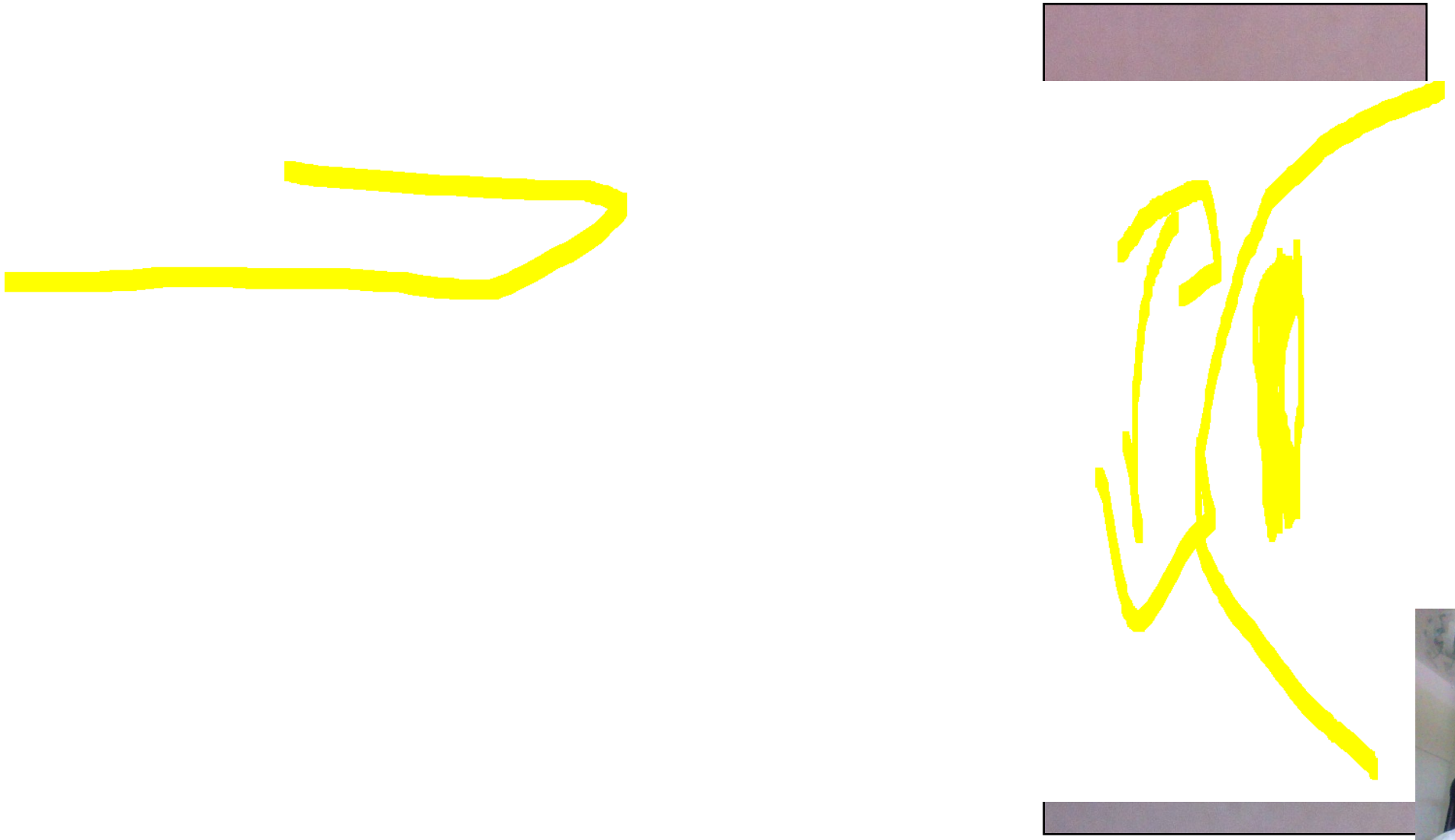
Failure of segmentation

-

->



Failure of segmentation

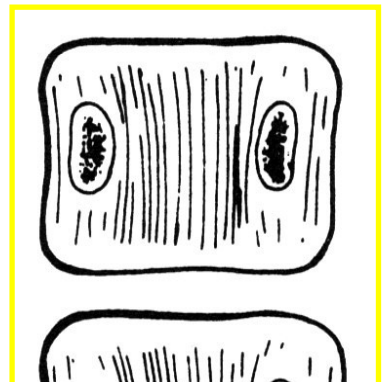
- 

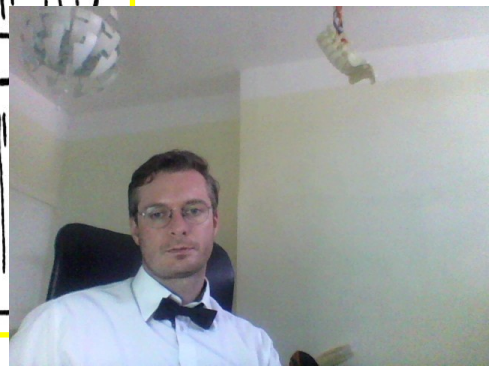
Failure of segmentation

Usualy asymptomatic

Can lead to relative shortening of spine

„





Failure of formation

- anterior

Could affect just part of vertebra / all structures

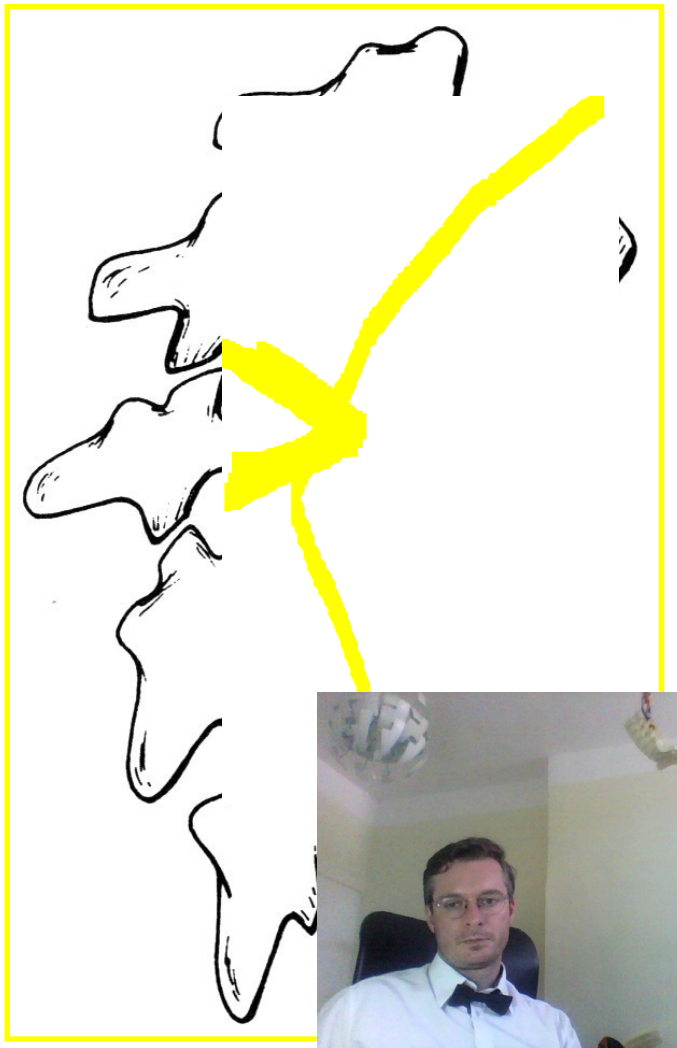
Solitary or multiple changes

„posterior hemivertebra“

-> kyphosis

- posterior – much less common

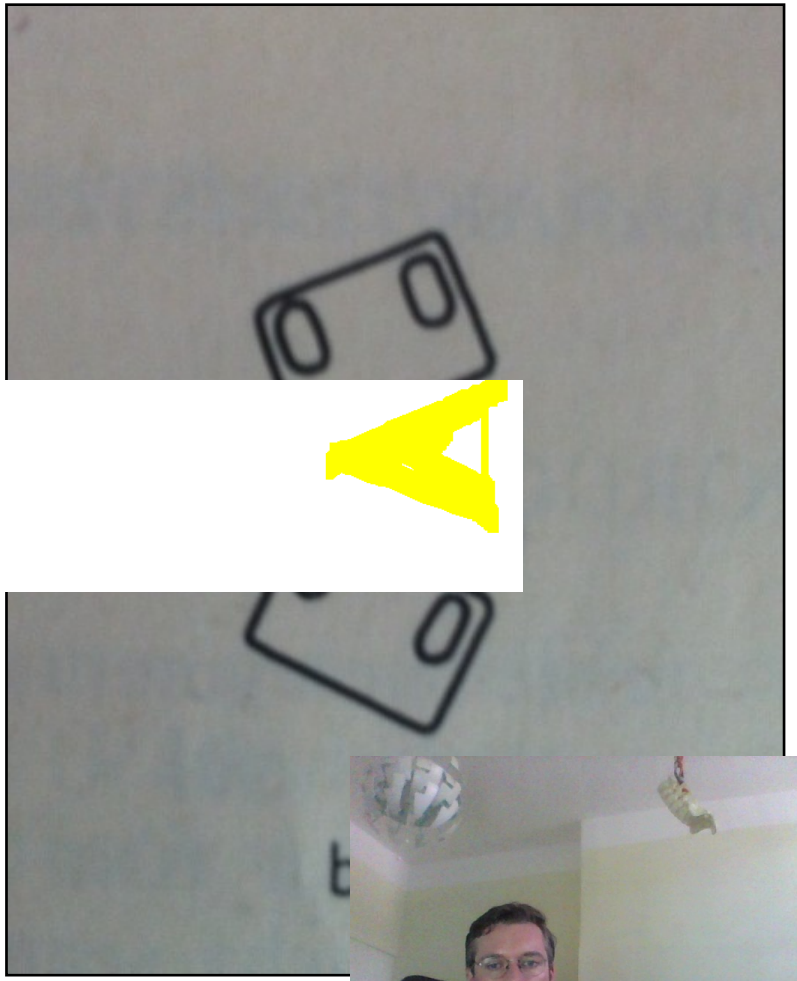
- > lordosis



Failure of formation

- Lateral
- Hemivertebra

-> scoliosis deformity



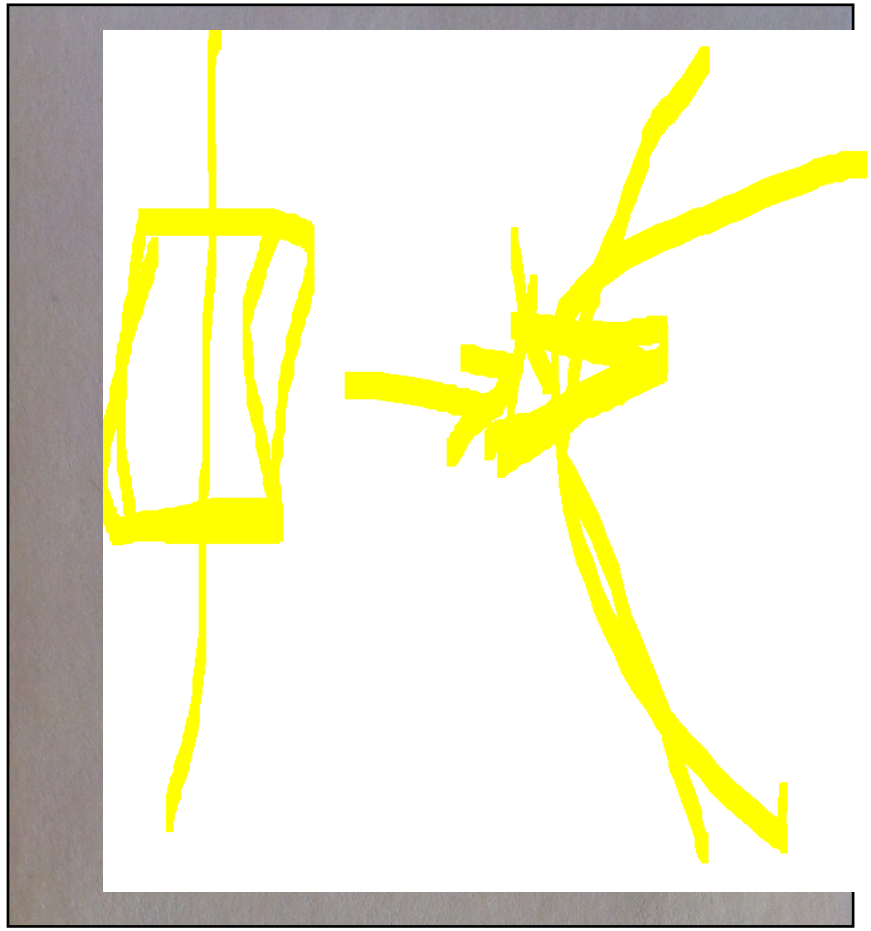
Failure of formation

Postižení solitární až mnohočetné

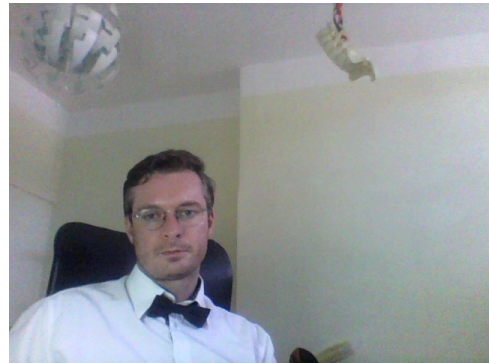
Postižení sousedních obratlů nebo
v různých úsecích páteře

Hemivertebra types

closed type / neuzavřený poloobratel



bez progrese / progrese deformity



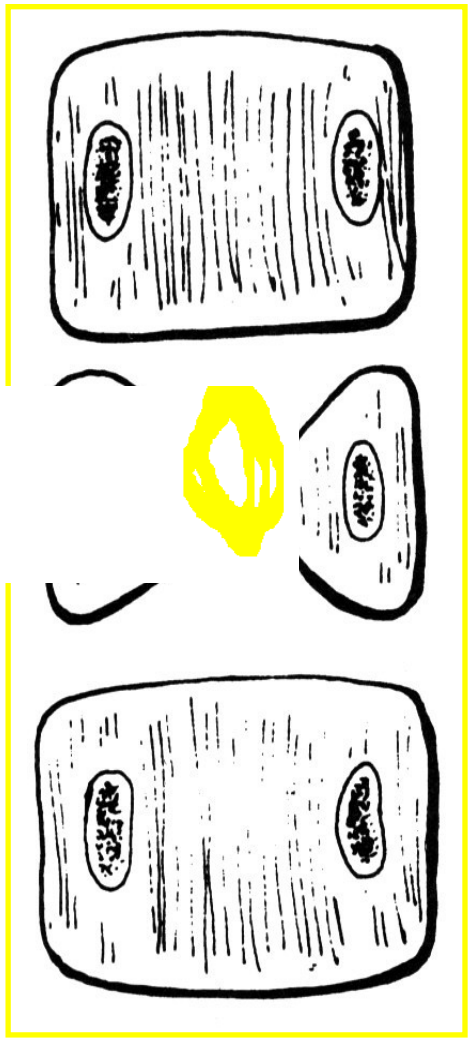
Failure of formation

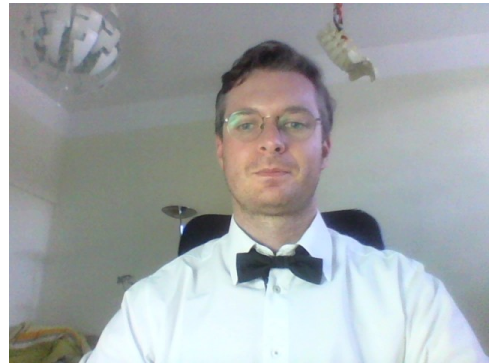
- Aterior central defect

The two parts of vert. are not connected together

„

- According to severity of the anterior defect can lead to kyphosis or is completely asymptomatic





