Thoraco-lumbar Fractures OP vs Non-OP treatment

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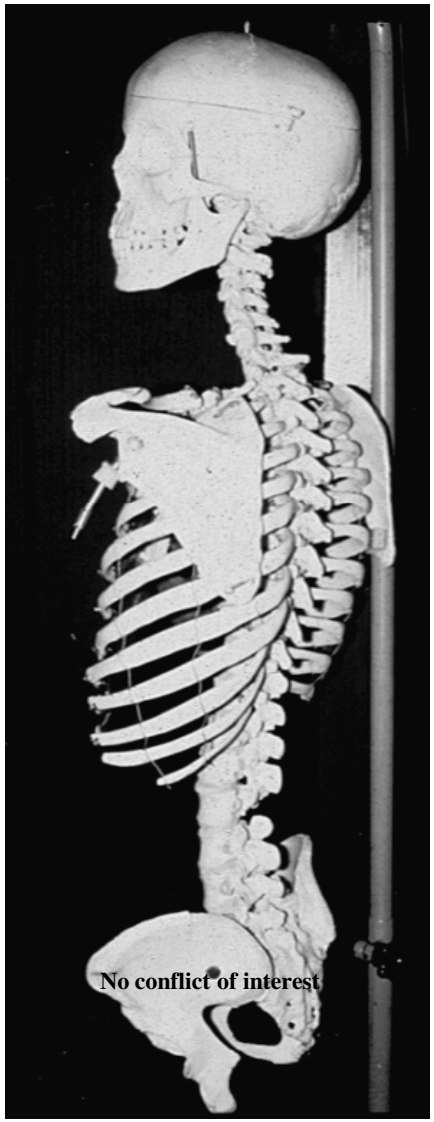
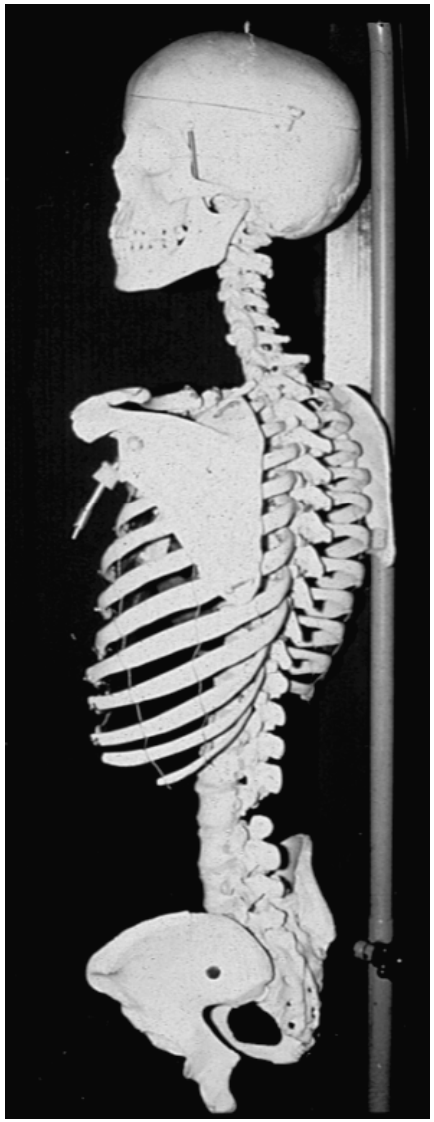
My aim is to teach you:

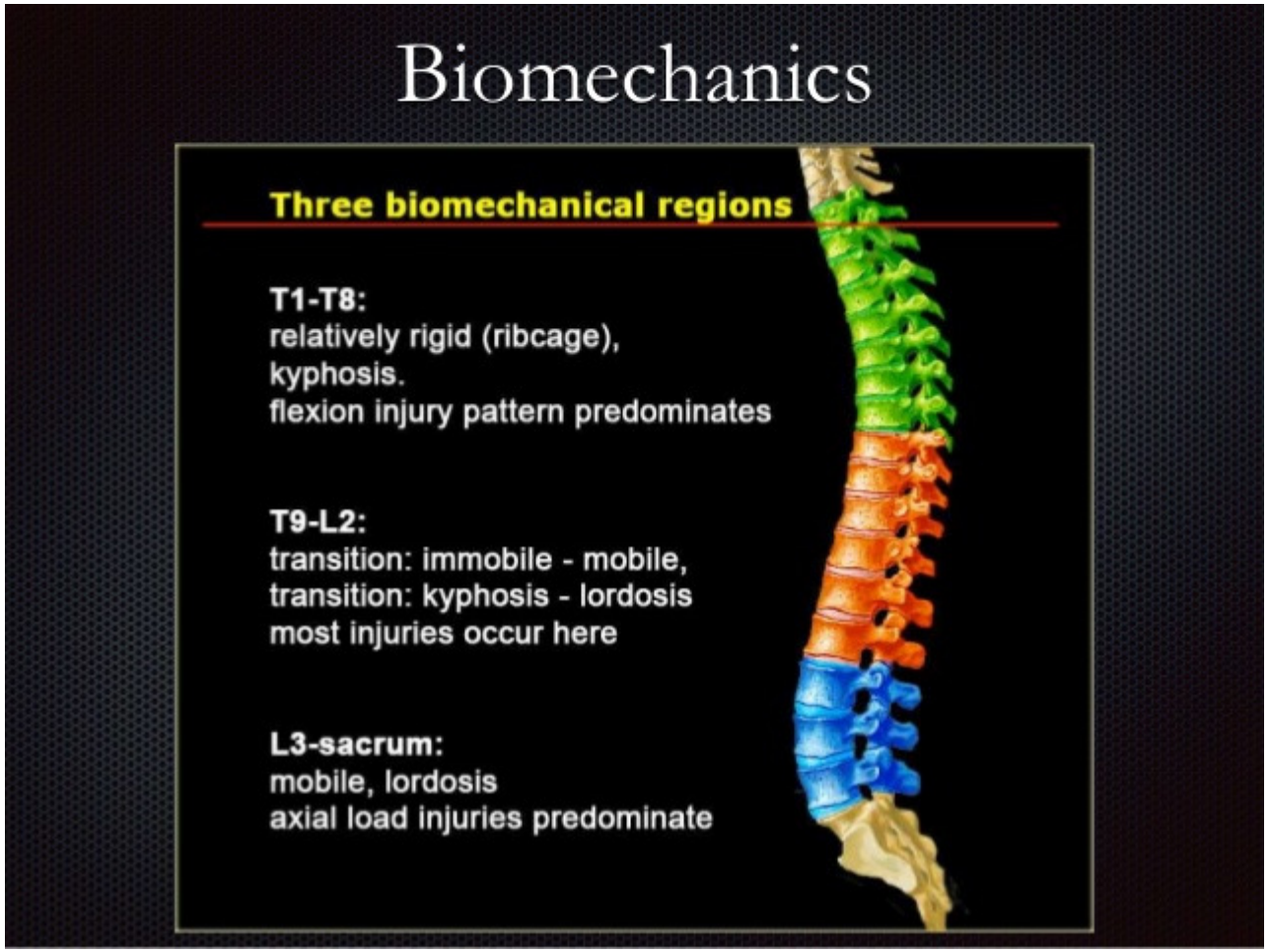


1. To evaluate the stability of TH11-L2 fxs!

2. To choose OP vs non-OP treatment!

Thoraco-Lumbar fractures TH11-L2





Thoraco-Lumbar fractures TH11-L2

Examples on ….