Combined failure

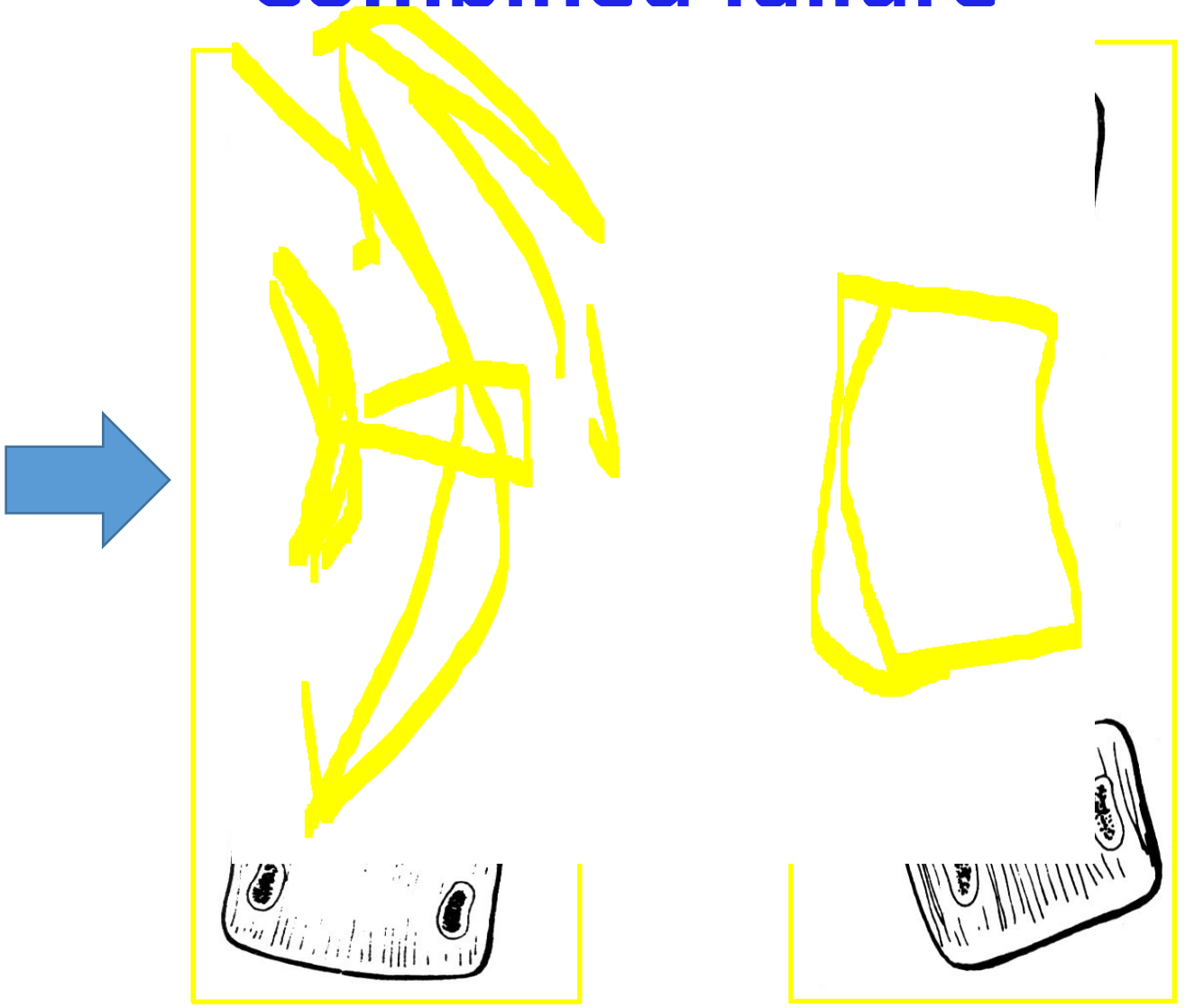
- Very common
- Multiple changes

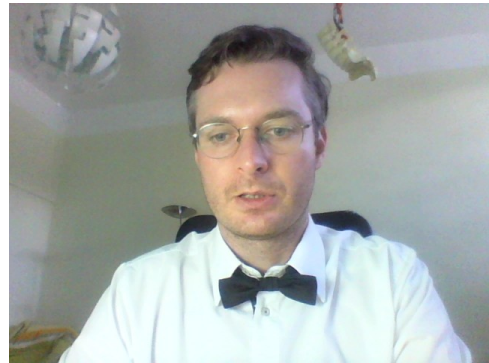
- Very individual

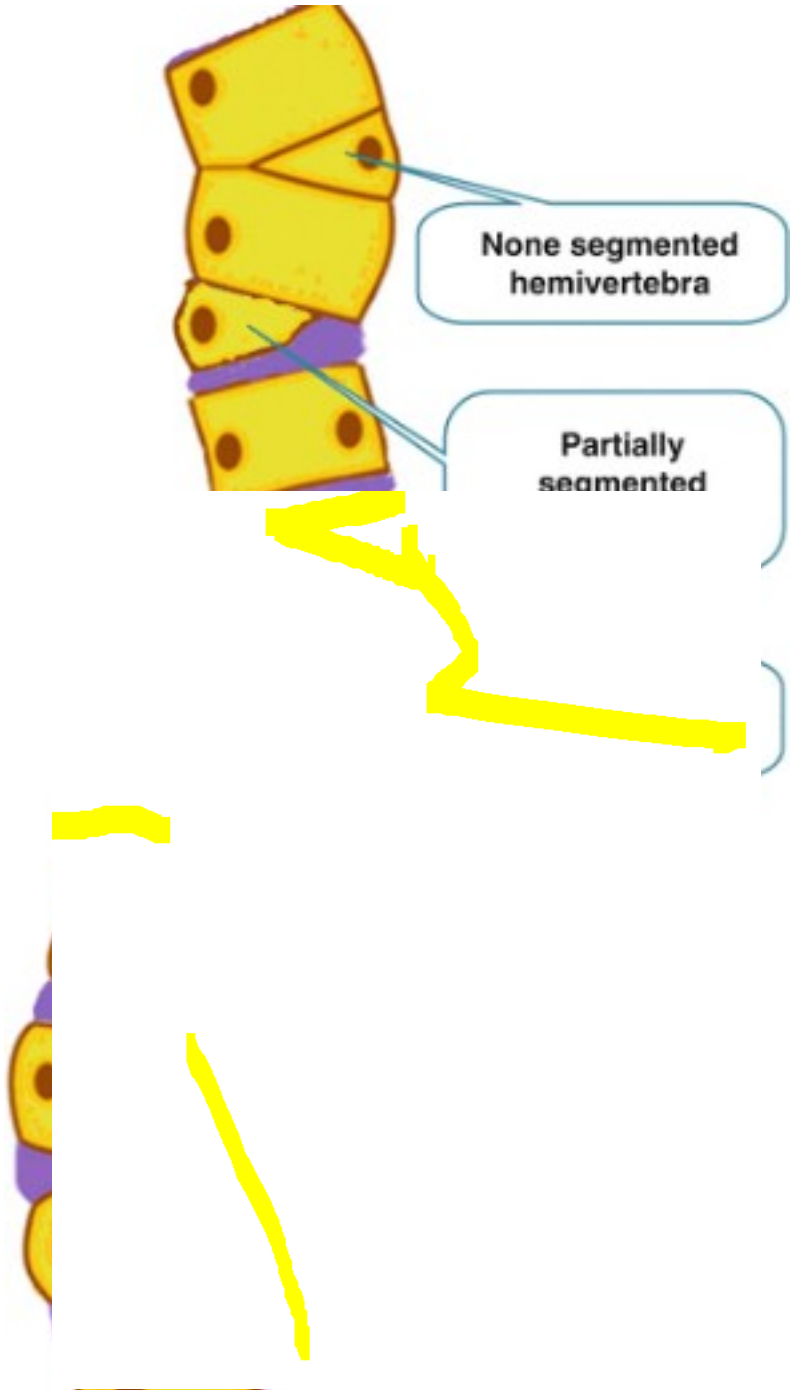
- Hard to predict progression in multiple changes, observation is the key.

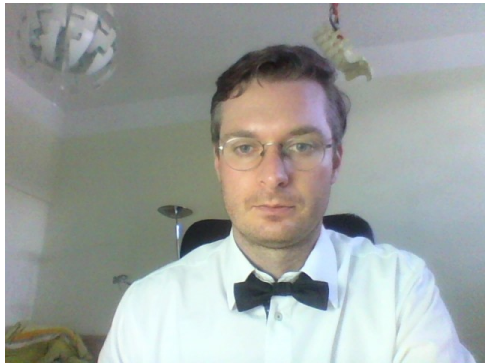
Combined failure

The highest risk of progression = Fully segmented hemivertebra + contralateral unsegmented bar !!






None segmented hemivertebra
Partially



Congenital scoliosis - therapy

Main rule – STOP the progression !

Observation – X-ray á 6months

if there is progression of deformity -> surgery

fastest growth– frist 5y of age

+ adolescent growth spurt

-> highest risk of progression !!!

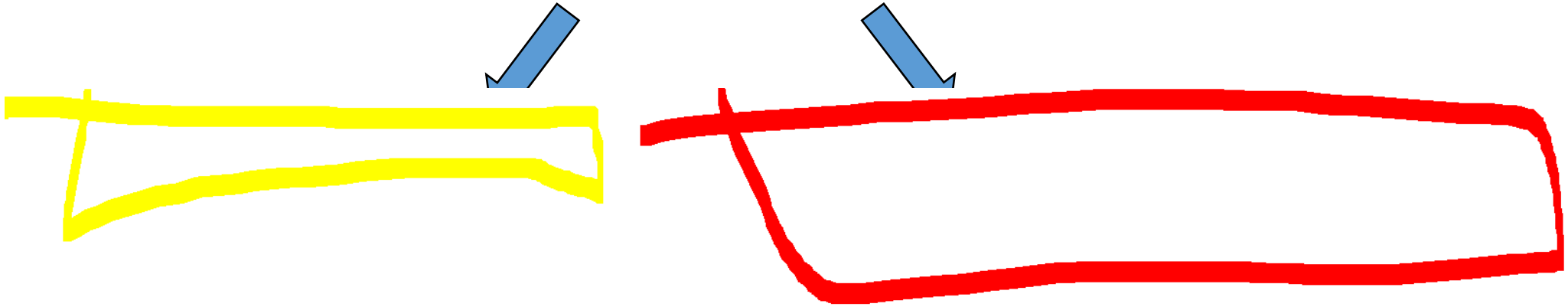
Hemivertebra

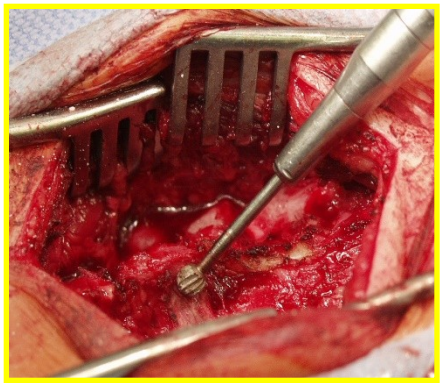
semisegmented

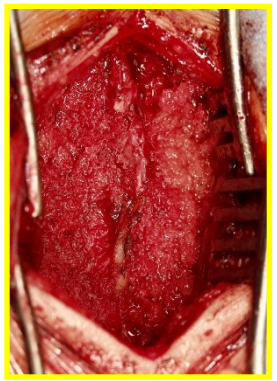
non-segmented

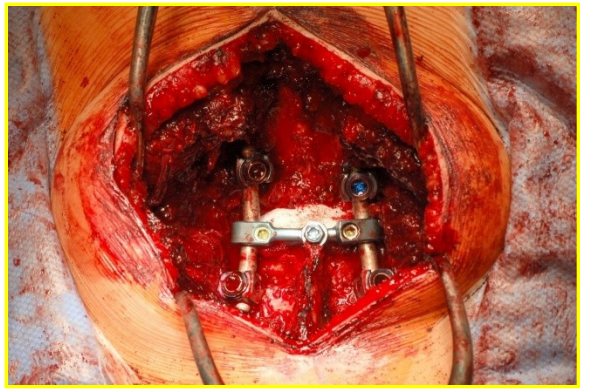
Risk of
sever scoliosis

2 main used surgical techniques



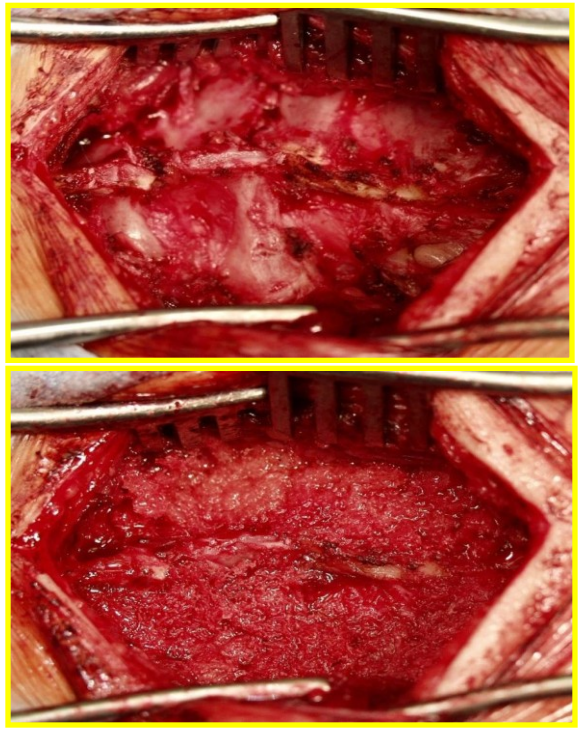






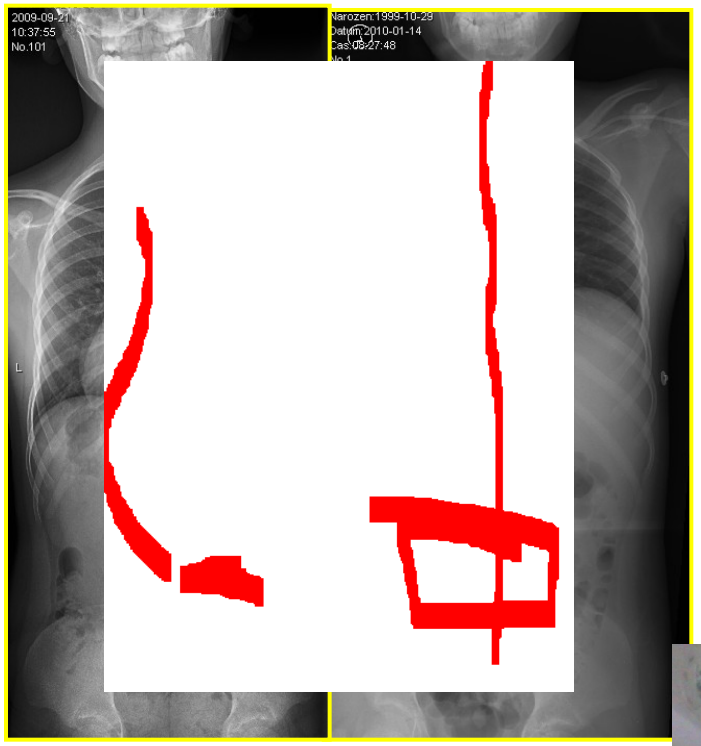
Surgery of hemivertebra

Simple fusion



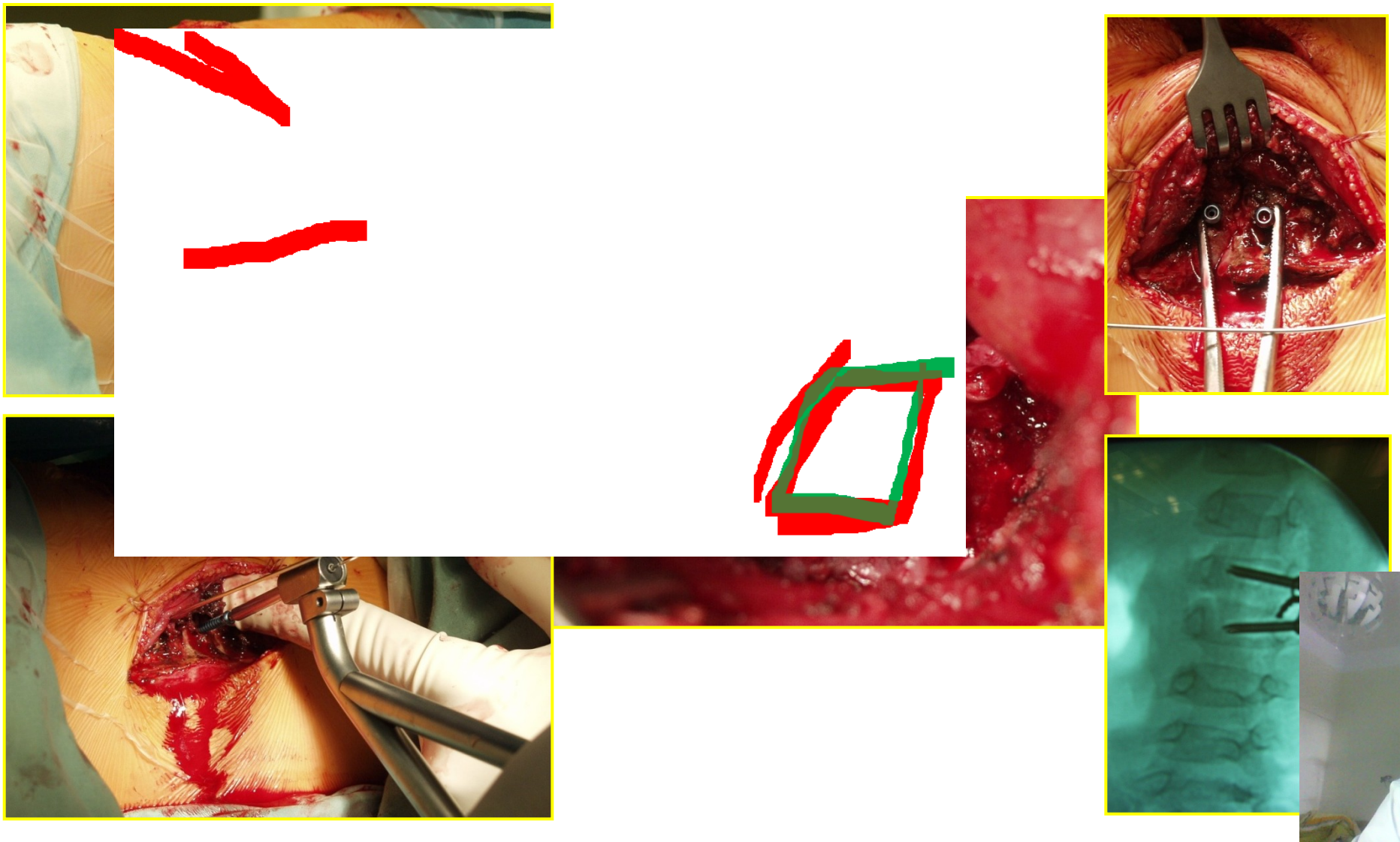
- Small deformities
- Blockage of worsening
- Without correction possibility