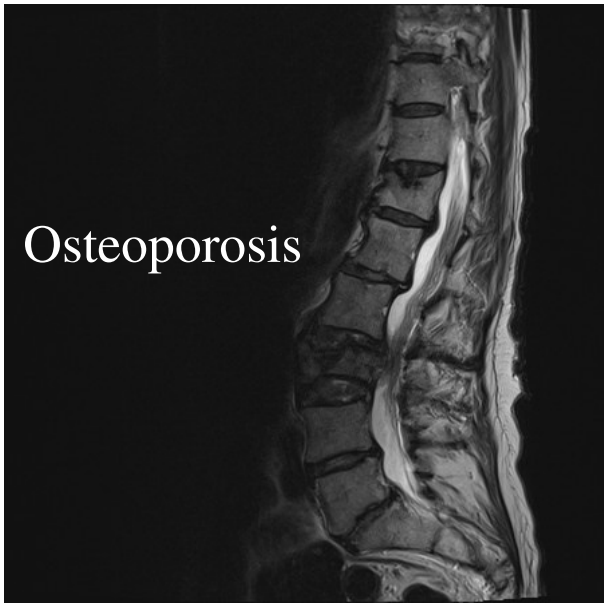
Biomechancal failure due to:

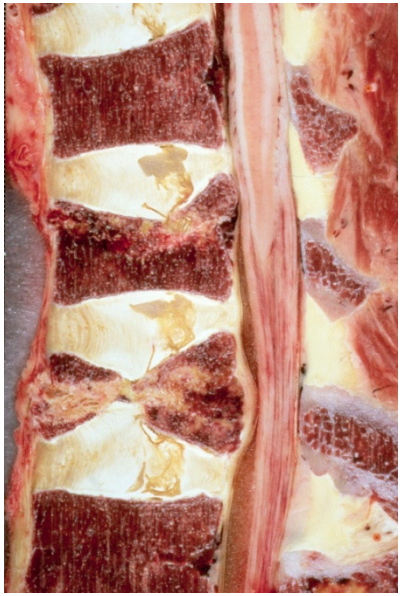
High energy–fracture:

Low energy–fracture:

Infection–osteomyelitis:

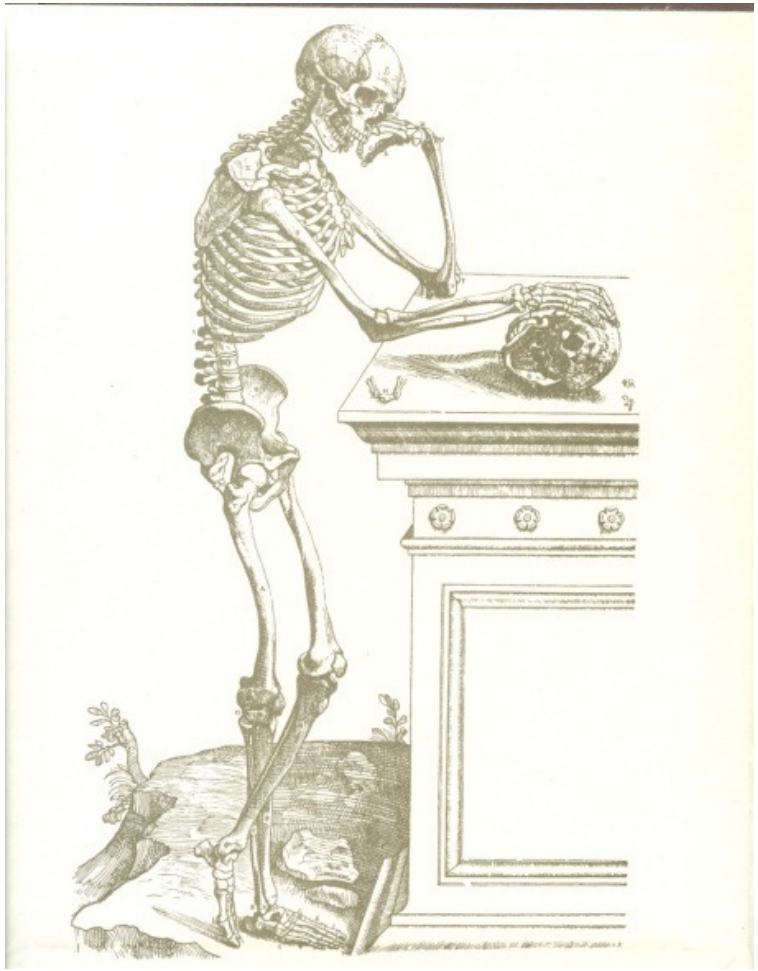
Cancer–metastasis:





Ca colon metastasis

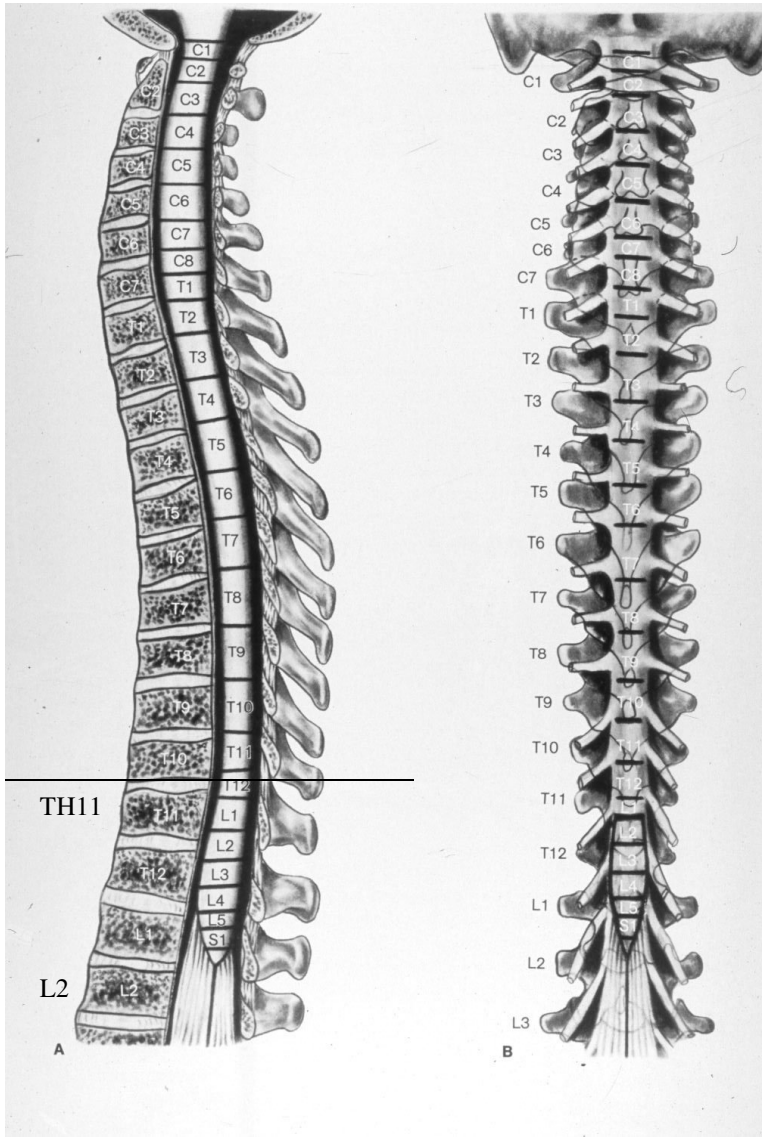
Workflow

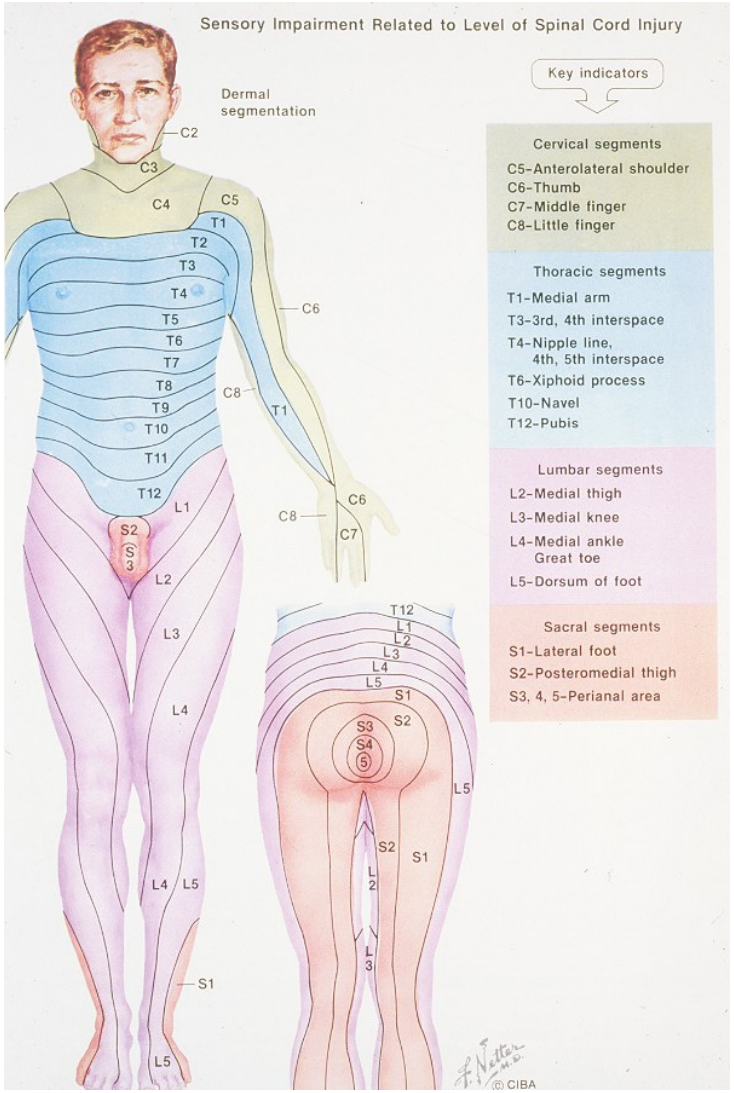


- Clinical examination – espec neurology!
- Imaging: Rtg, CT, MR
- Evaluation of stability: Denis, AO, TLICS
- Treatment according to:
  - Stable fracture: 3P brace?
  - Mobilize: when ?

- - Unstable fracture: OP?, when?
  - Mobilize: when ?

Clinical examination





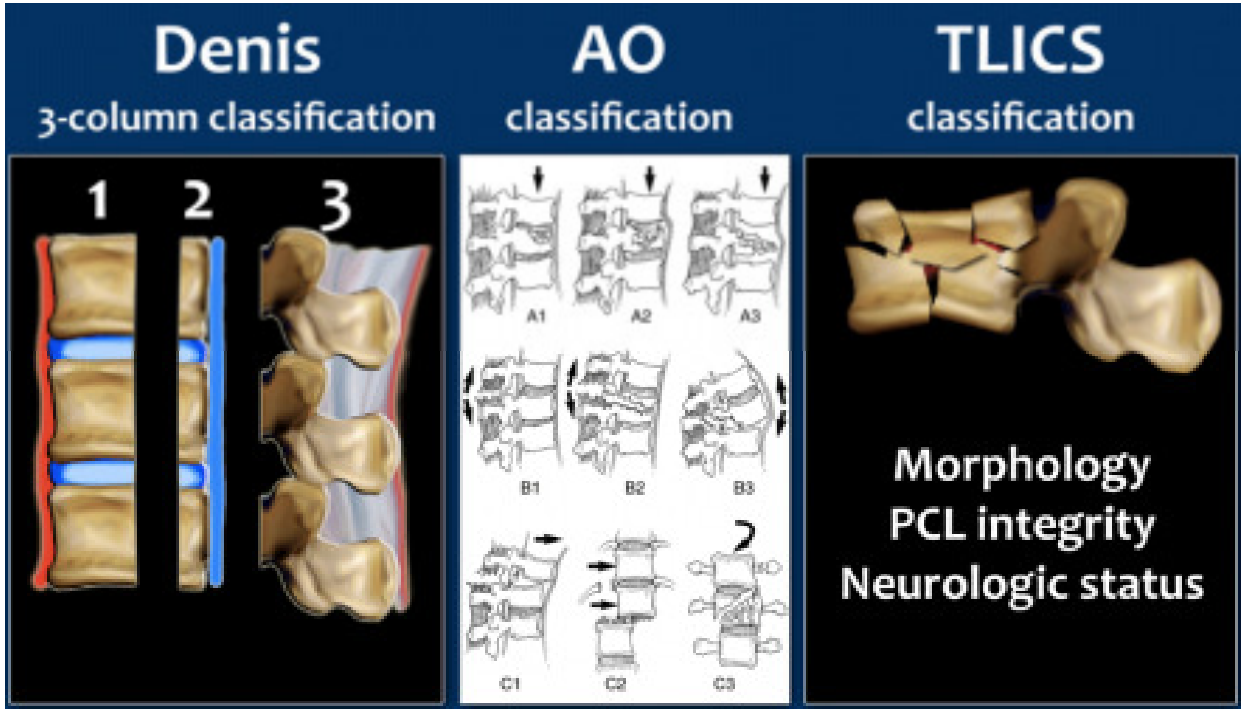
Imaging: Rtg, CT, MRI

- <u>What to look at on rtg</u>
- Any deviation in the spine profile **(>50% decrease in anterior wall height,** it is not calculated into "instability"!)

- <u>What to look at on CT:</u>
- <u>The details (**canal enchroachment** is neither calculated into "instability")</u>

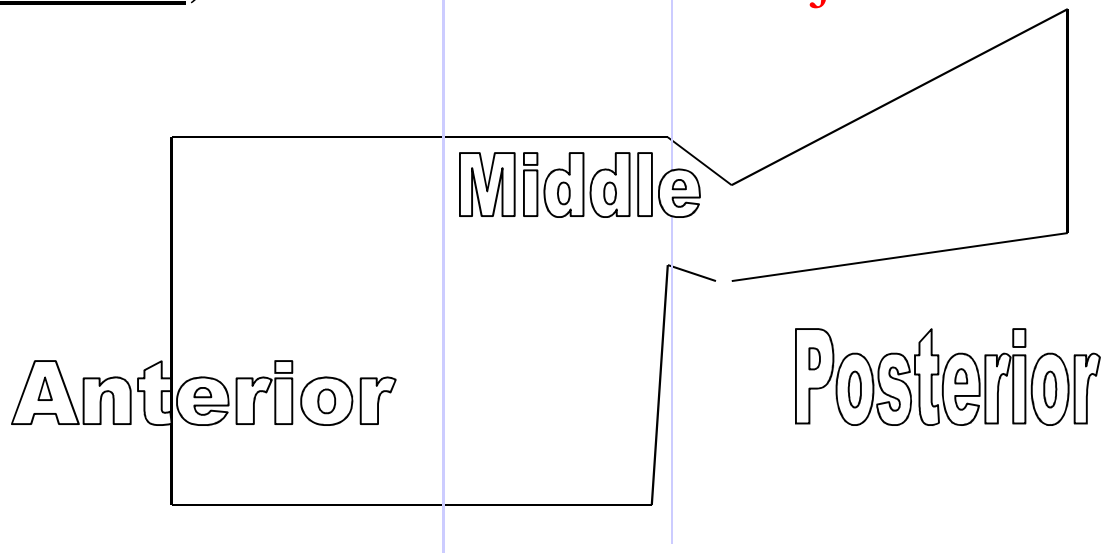
- <u>And MRI:</u>
- Only when **neurology is not correlating to** the skeletal injury and if **the PLC needs to** be evaluated

Evaluation of the stability; the three´s (3)…….



Denis evaluation: "The 3 columns"

- Unstable, if 2 of 3 columns are injured



- Also if neurological damage; partial – or total

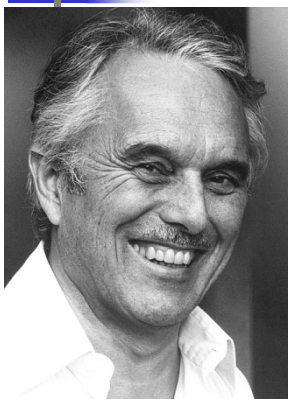
Ant col:
ALL,
ant. 2/3 of body,
ant. 2/3 of disc.

Middle col: post. 1/3 of body,
post. 1/3 of disc,
PLL

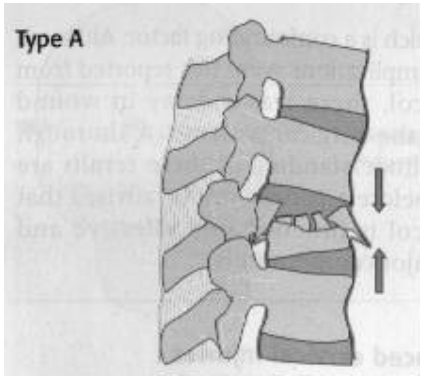
Post col:
All behind PLL

Francis Denis

AO evaluation (Müller) – "The 3 fracture types" …



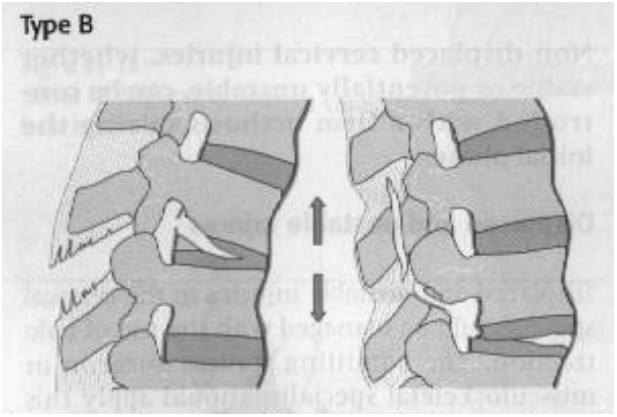
Maurice Müller



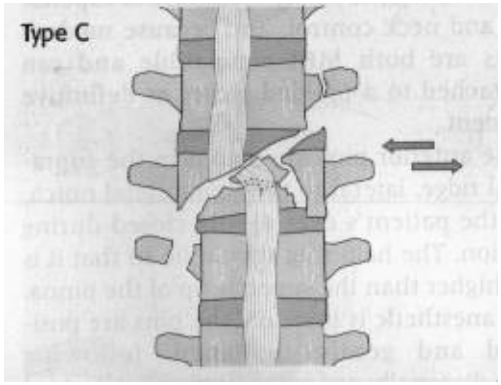
Compression injury of the anterior column

… also:
N: neurology (0,1,2,3,4)
M: modifiers (1,2)

but No "rules" about stability ??



Two-column injury with either posterior or anterior transverse distraction



Two-column injury with rotation

AO Surgery Reference
Online reference in clinical life

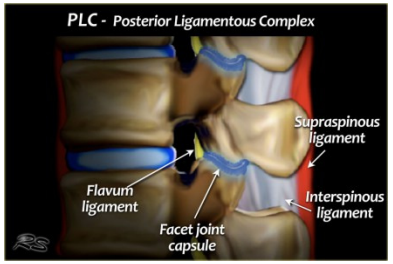
*AO = **A**rbeitsgemeinschaft für **O**steosynthesefragen*

TLICS evaluation (Vaccaro et al) – "The 3 independent predictors"

"**T**horaco**L**umbar**I**njury**C**lassification**S**core"

Alex Vaccaro

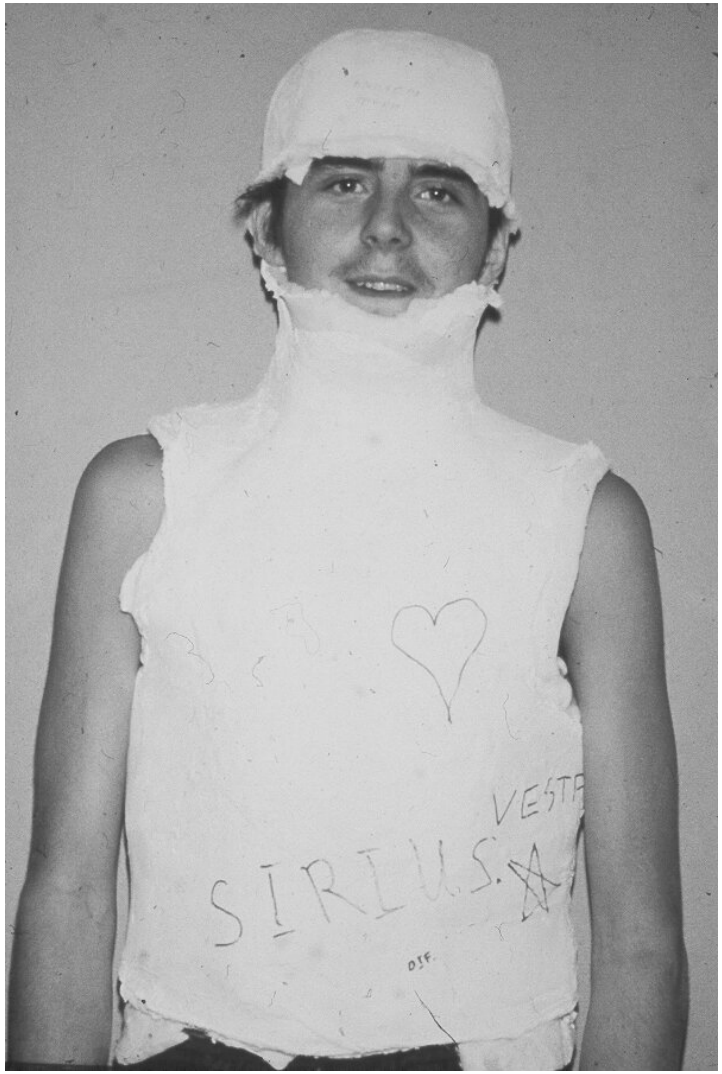
TLICS 3 independent predictors				
1	**Morphology** immediate stability	- Compression - Burst - Translation/rotation - Distraction	1 2 3 4	- Radiographs - CT
2	**Integrity of PLC** longterm stability	- Intact - Suspected - Injured	0 2 3	- MRI
3	**Neurological status**	- Intact - Nerve root - Complete cord - Incomplete cord - Cauda equina	0 2 2 3 3	- Physical examination
Predicts		- **Need for surgery**	0 – 3 4 > 4	- nonsurgical - surgeon's choice - surgical



Need MRI!?

J Spinal Disord Tech. 2005 Jun;18(3):209-15.

The surgeons choice; is it stable or not??



Non operative: 3point brace

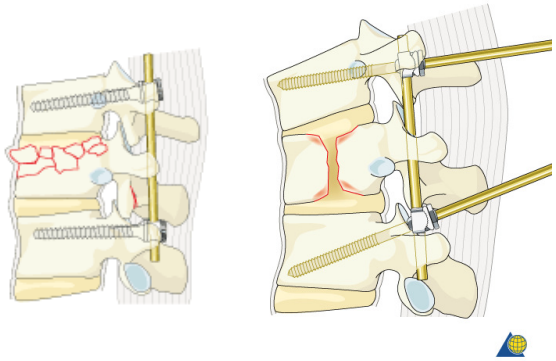
- **Indicated in: Stable injuries (6w-24h, 6w-12h, 3m physio)**
- Not in: Instability, polyfractures, broken ribs, flail chest, pulmonary injury, obesity, burning
- Advantage: Does not need surgery
- Disadvantage: Not easy – must be co-working. May cause pulmonary compromise, skin problems and fracture status may deteriorate.

- **Immediate mobilization!**

Operative treatment options for unstable T-L fractures

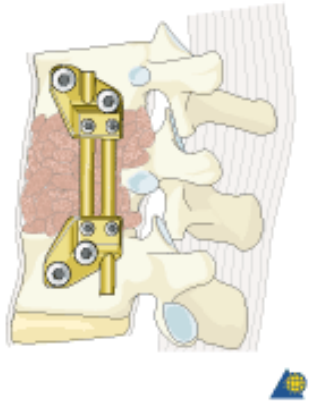
Only posterior ……

-Transpedicular screws and rods



Only anterior ……

- Screw-plates, screws and rods, grafting or cages



Any combination of these ……..

Operative treatment for unstable T-L fractures

I recommend: Only posterior reduction and fixation using transpedicular screws and rods!