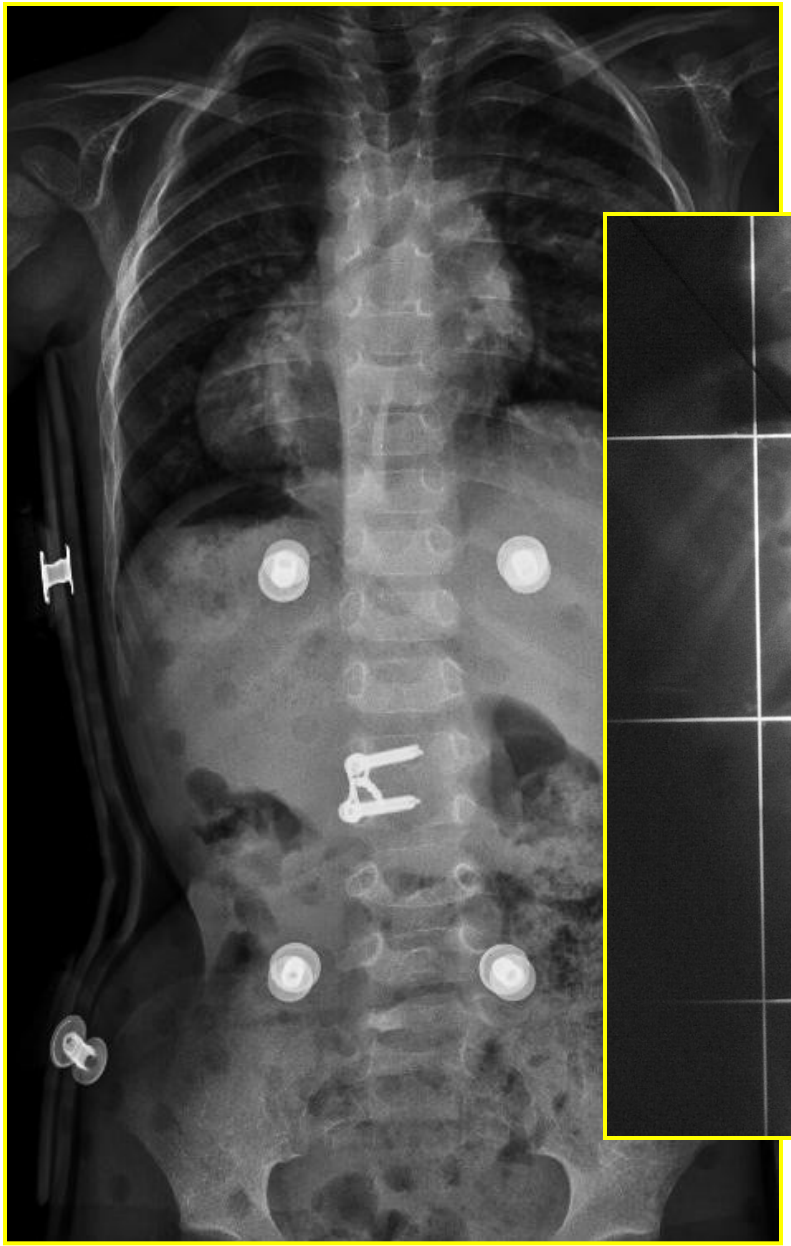
Hemivertebrektomy

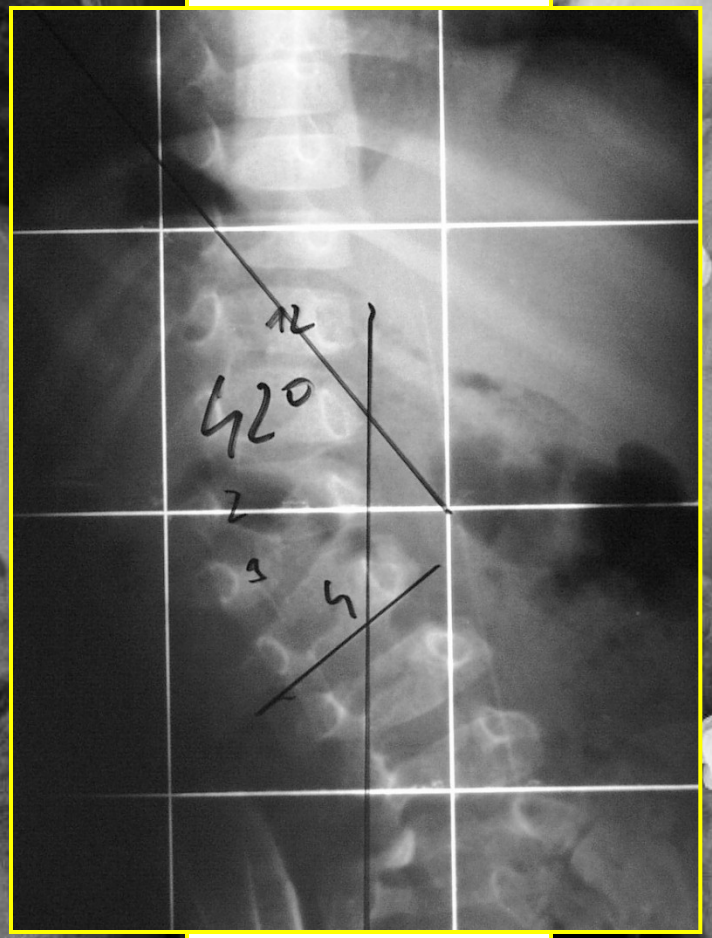


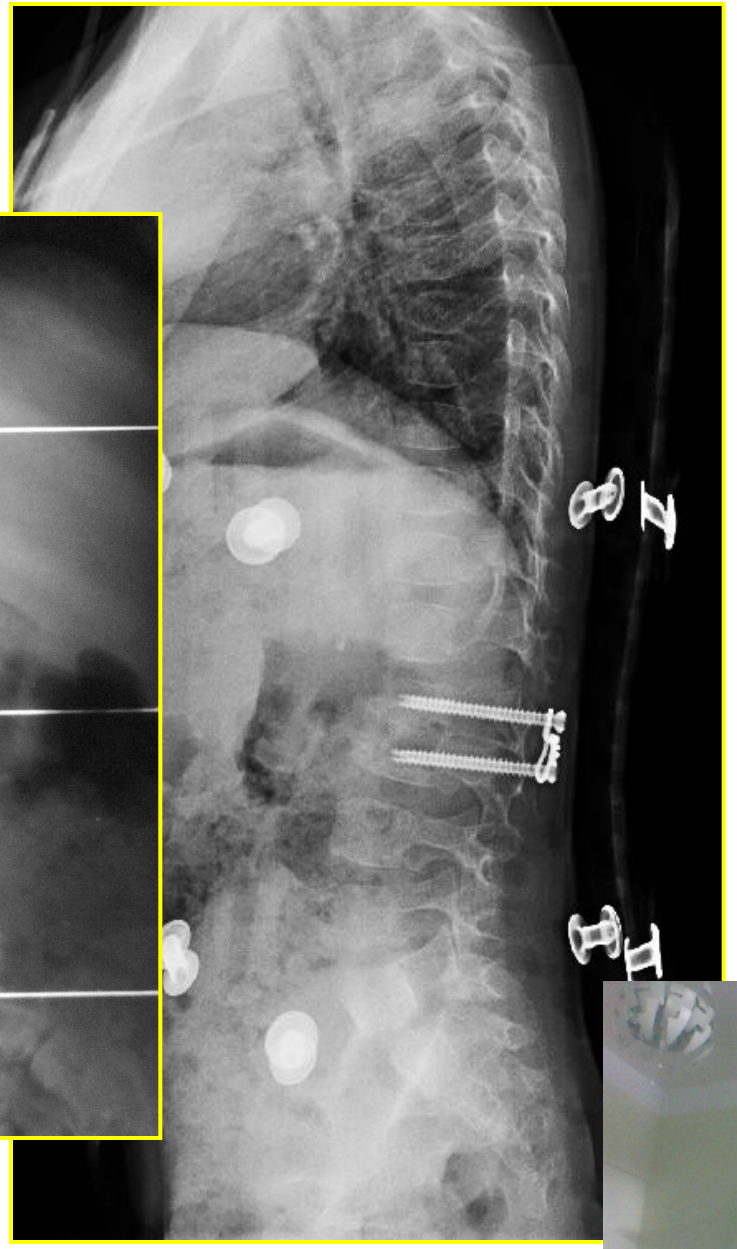
- Larger deformities
- Curve correction
- Prevention of secondary curves

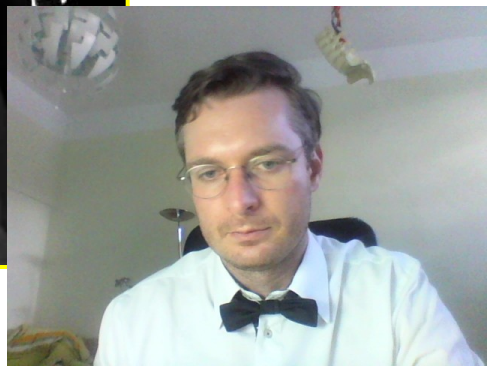
Hemivertebrectomy combined approach



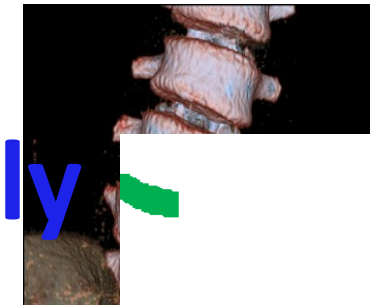


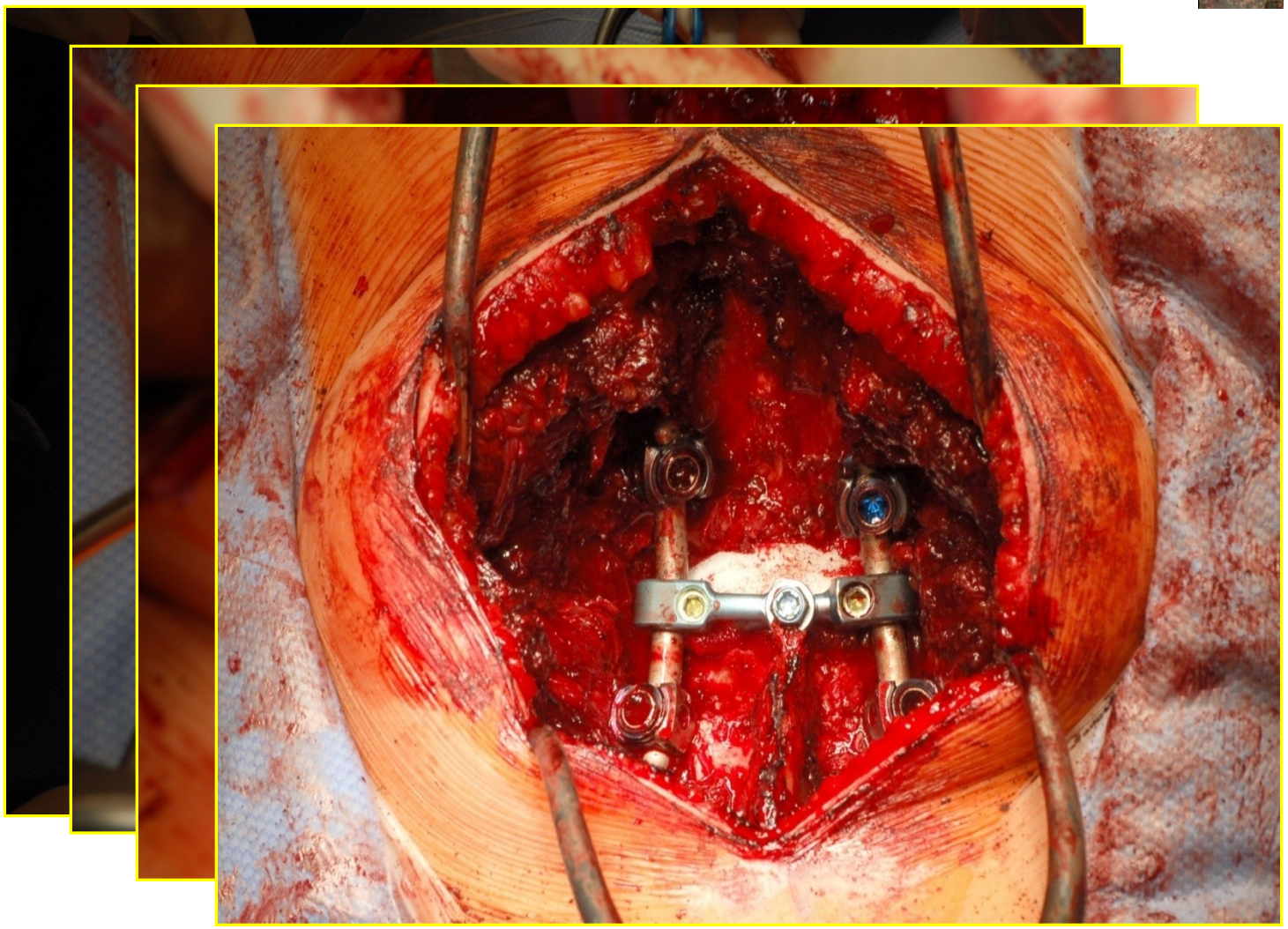

42°

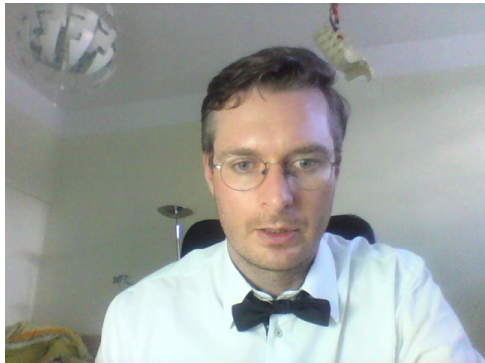


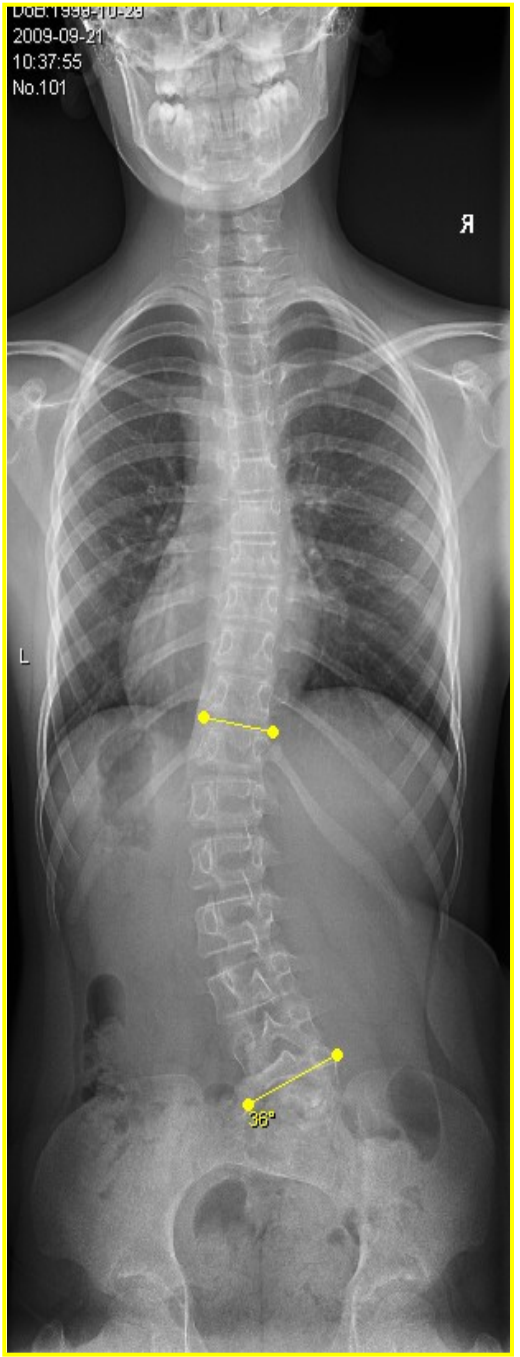


Hemivertebrektomy
posterior approach only





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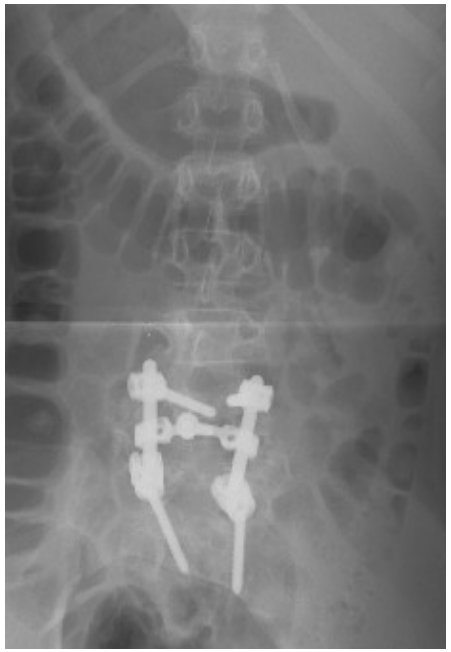
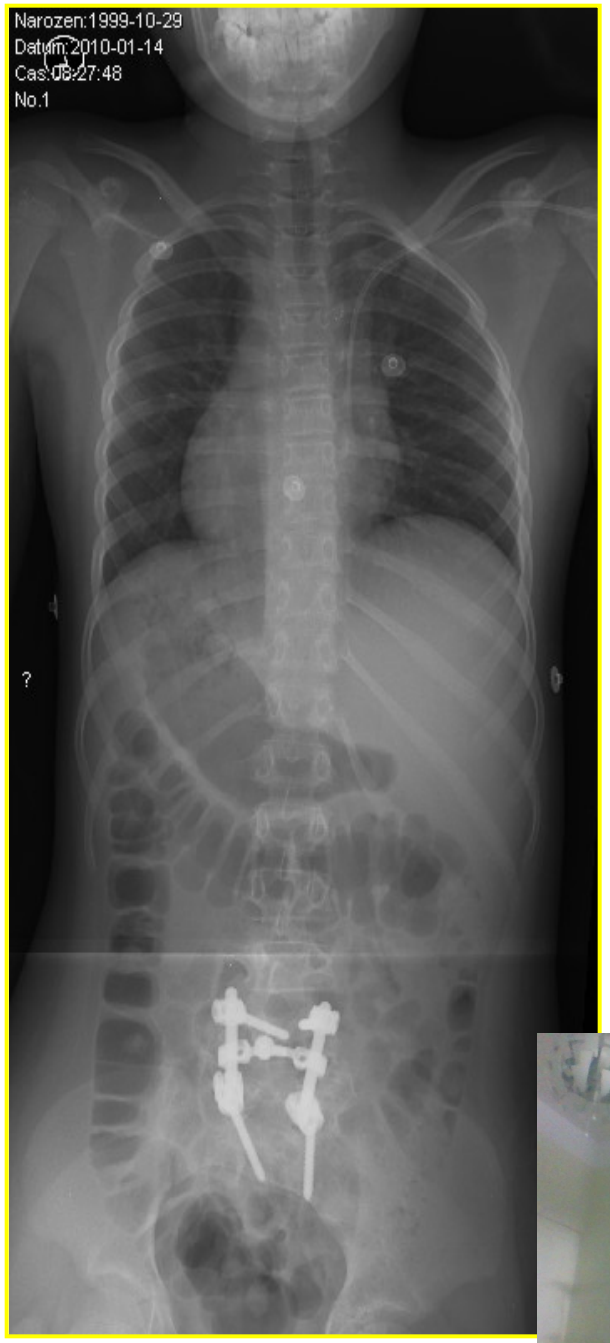
36°




Narozen:1999-10-29
Datum:2010-01-14
Cas:08:27:48
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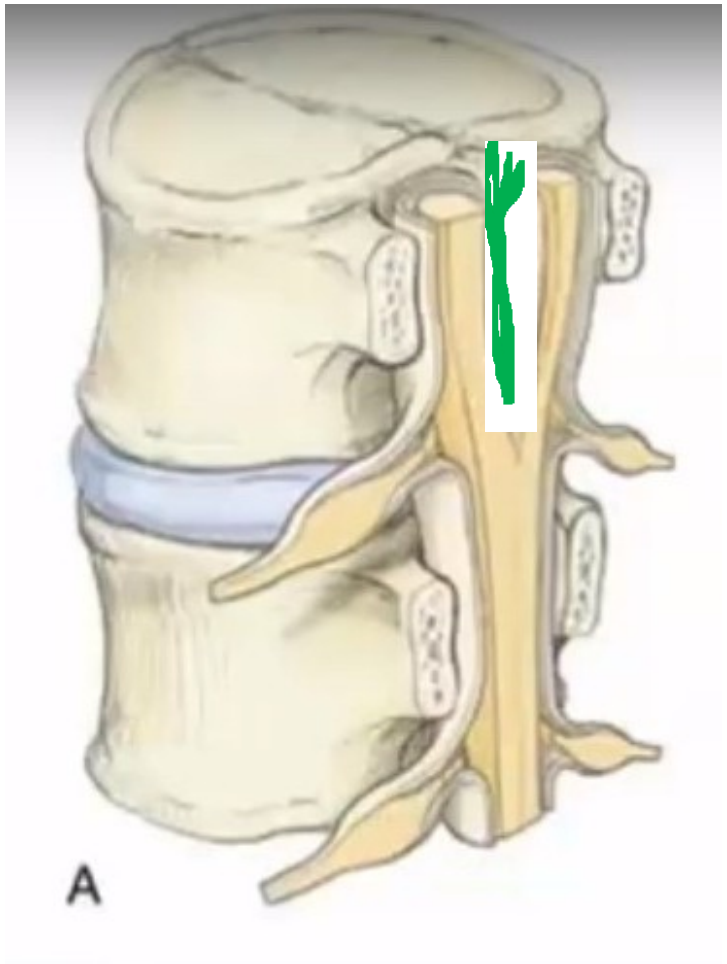
Conclusion