Advantages:

1. Independent of fracture type.
2. Allows correct and save reduction.
3. Short segment fixation.

Disadvantages acc to AO:

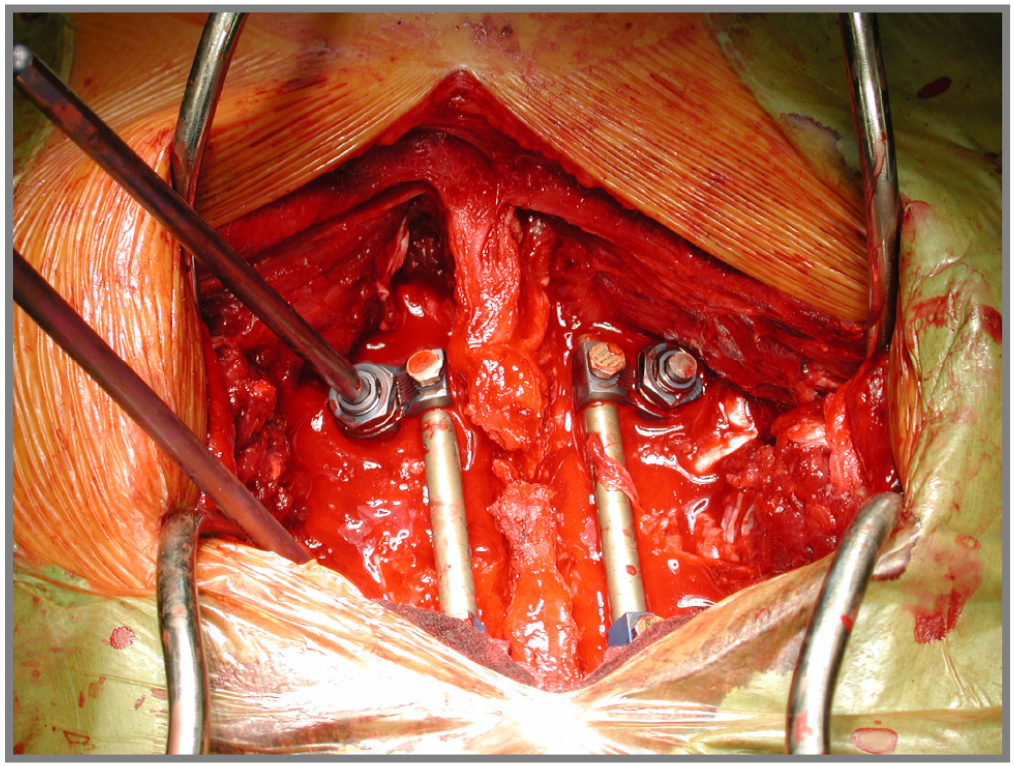
“Certain A-type fractures may need additional anterior support”;

I have never seen it (since 1987)!

The goal of operative treatment for unstable T-L fractures (4R)

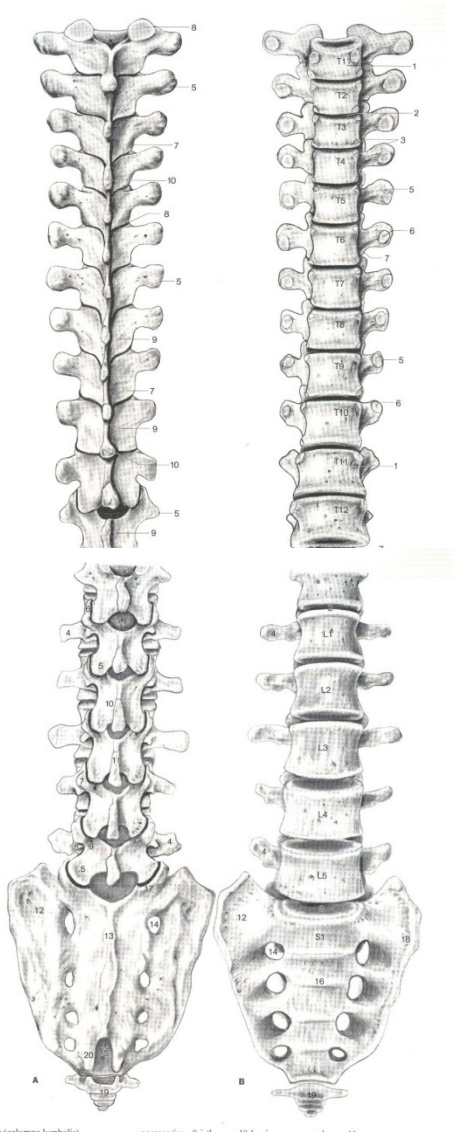
- Restoring anatomy
- Restoring stability
- Reducing risk of neurological compromise
- Rehabilitation is easier and immediate!

Transpedicular lordosis and distraction reduces all T-L fractures by ligamento-taxis