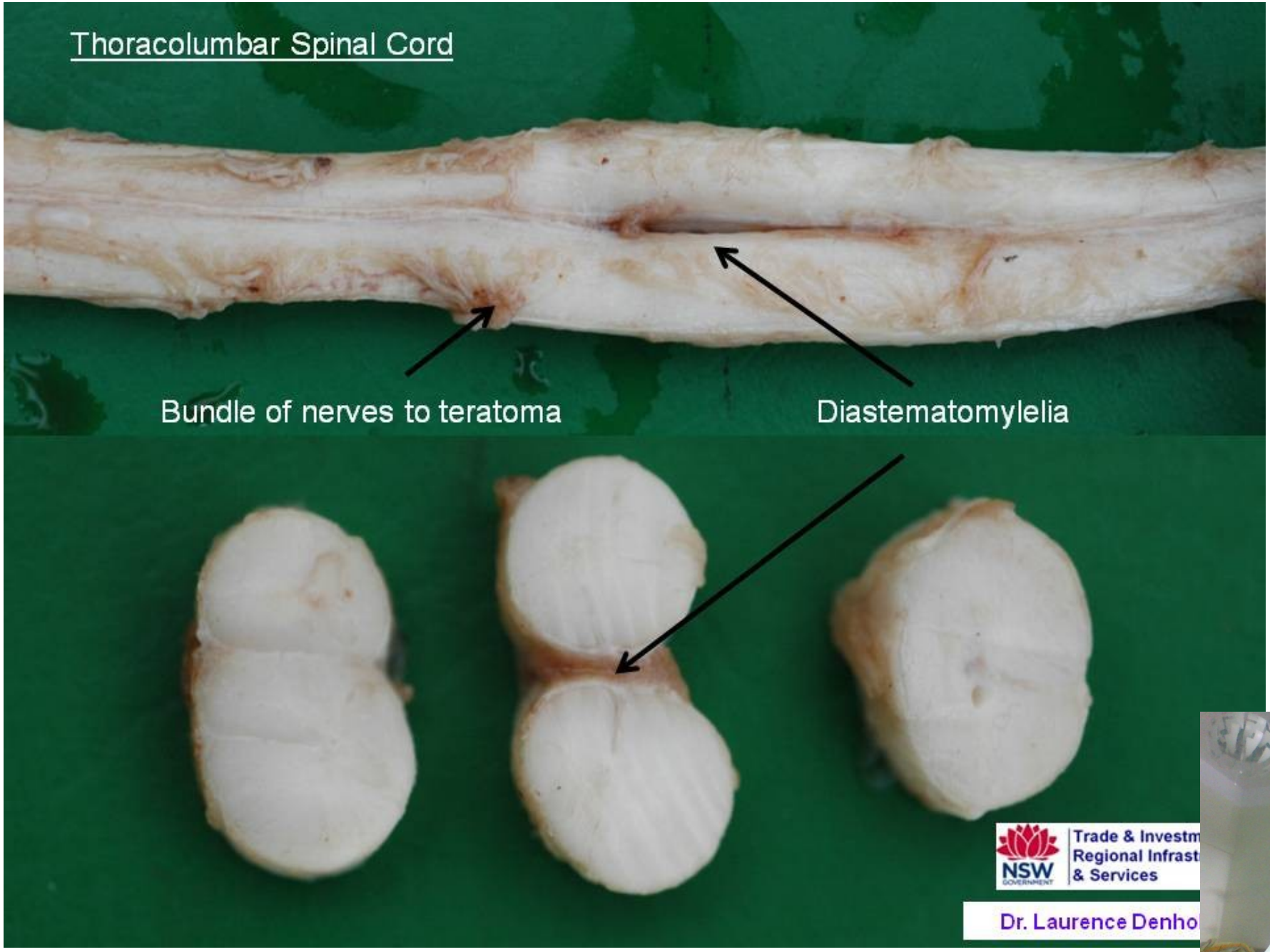
The main factors of succesful treatment of congenital scoliosis

- **early detection**
- **good timing**
- **adequate surgical approach**

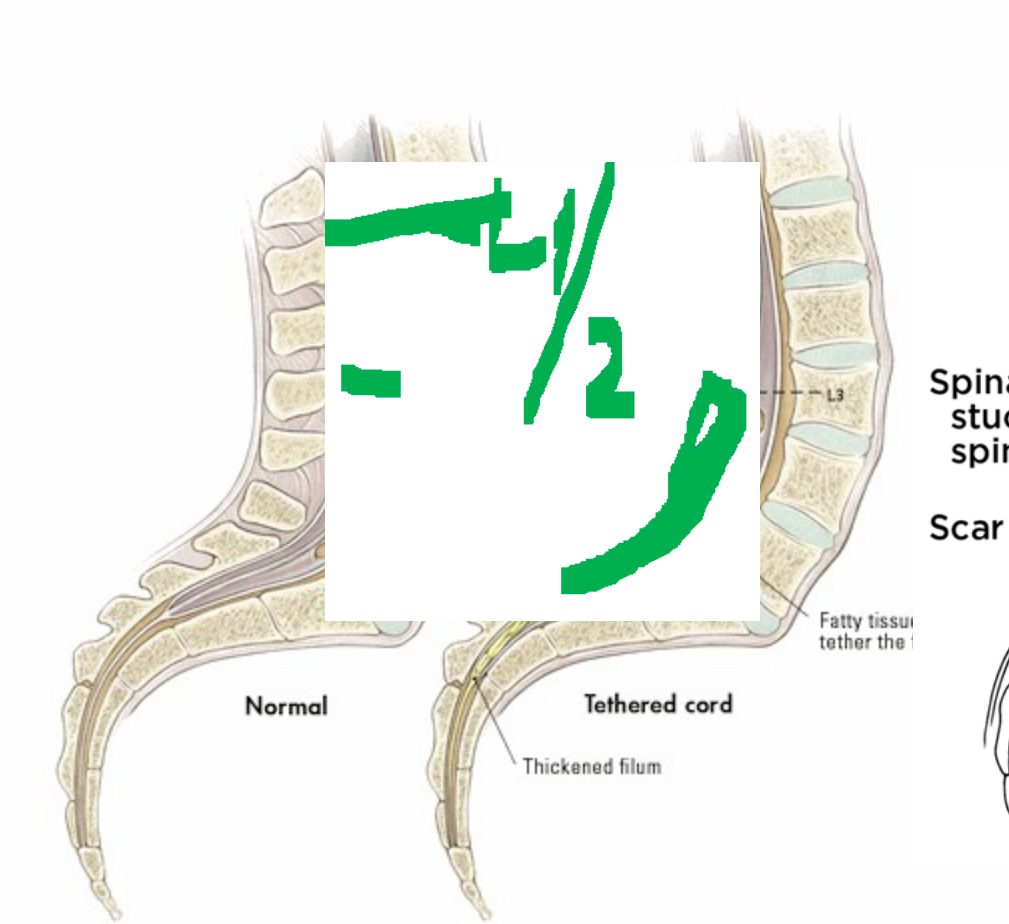
Diastematomyelie

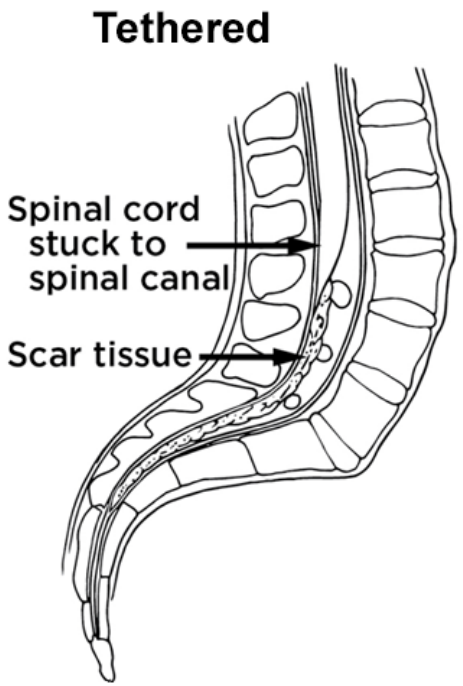


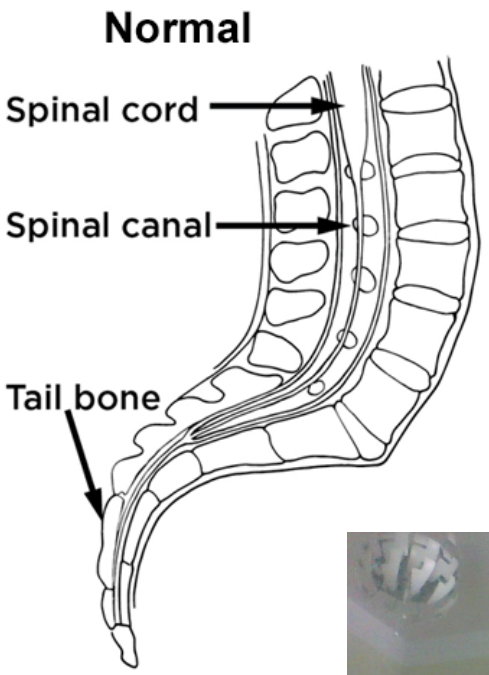
Skl, N


Thoracolumbar Spinal Cord
Bundle of nerves to teratoma
Diastematomylelia
NSW
Trade & Investm
Regional Infrast
& Services
Dr. Laurence Denho

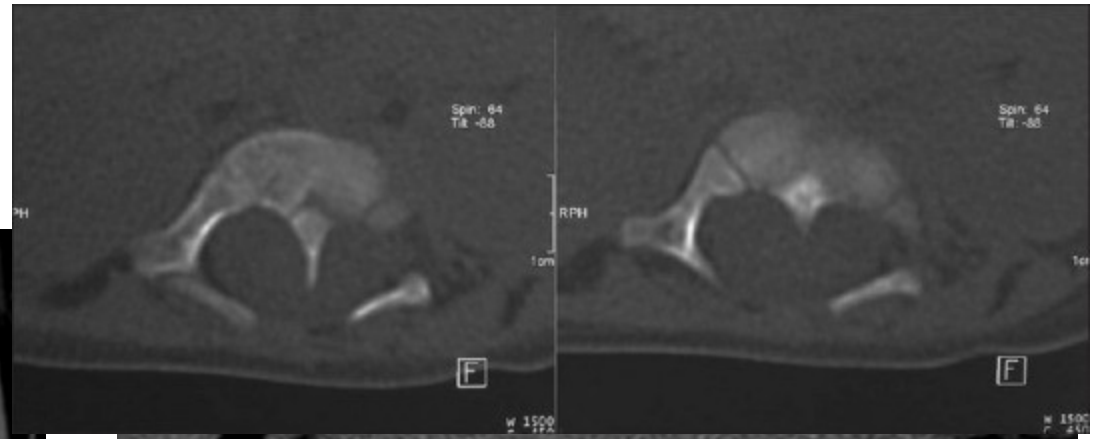
Tethered cord syndrome

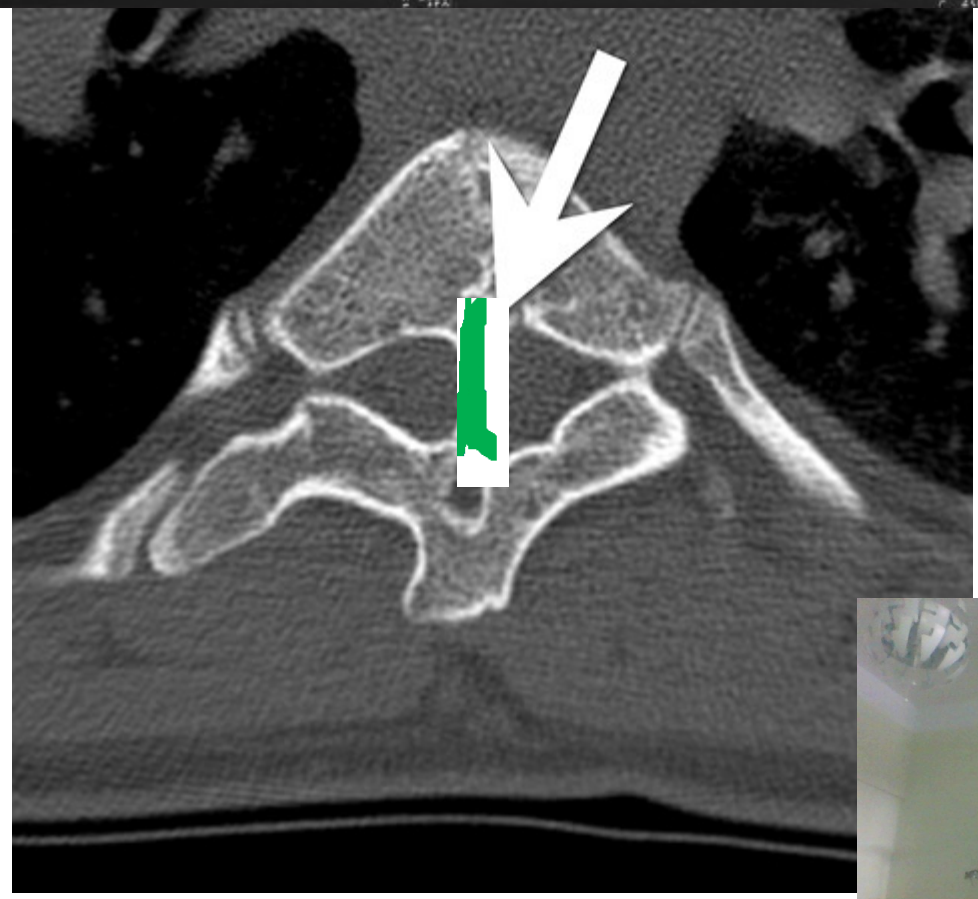


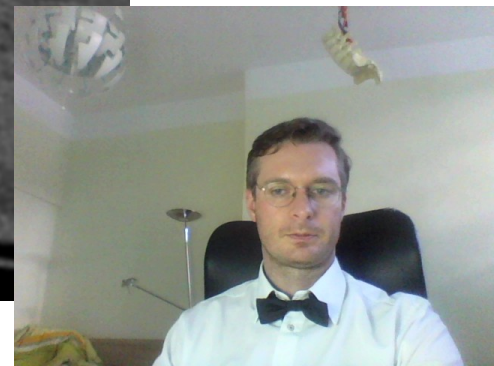




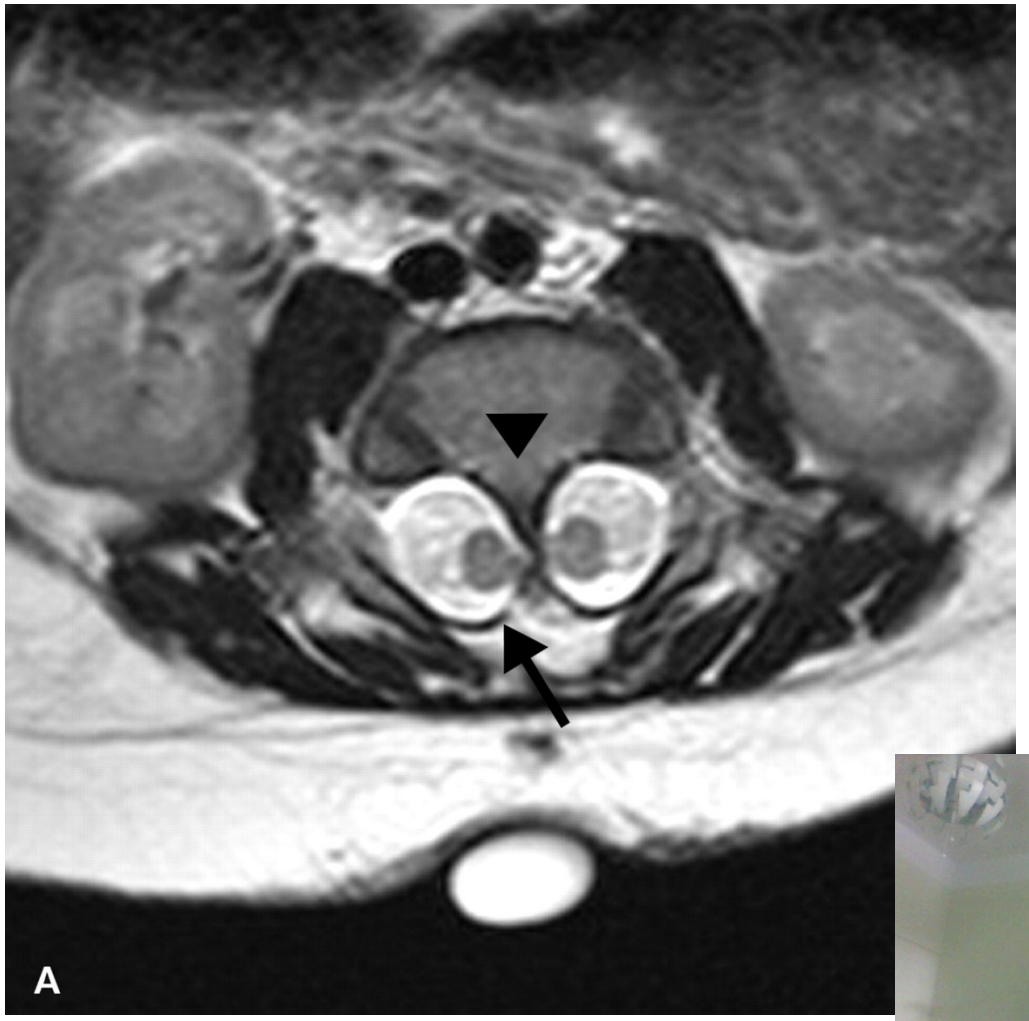
CT

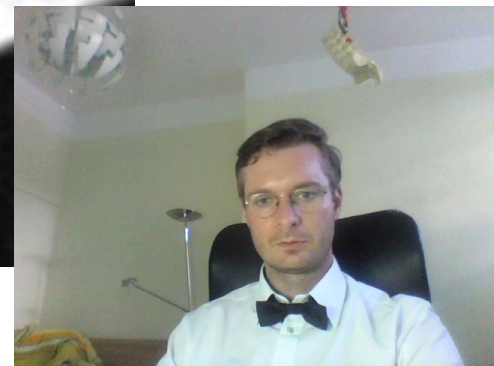






MRI





Neuromuscular scoliosis

Scoliosis types due to ethiology

Deformity type

- Idiopathic
- Congenital
- Neuromuscular

Age

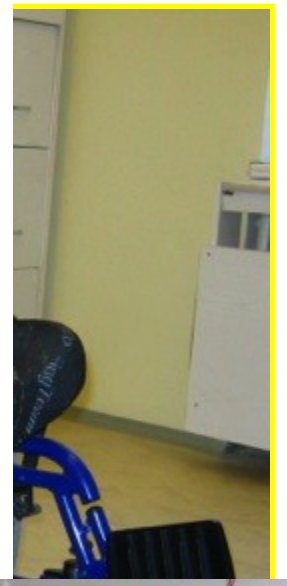
- Infantile
  < 3 y
- Juvenile
  4-10 y
- Adolescent
  11-17 y
- Adult
  > 17 y