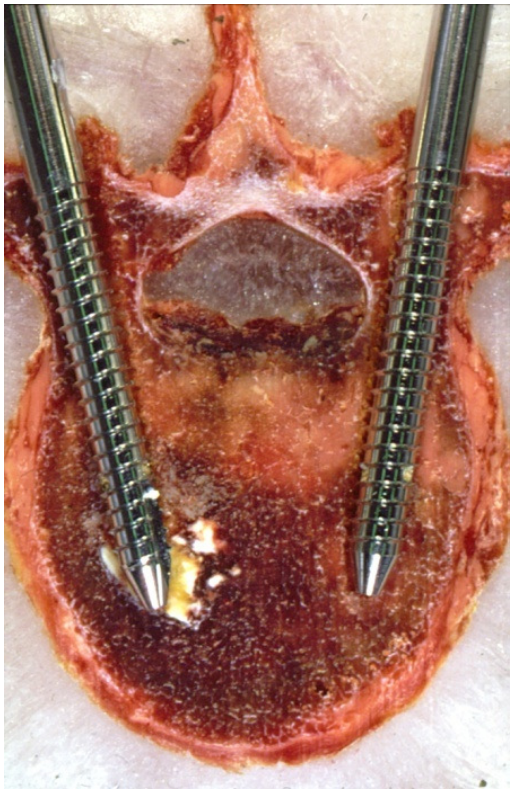


USS fracture system – (DePuy Synthes)
used in all types of T-L injuries

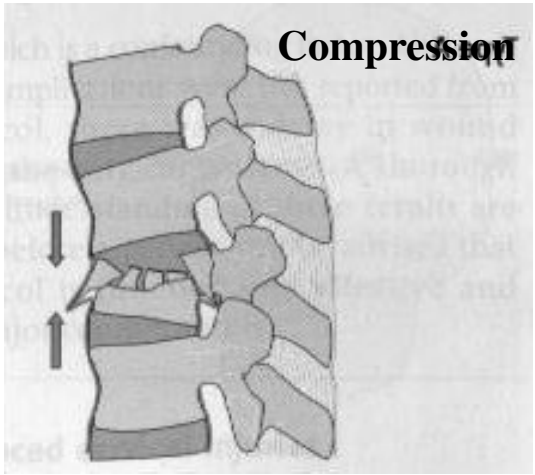
Posterior Anatomy of the T-L spine

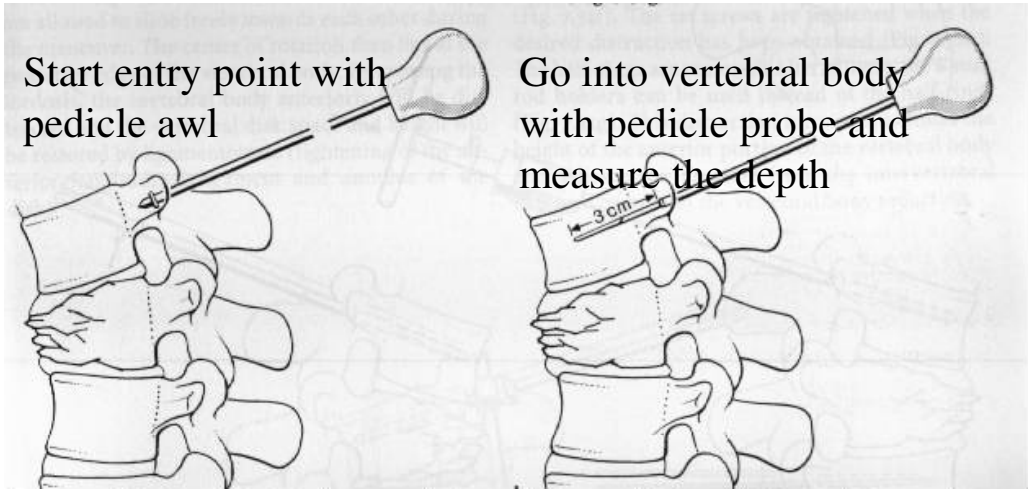


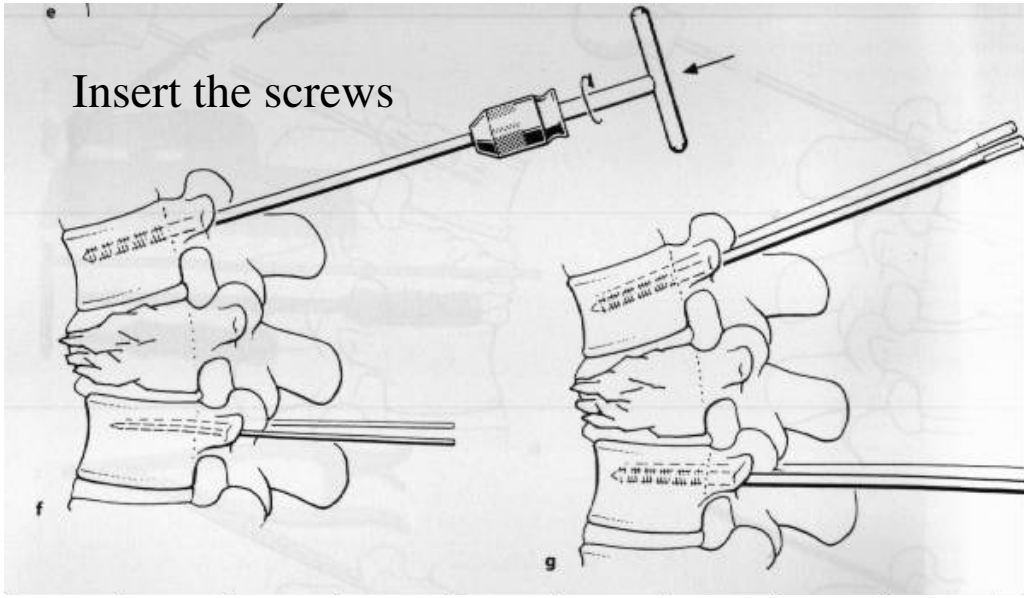
The pedicular anatomy of the T-L spine



Transpedicular screw and rod instrumentation

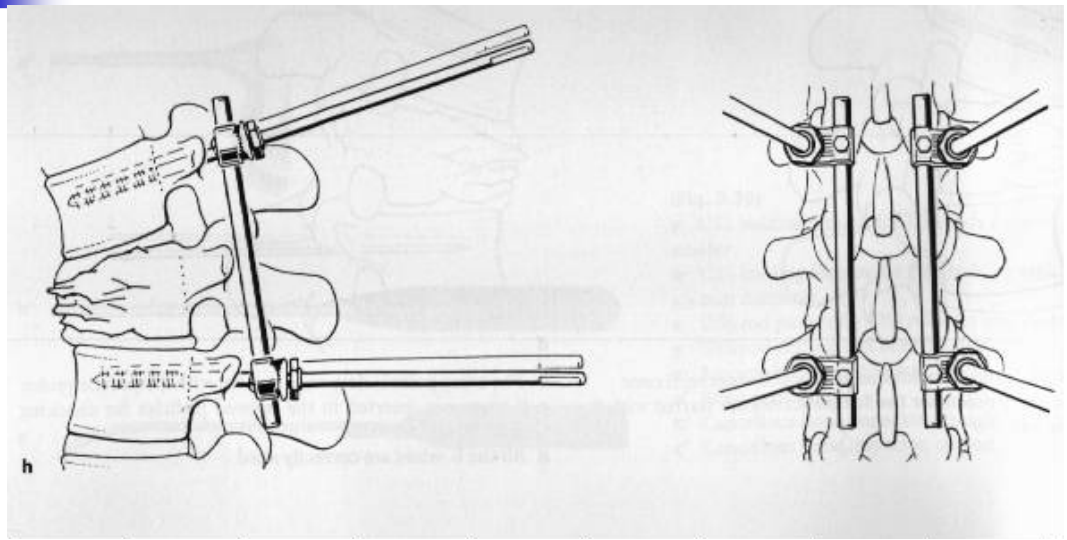






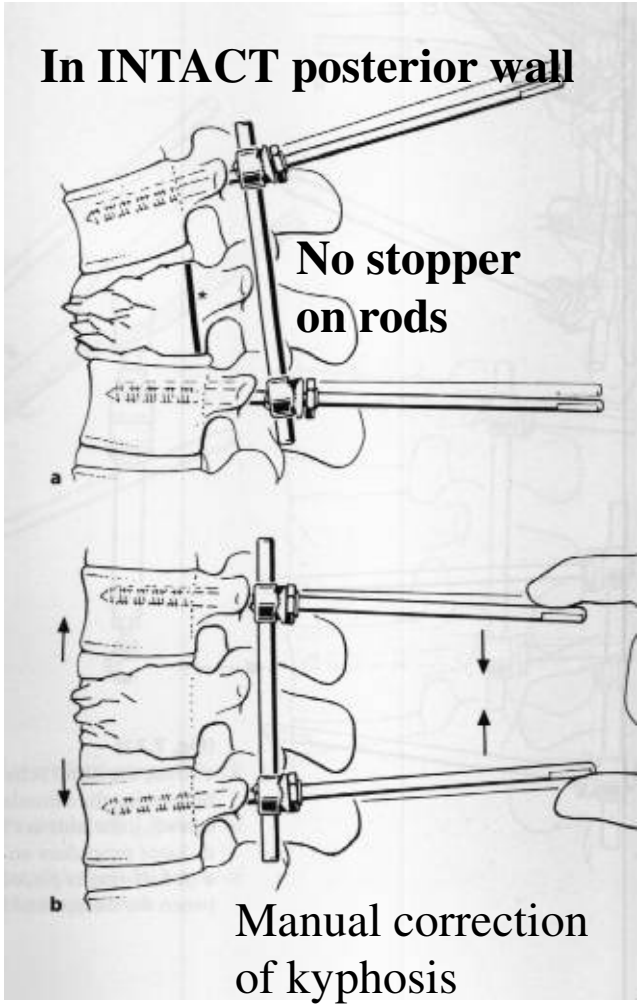
Check correct placement!