Neuromuscular scoliosis

- Significant progression (even after growth)

- severe deformities
- combined with pelvic and hip deformities
- high degree of associated dysfunction
  - [redacted] y
  - [redacted]
  - [redacted]
  - osteoporosis

Conservative treatement



Léčebné postupy

1. Conservative treatement

disadvantages : -

-

-

-

2. surgery

indication: -

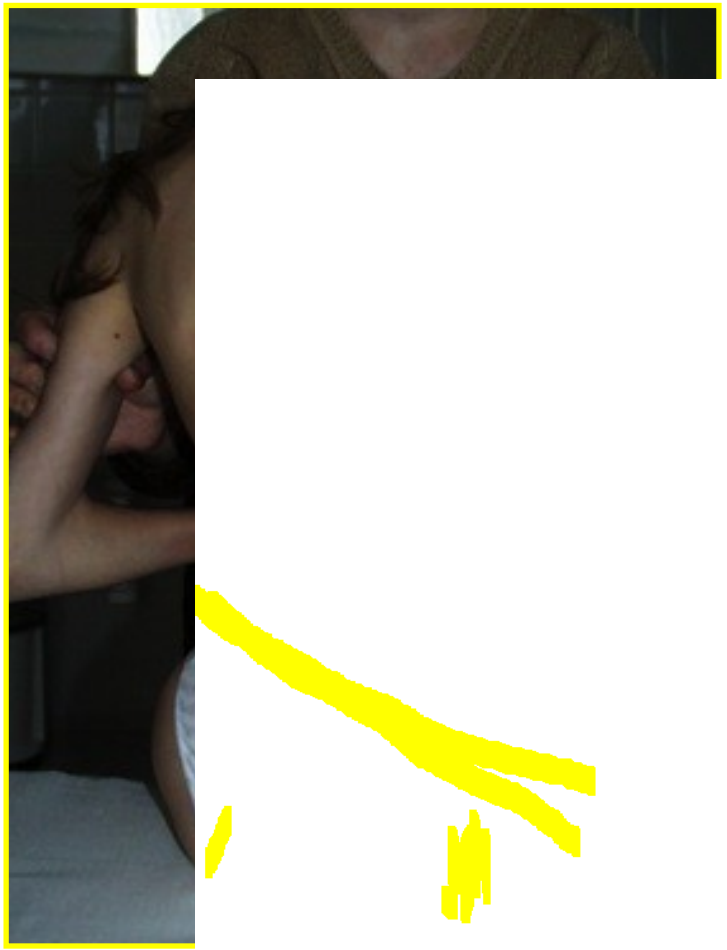
-

-back pain

- the tendency to pressure sores

Neuromuscular spine deformity = complex deformity

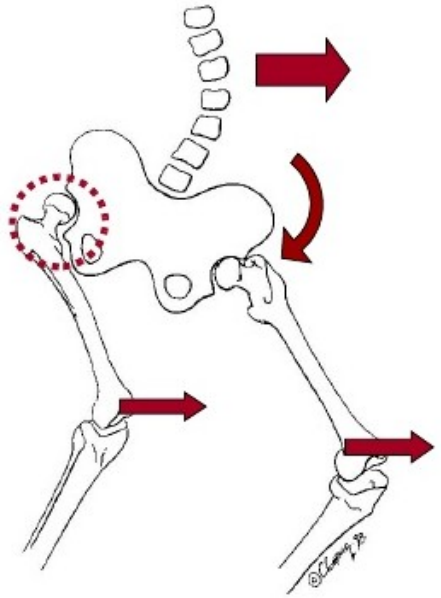
- Long thoracolumbar dx convex curve
- kyphoscoliosis
- hyperlordosis
- Hip anomaly
- Pelvic obliquity



OXFORD BROOKES UNIVERSITY

School of **Health** and **Social Care**

Postural Managemer



- Scolio
- Pelvic
- Winds
- Hip Di

Madigan & Wa

Letts et al 198

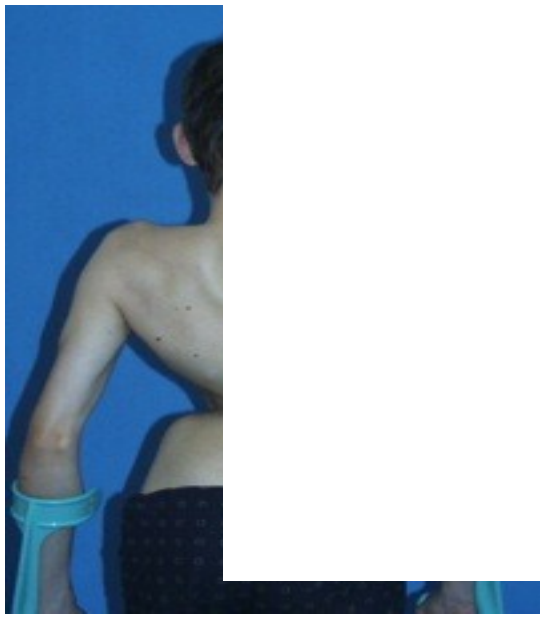
Lonstein & Be (29 participants)

Young et al 1998 (26 participants)

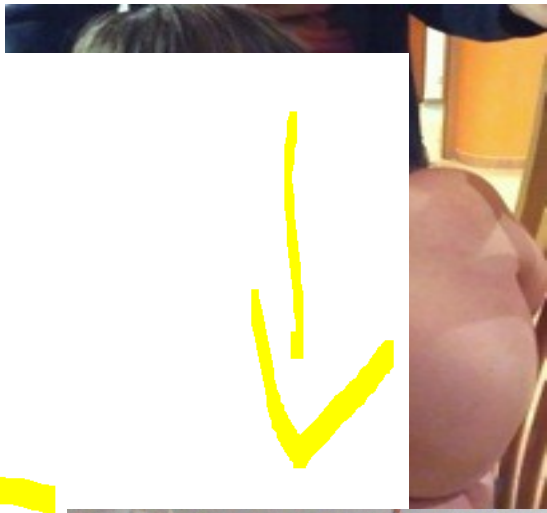
Basic NM scoliosis types

SPASTIC

- brain
-
-

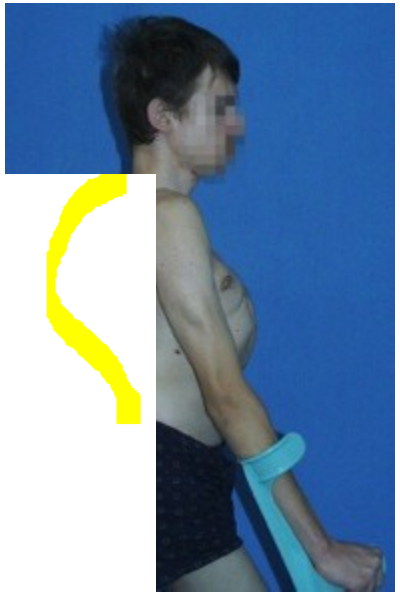


FLACCID



NM spine deformities

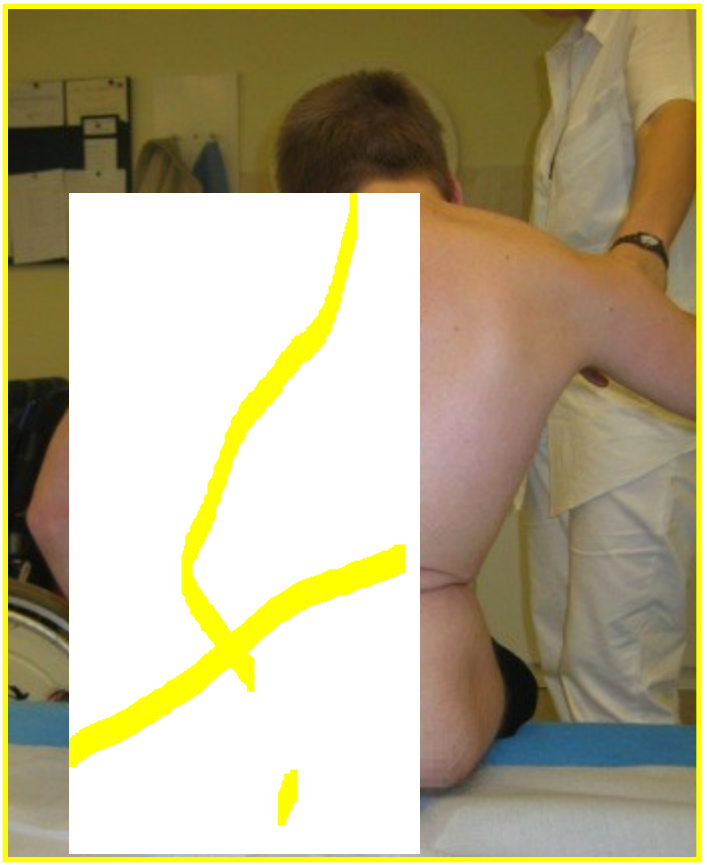
1. Spastic forms



2.H

NM spine deformities

Sitting instability



Standing instability

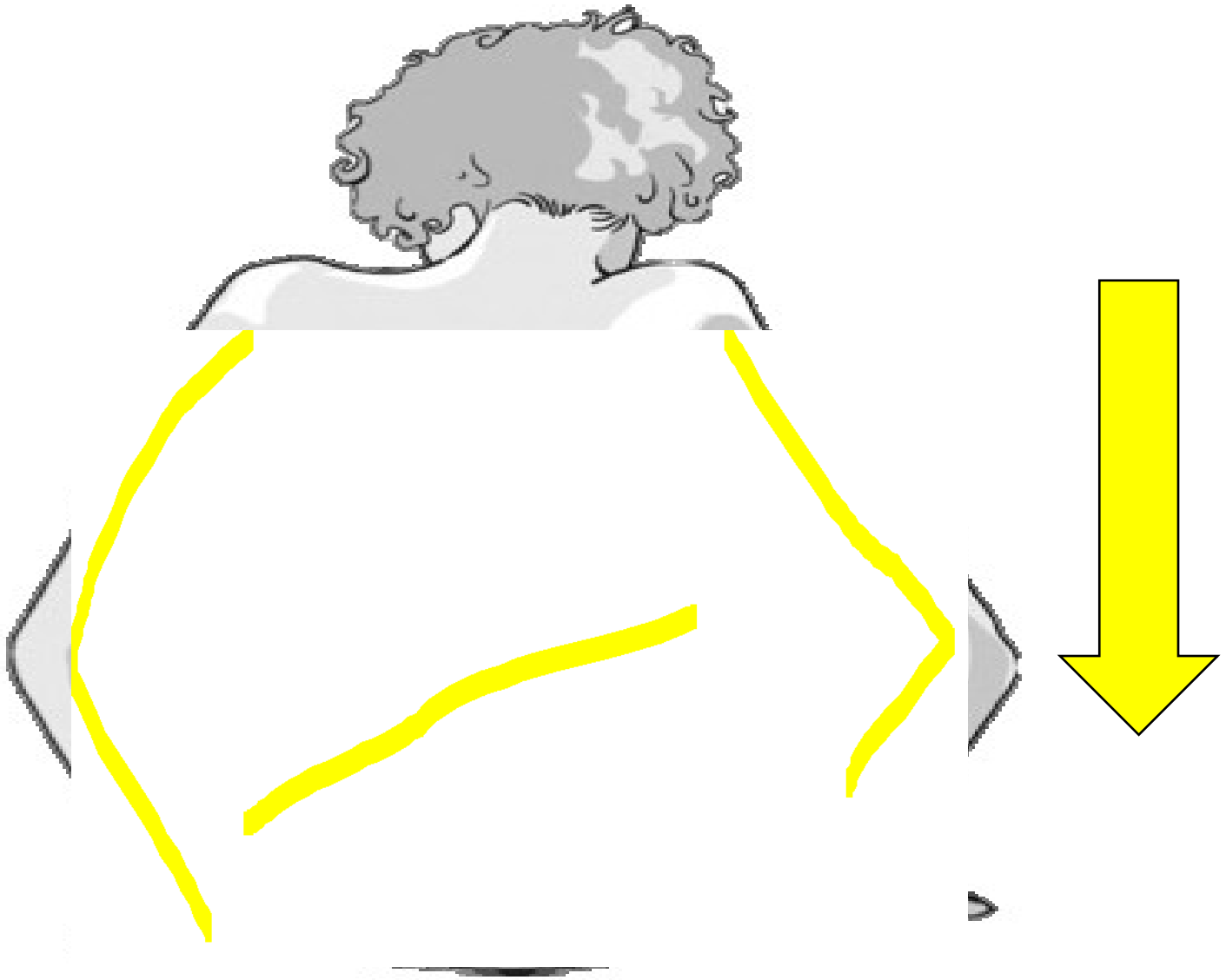
Clinical examination of NM deformities

Gibbus

Plumb

Correction in traction

FLACCID deformity



gravity

Trunk co

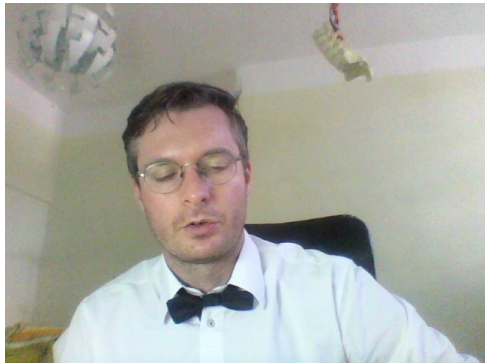
TYPES
A. Neuropathic
I.upper motoneuron failure

- cerebral palsy
- n
- oussy-Levy syndrome)
- syringomyelie
- spinal tumors
- spinal cord injury

A. Neuropathic
II. *lower motoneuron failure*

- Poliomyelitis
-
-
- ar atrophy

Werdnig-Hoffman, Kugelberger-Welander

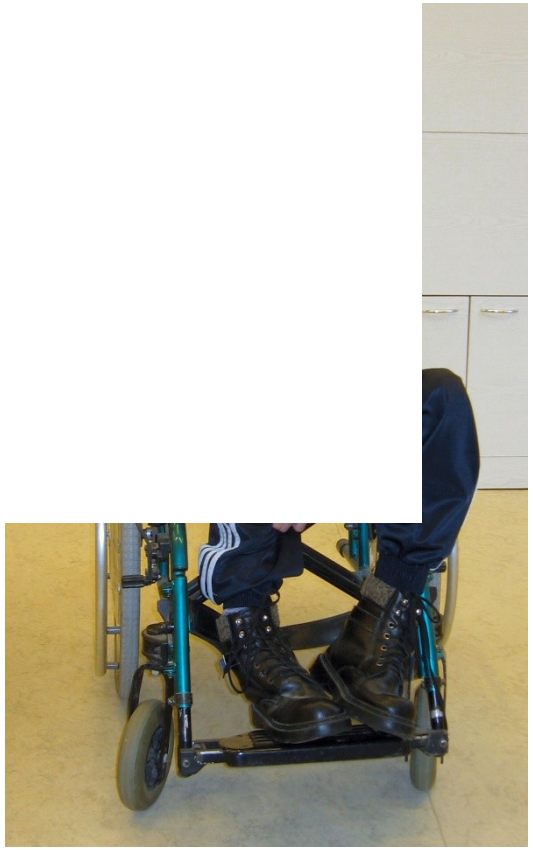


B . Myopathic curves

- [redacted]
- [redacted]-girdle syndrome, fascioscapulohumeral syndrome)
- fiber type disproportion syndrome
- congenital hypotonia
- dystrophic myotonia