Transpedicular screw and rod instrumentation



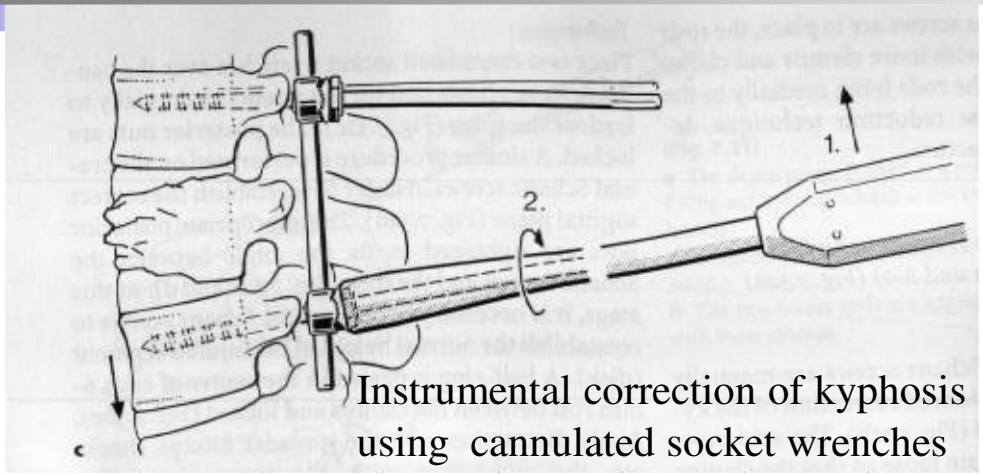
Mount rods and clamps onto screws

In INTACT posterior wall

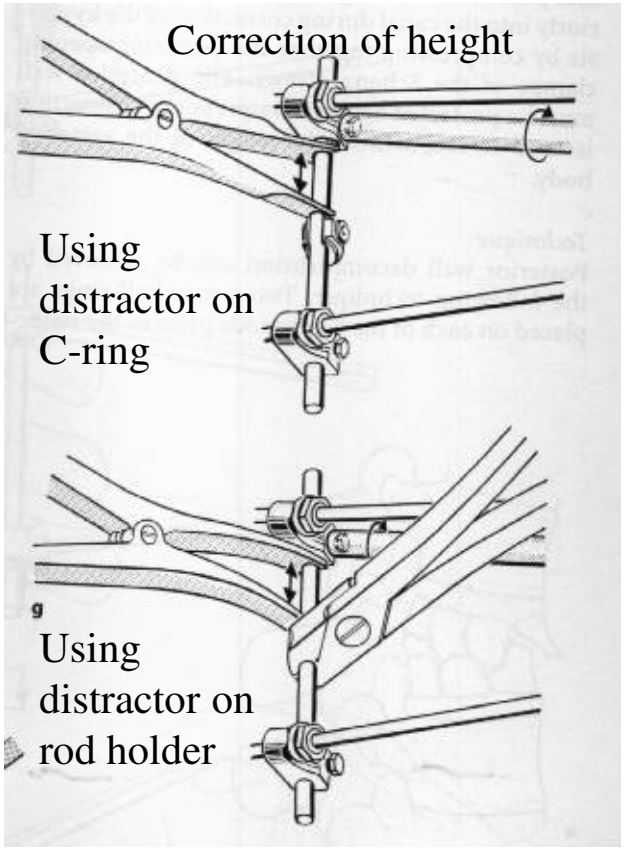


Manual correction
of kyphosis

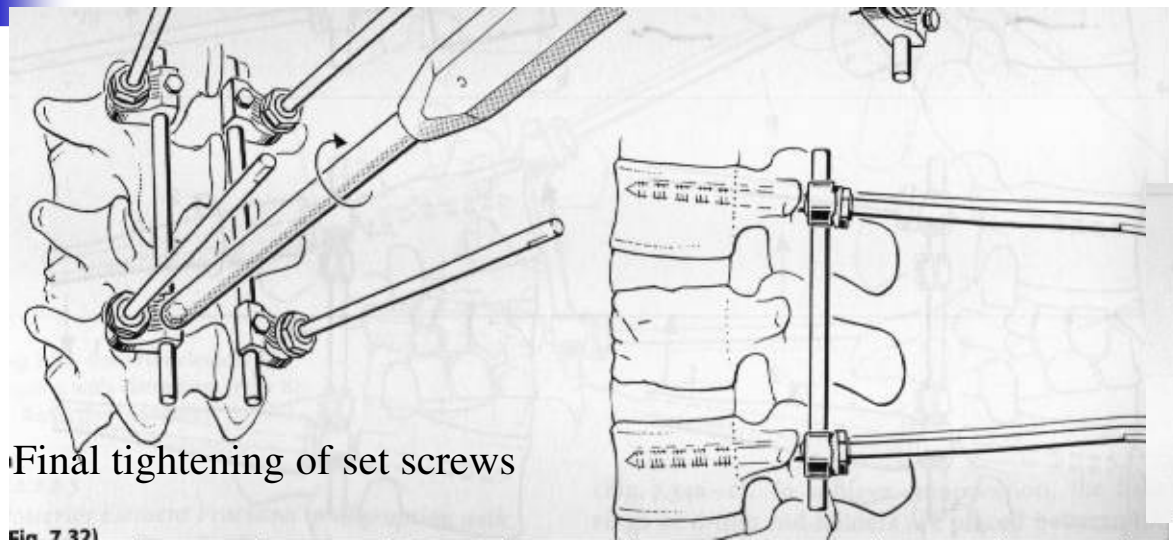
Transpedicular screw and rod instrumentation



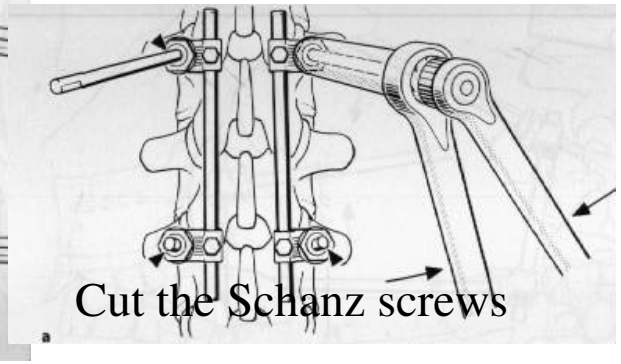
Instrumental correction of kyphosis using cannulated socket wrenches