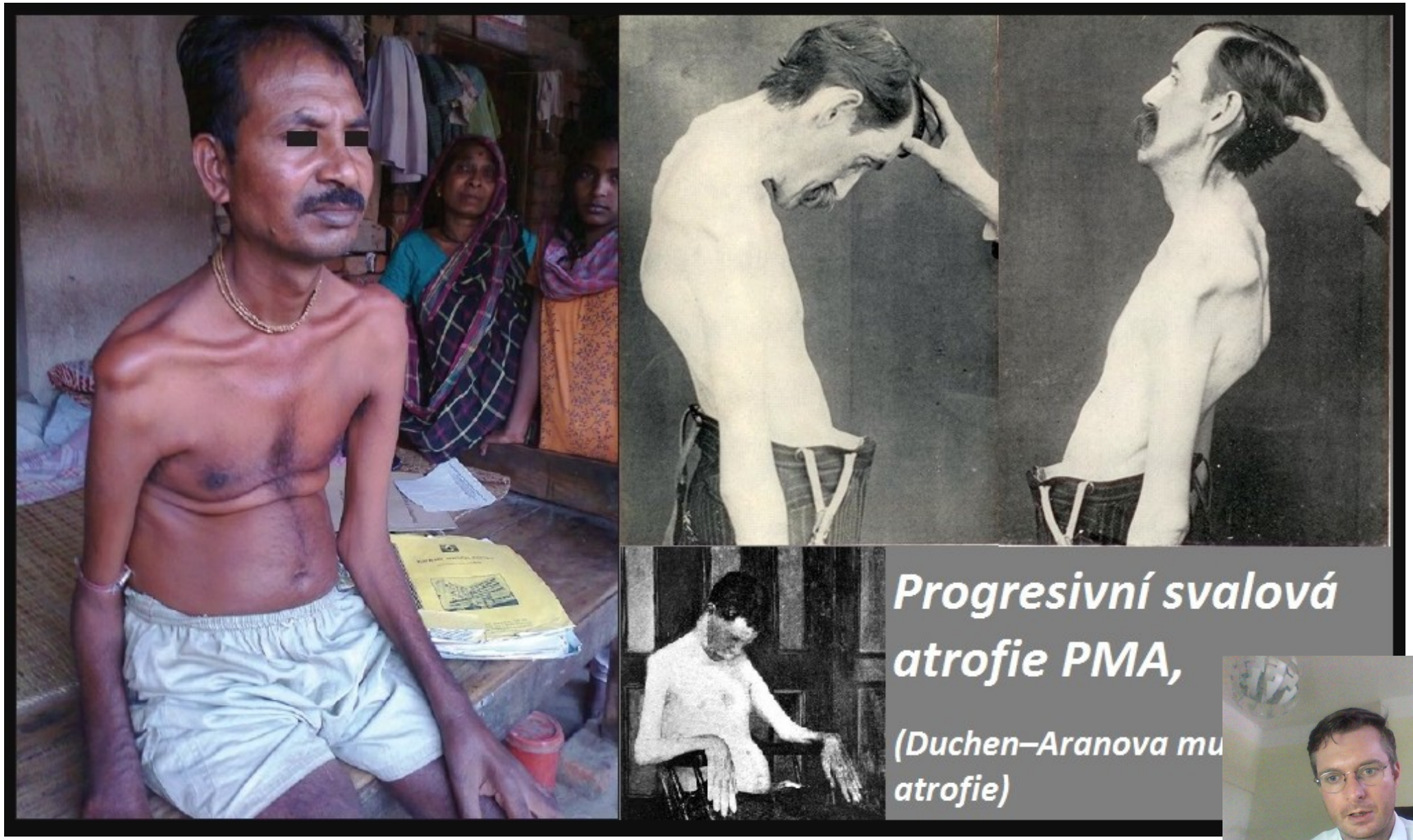
SMA
Infantile

-
-
-



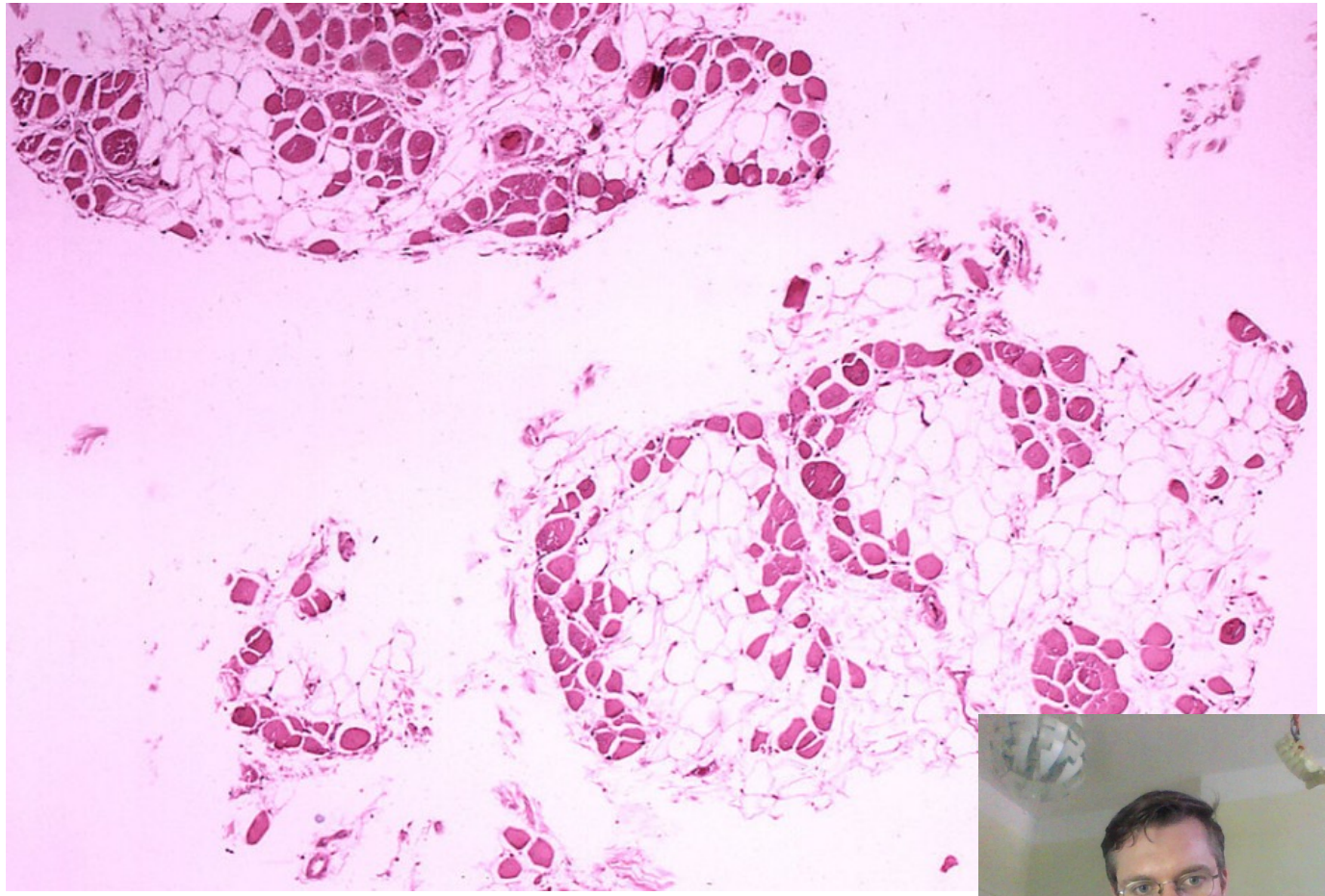
- Disability of the hips

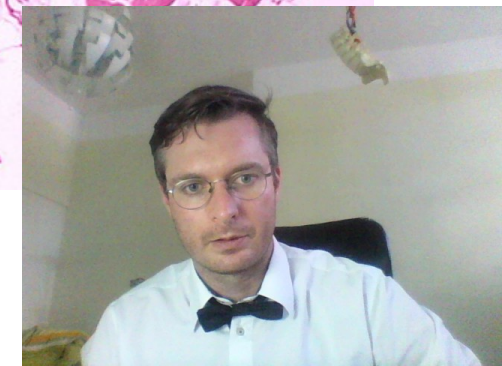
- Scoliosis: paralytic curves, progression


Progresivní svalová
atrofie PMA,
(Duchen–Aranova mu
atrofie)

Duchene muscular dystrophy

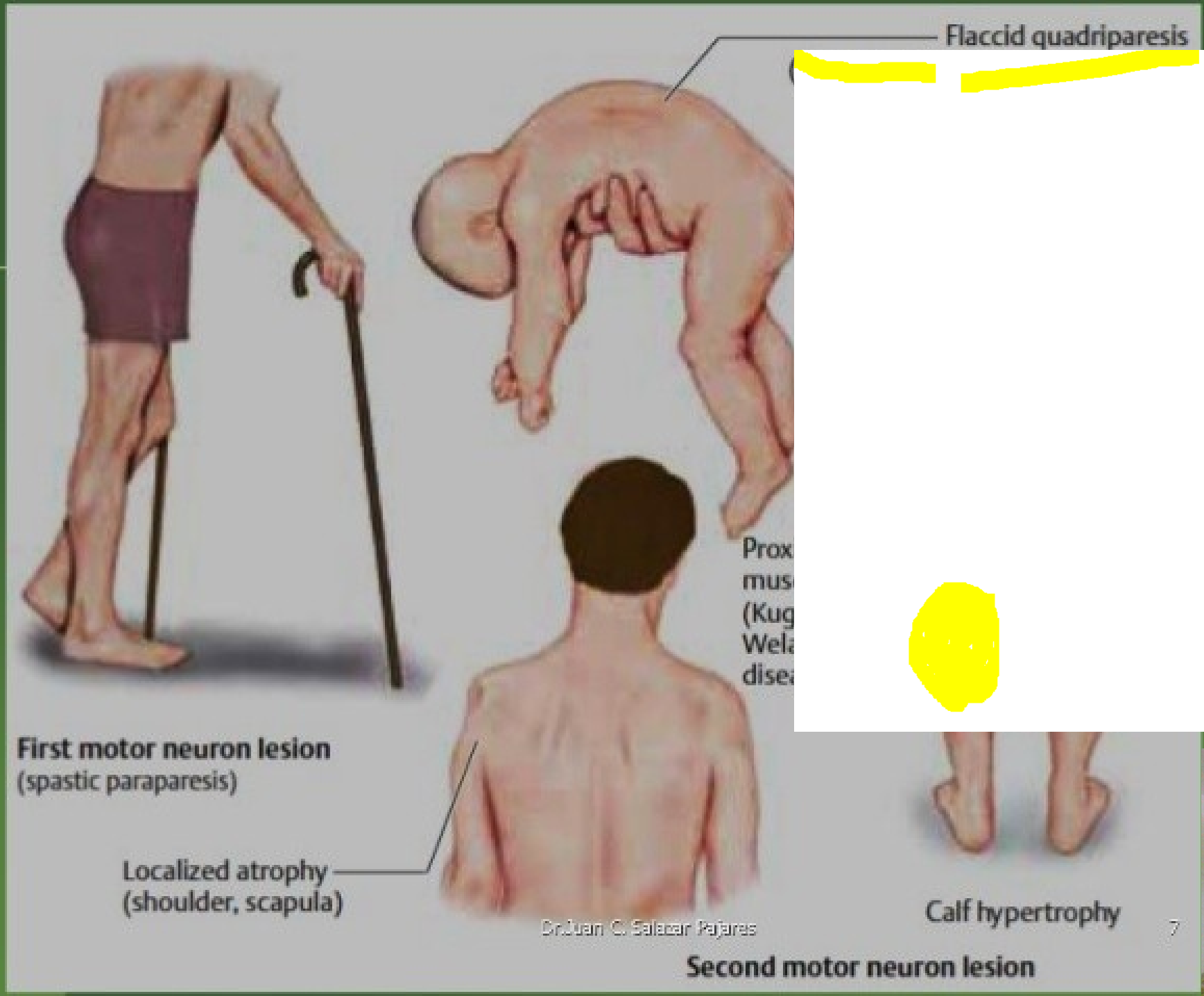
-
-
-
-
- Gradual replacement of muscles by fibrous tissue.





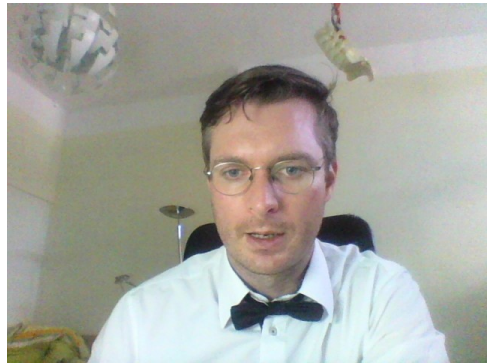
Duchene muscular dystrophy

- ome,
  a consequence, dying muscle fibers are
  igaments.
- g, getting up from a lying or sitting position
-
-
-


Flaccid quadriparesis
First motor neuron lesion
(spastic paraparesis)
Localized atrophy
(shoulder, scapula)
Calf hypertrophy
Second motor neuron lesion
Dr.Juan C. Salazar Pajares
7

Therapeutic approach

- A. Muscular dishalance of the lower lin
- B.
- C.



Surgical treatement

INDICATION

- Paralytic curves
  collapse and instability of the spine
- Progressive deformity
- Sitting instability
- Impairment of cardiopulmonary functions
  by orthosis
- Back pain
- Tendency to pressure ulcers

CONTRAINDICATION

- Poor overall internal condition

General or local infection

Significant non-cooperati

Surgical treatement

Goals

Complication

njury
nsive loss

on

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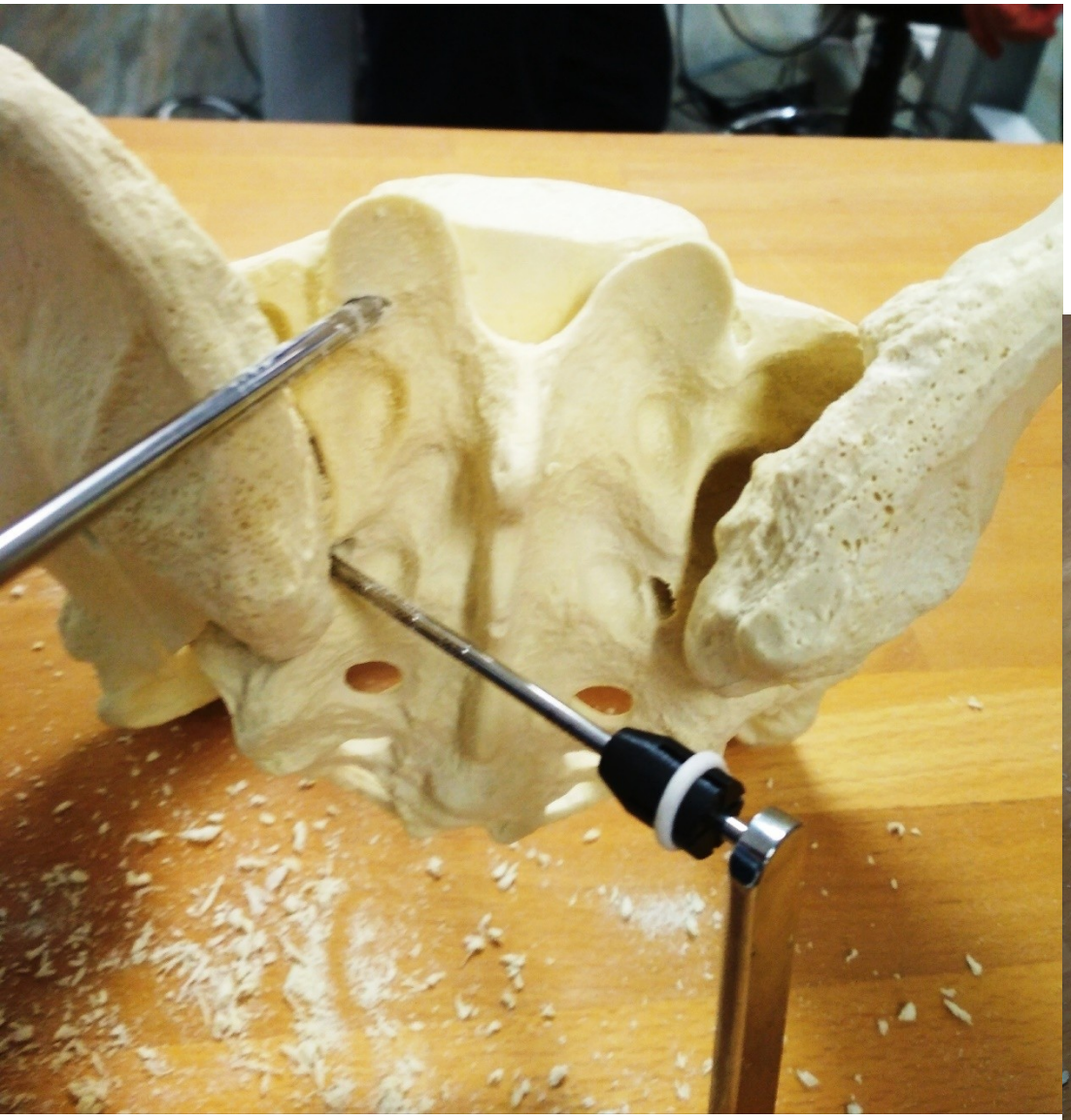
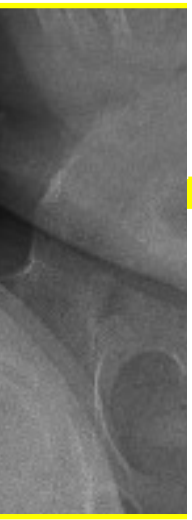
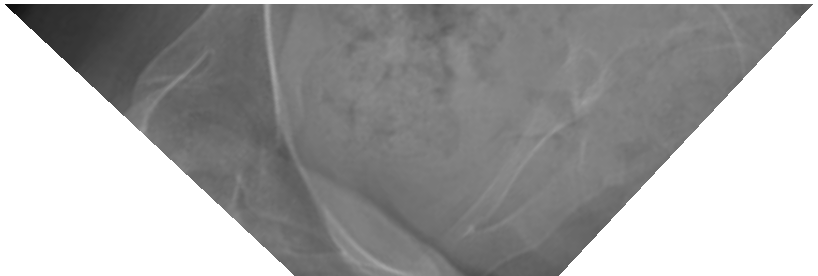
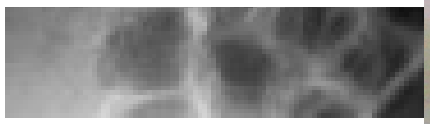


Pelvic fixation

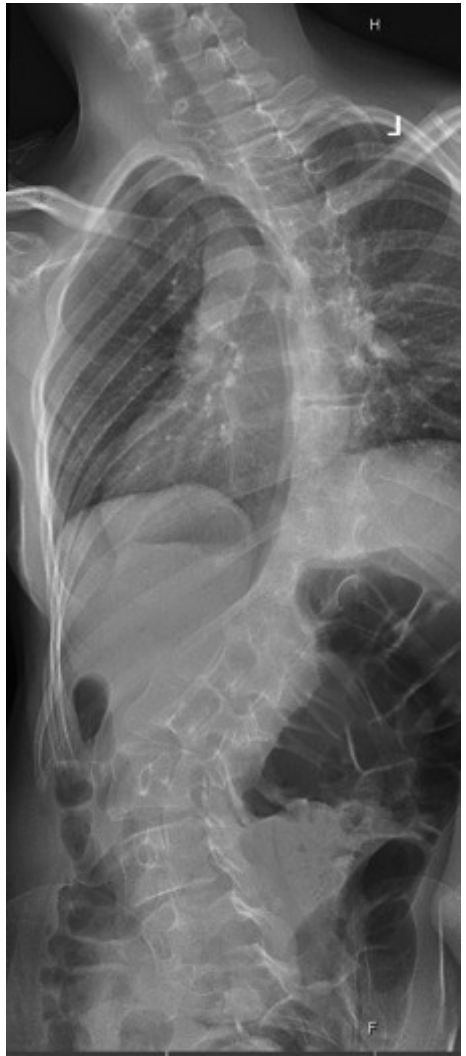
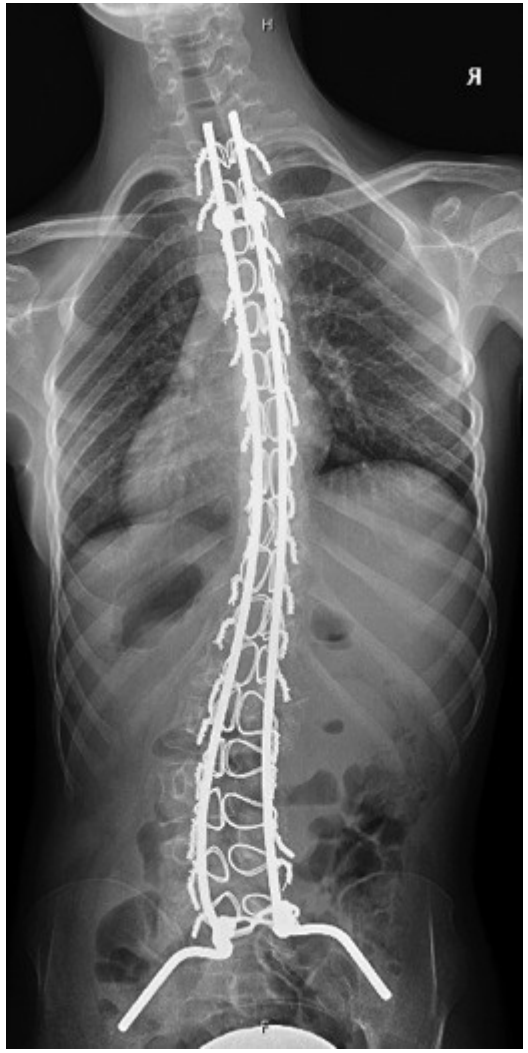
Ga

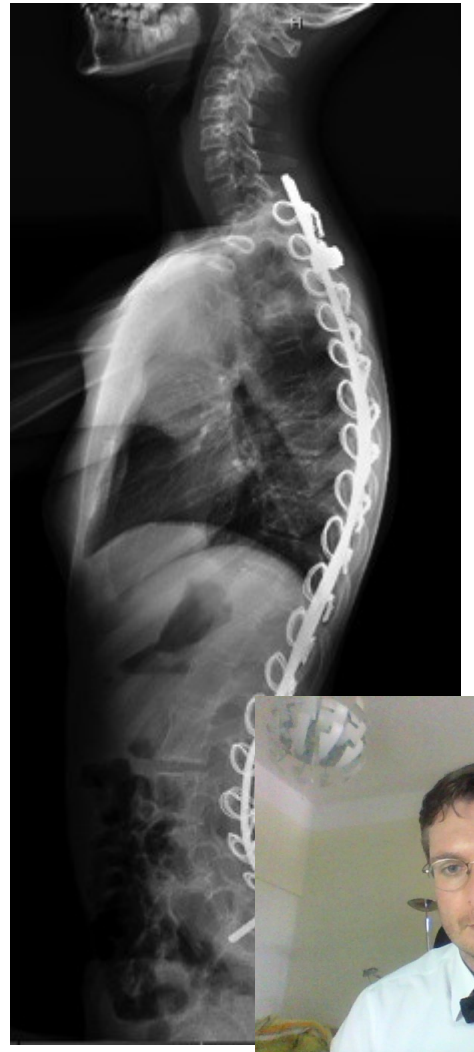
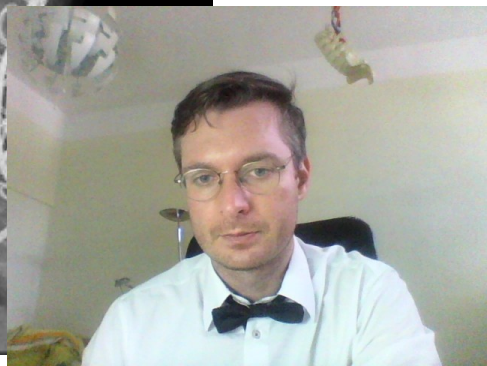


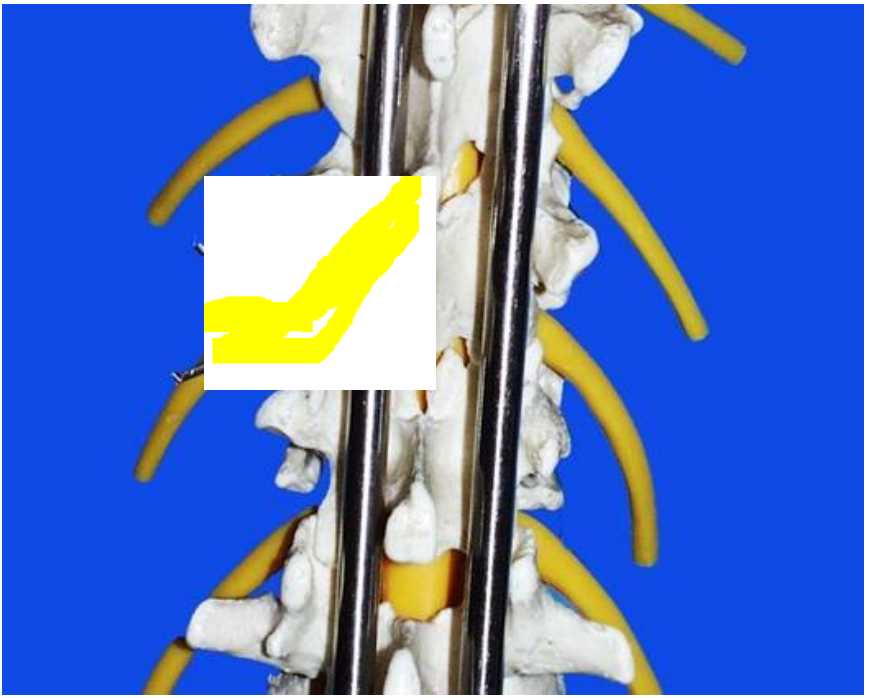


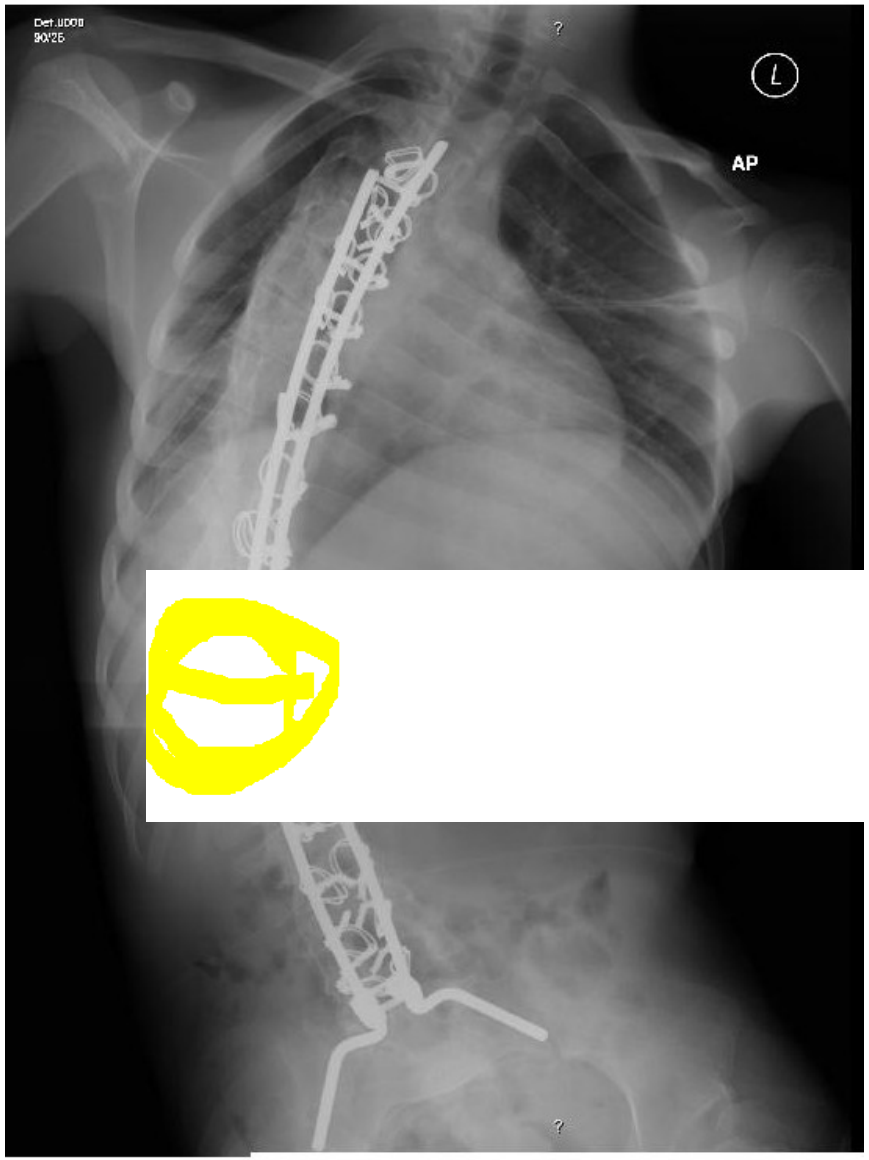


Luque Galveston technique

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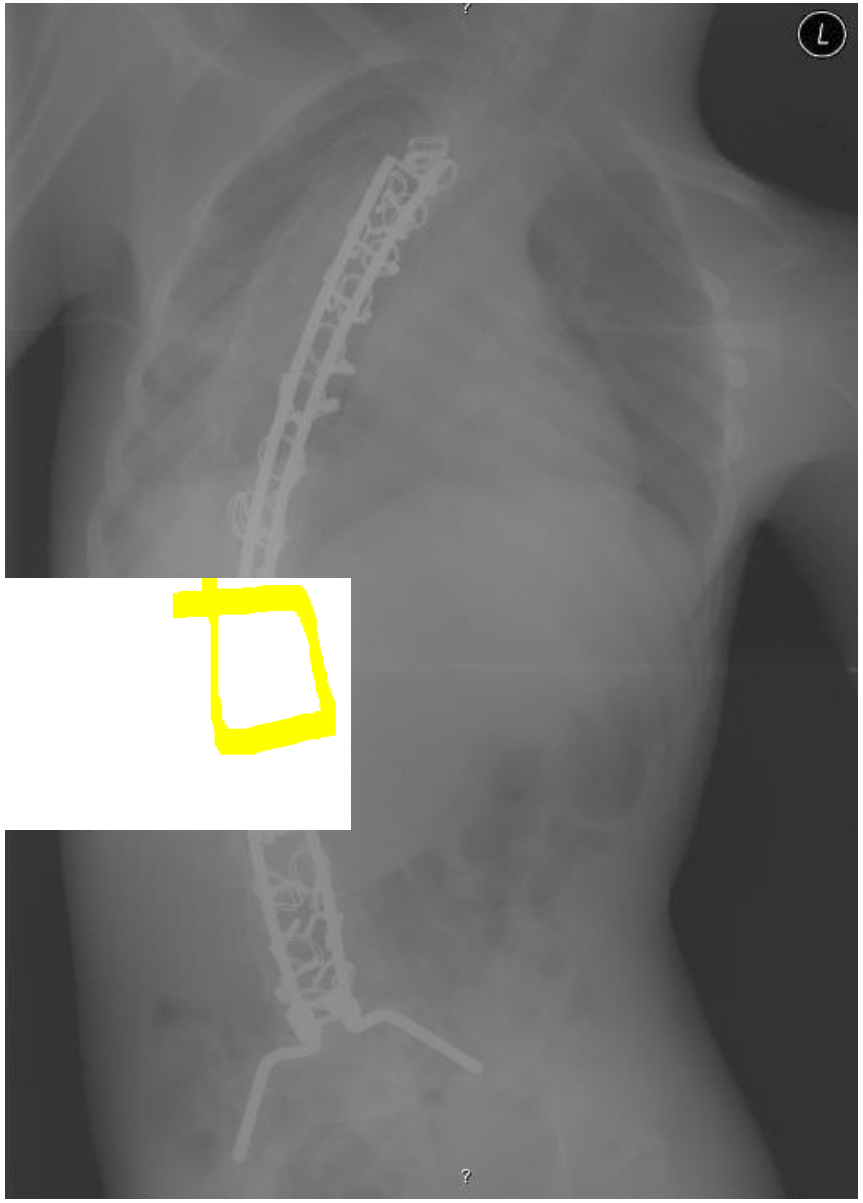

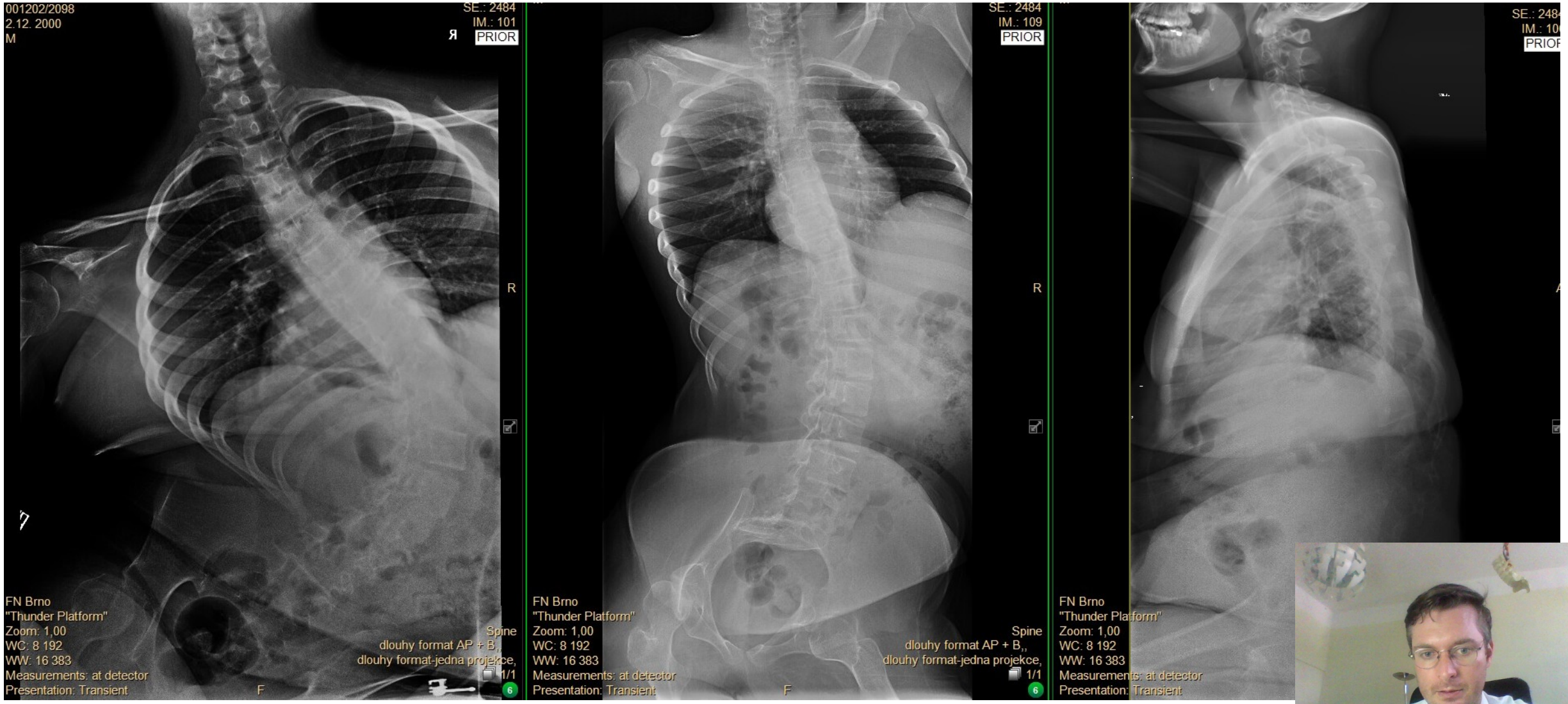
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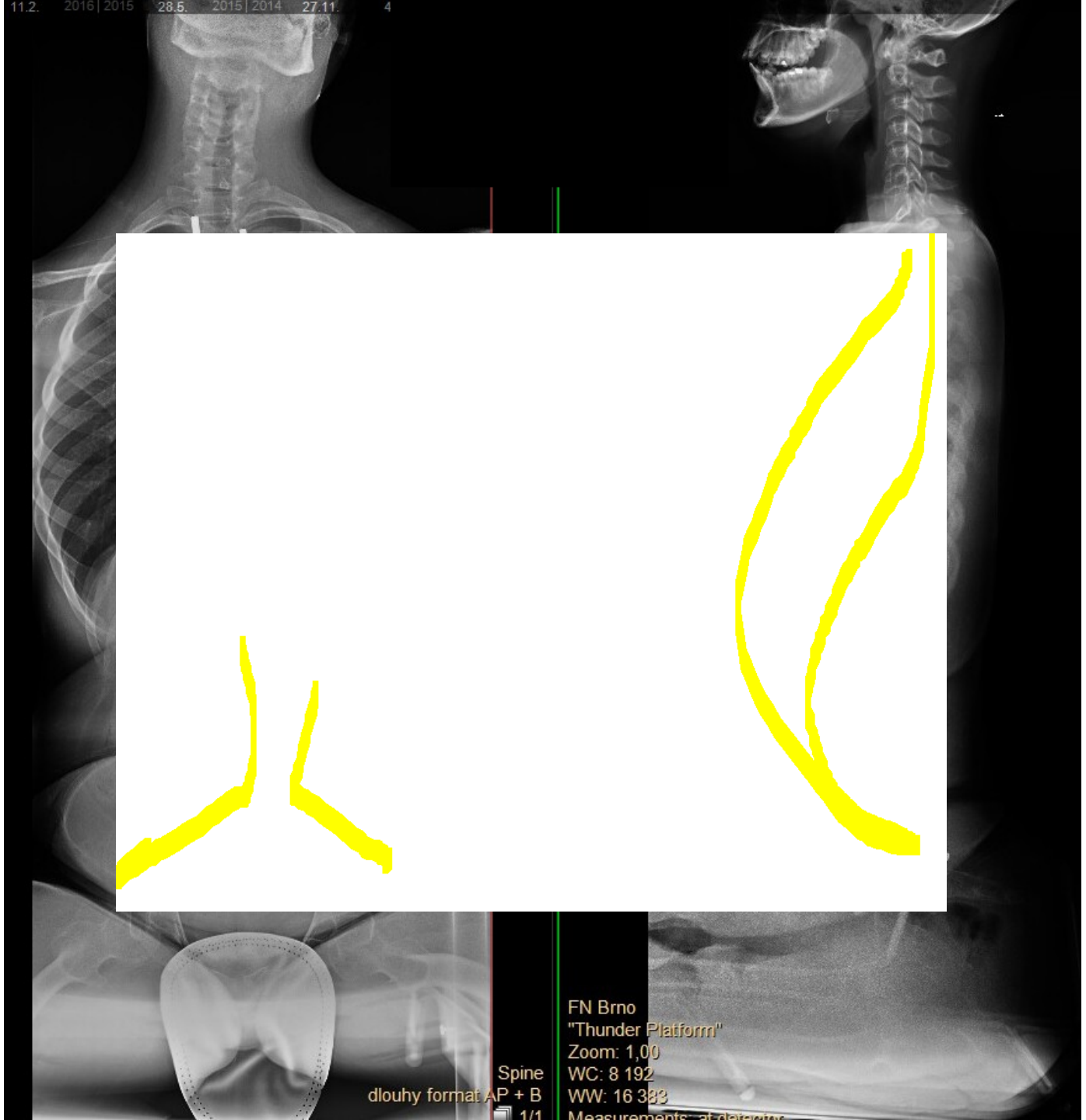
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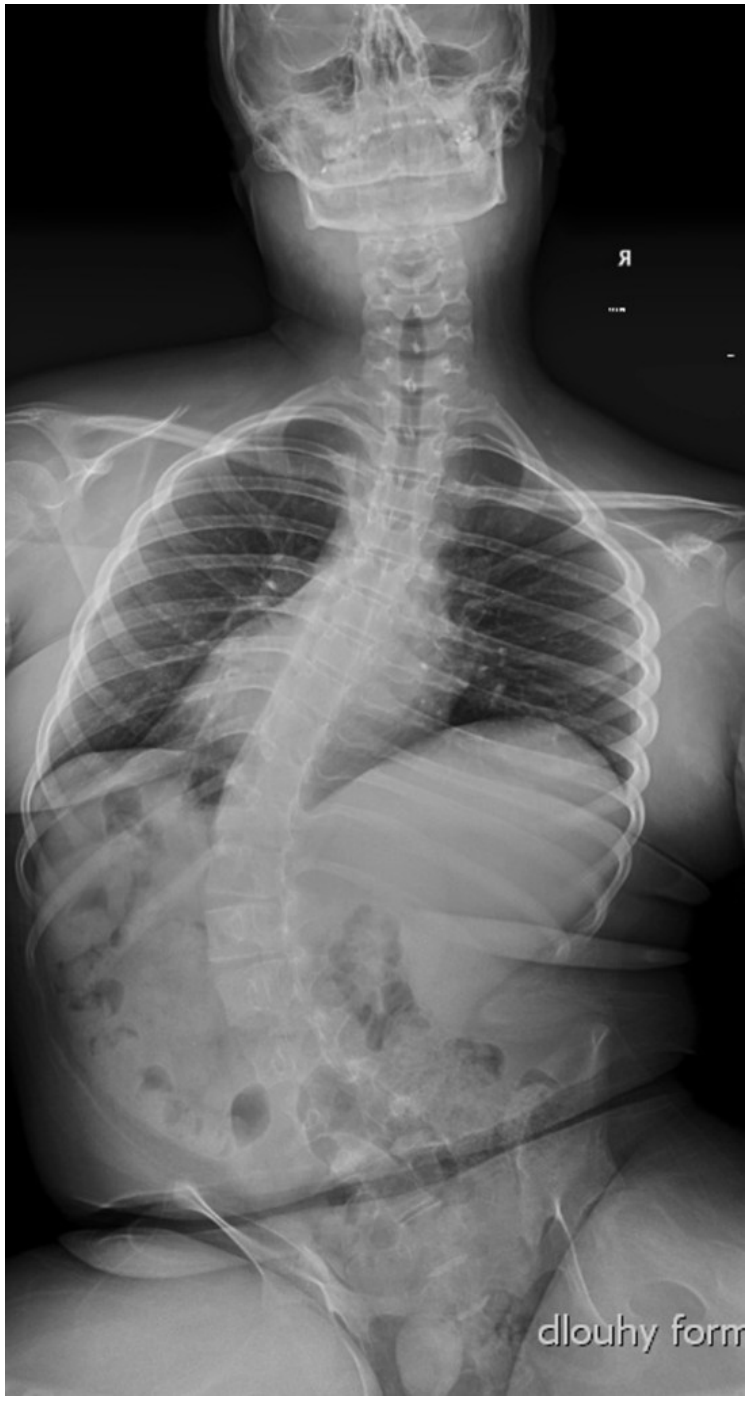
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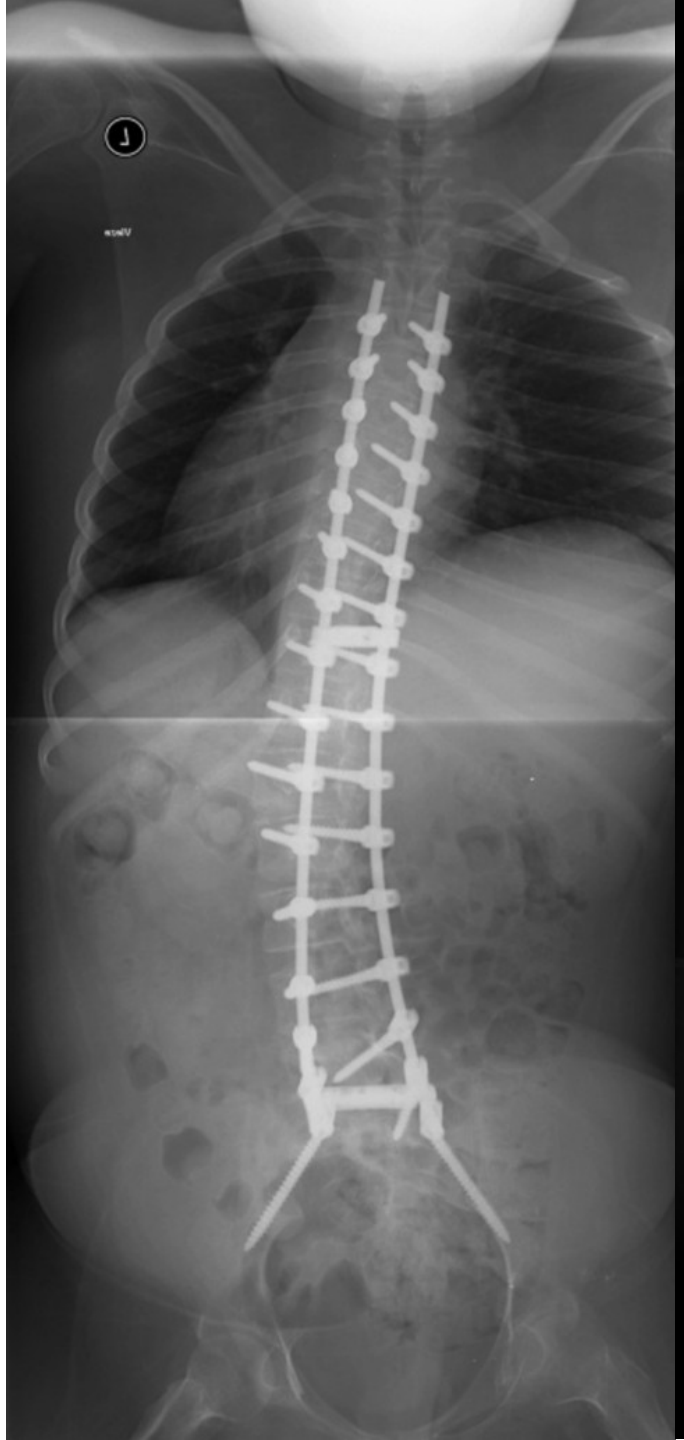
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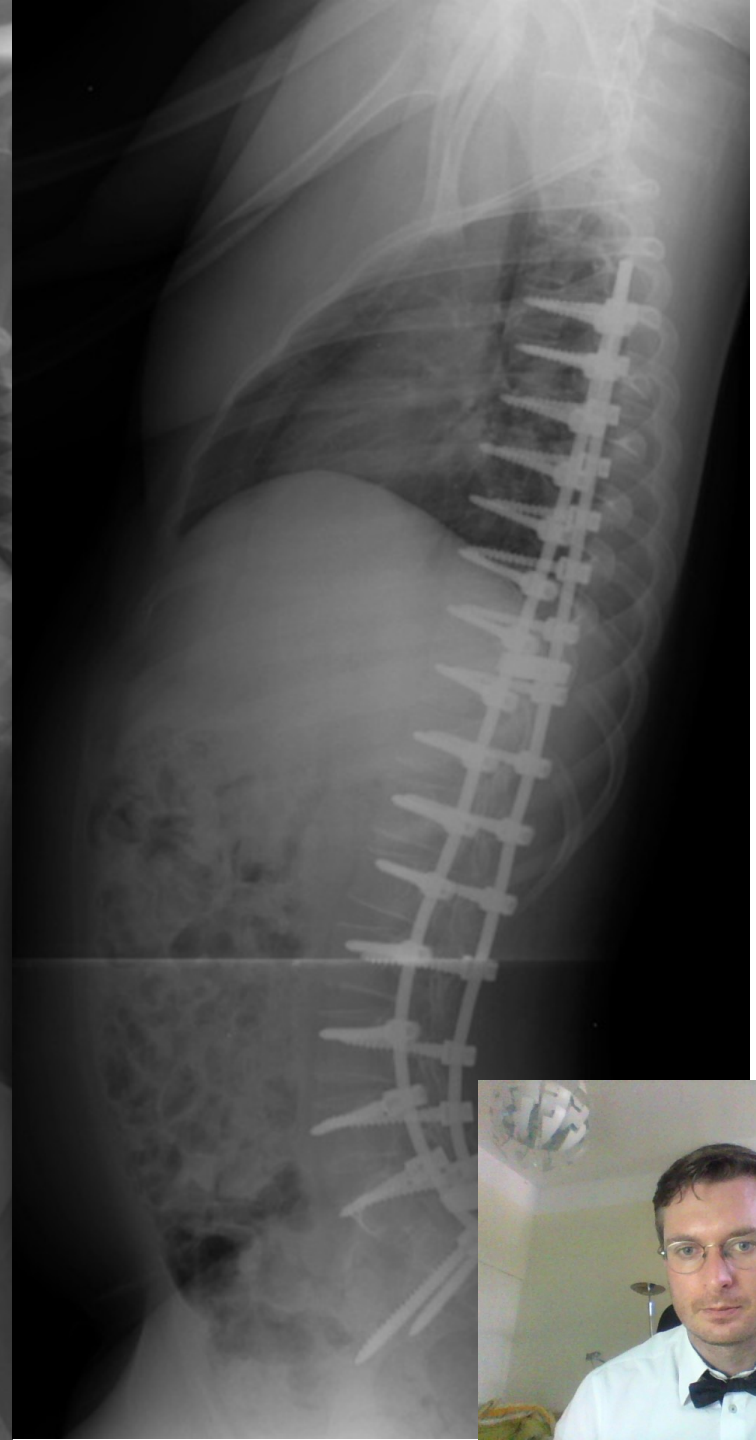
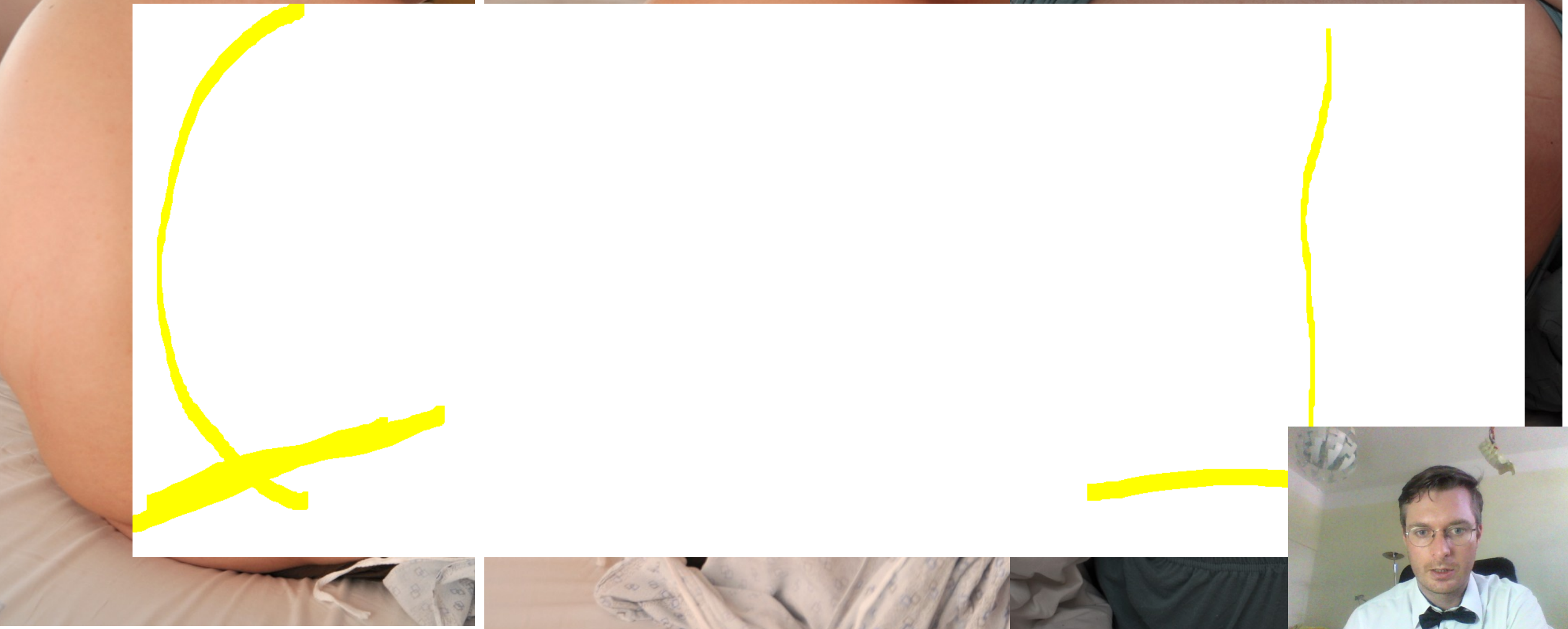
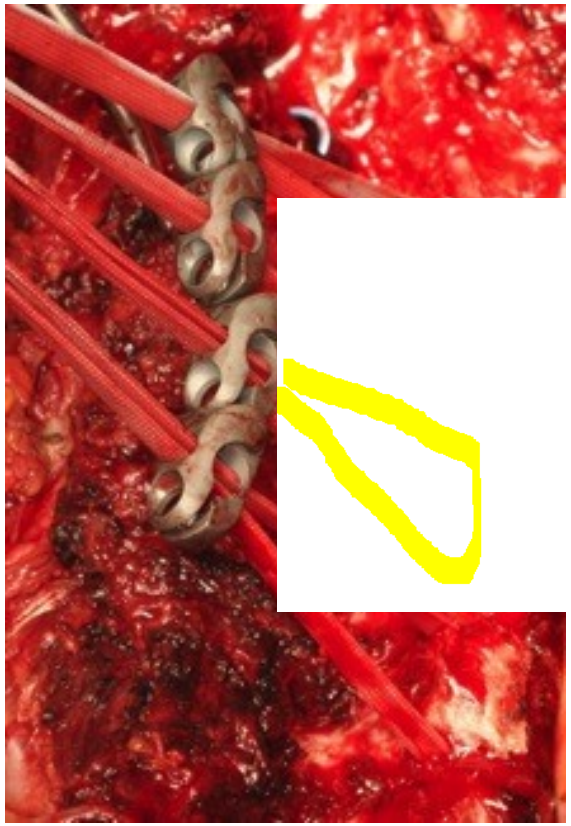
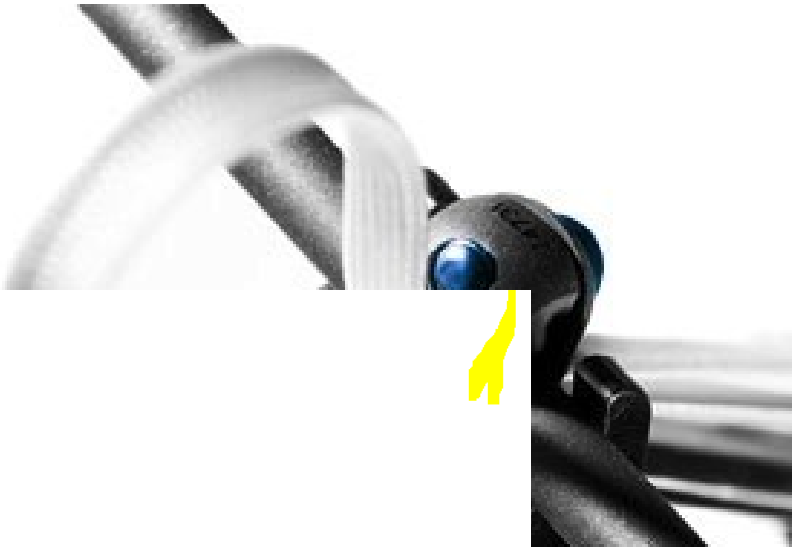


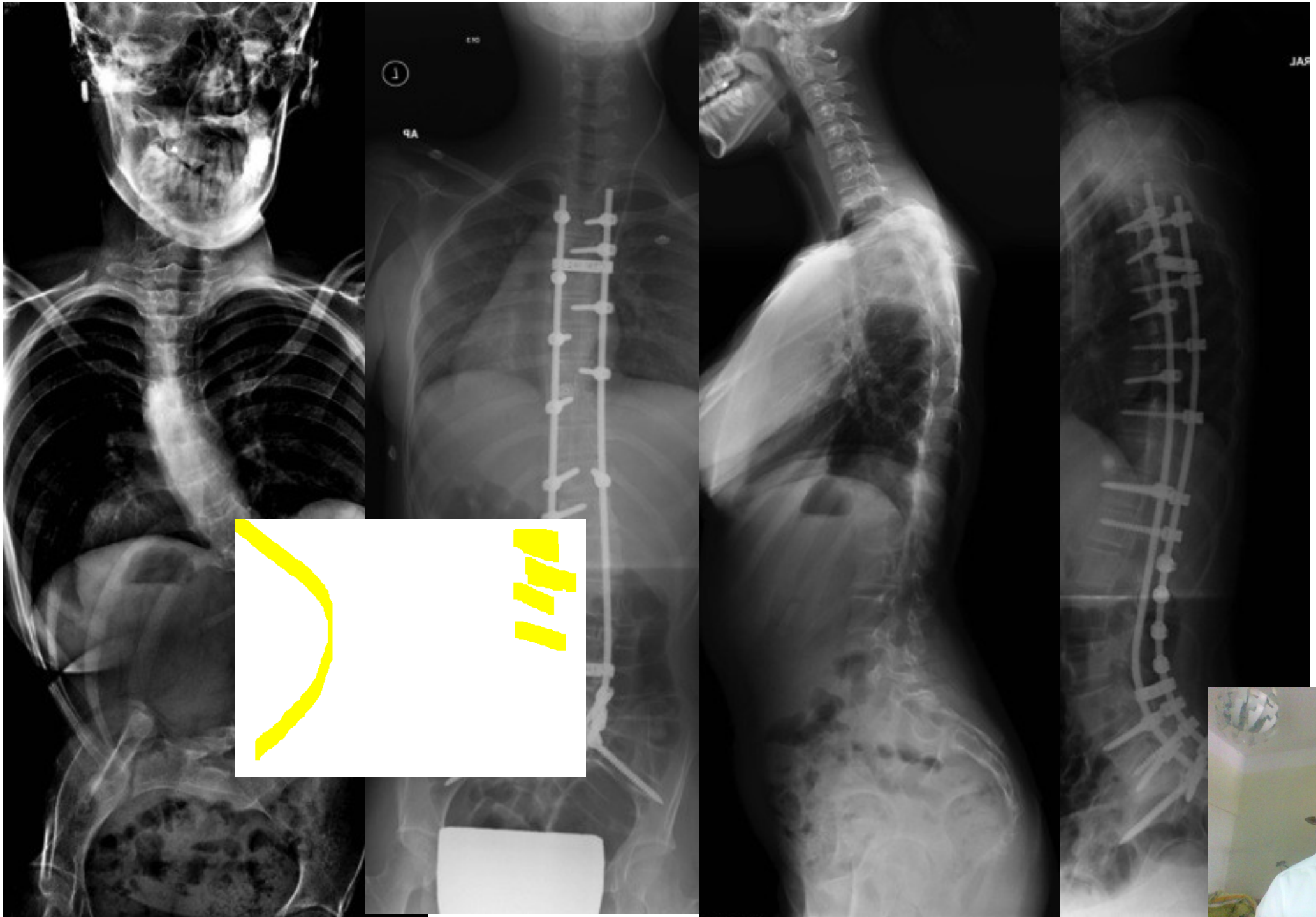


Universal Clamp







NM scoliosis – take home

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ruction deformities

Scoliosis in general-take home message

- 3D deformity !
- AIS 80% of all deformities
- Physiotherapy does not stop progression in AIS !
- Brace from 20°Cobb to stop progression in growing patient
- Surgery above 40°Cobb angle