Transpedicular screw and rod instrumentation

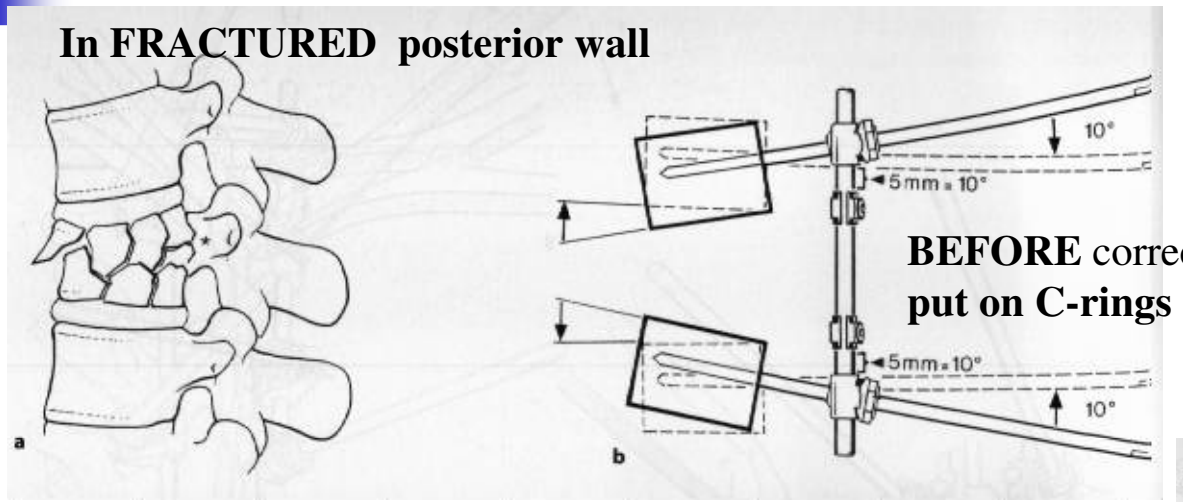


Final tightening of set screws

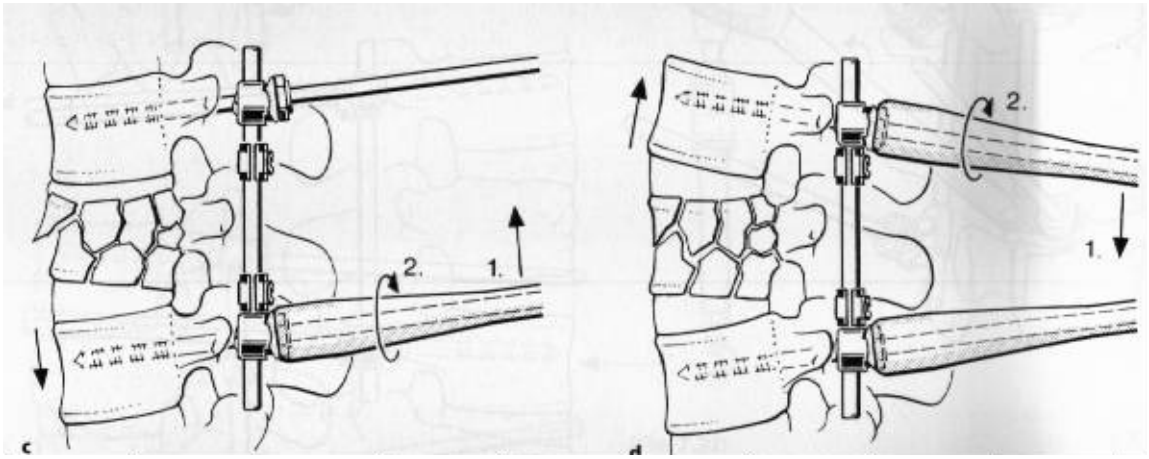


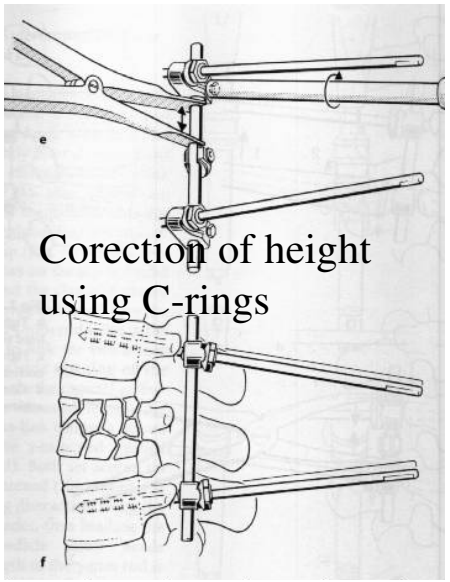
Cut the Schanz screws

Transpedicular screw and rod instrumentation



BEFORE correction of kyphosis,
put on C-rings (stopper)

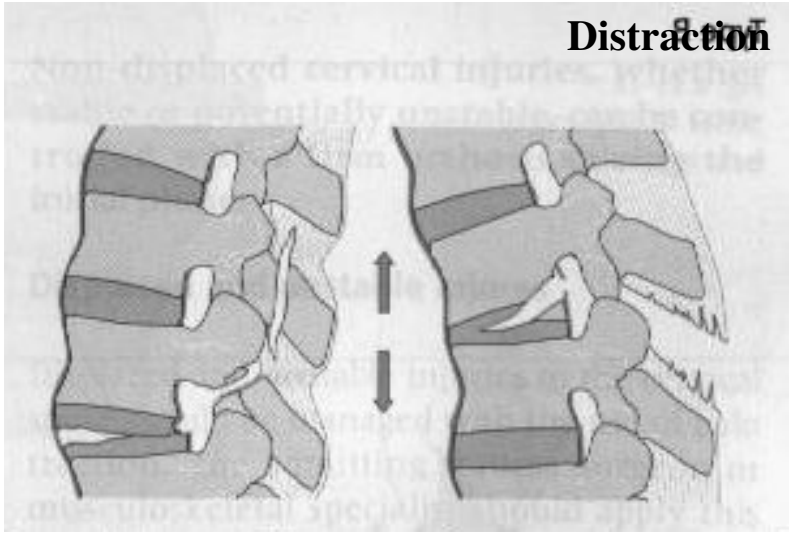


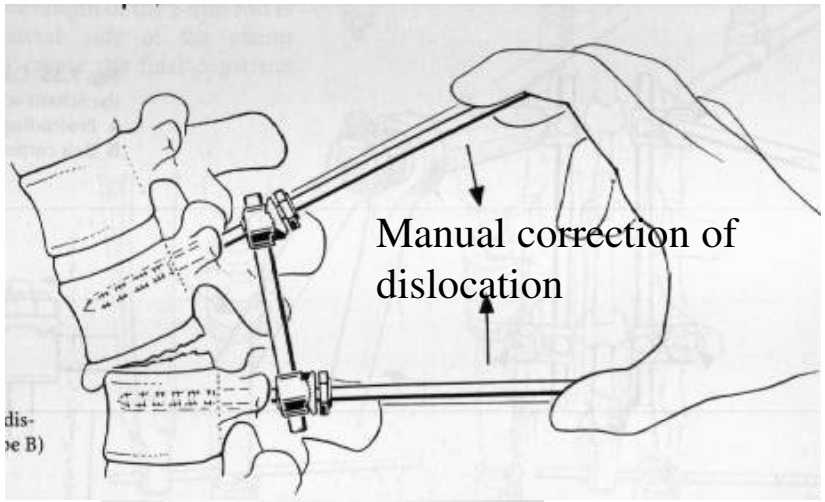


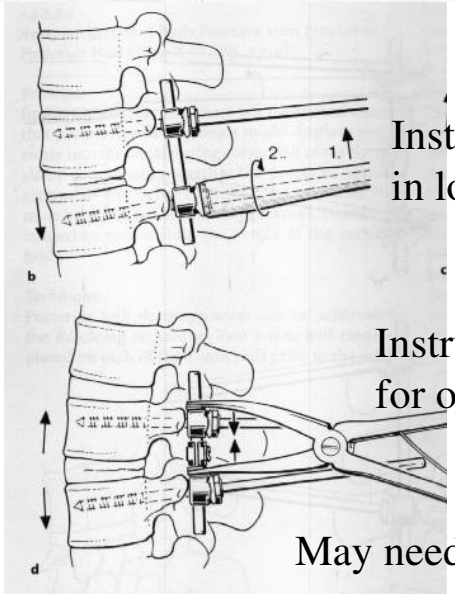
Corection of height
using C-rings

Instrumental correction of kyphosis using one
or two cannulated socket wrenches

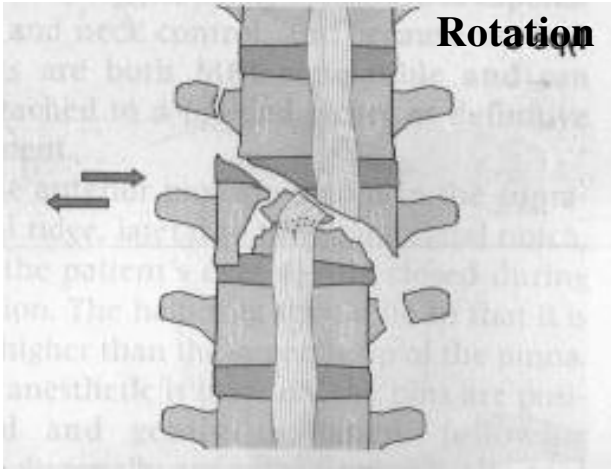
Transpedicular screw and rod instrumentation

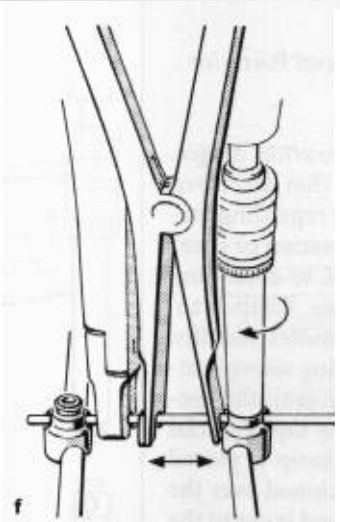




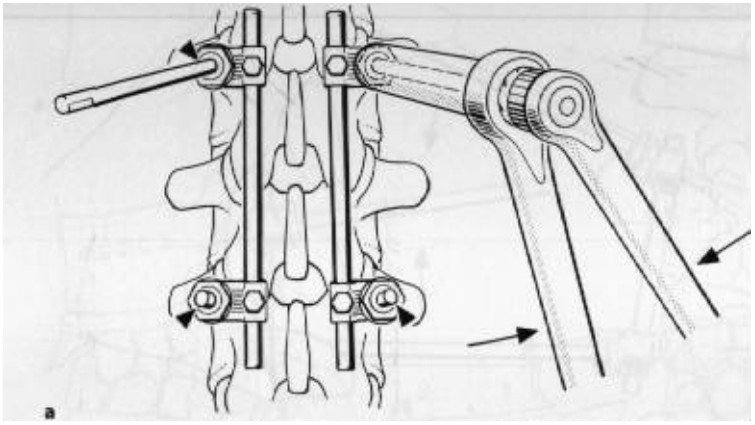


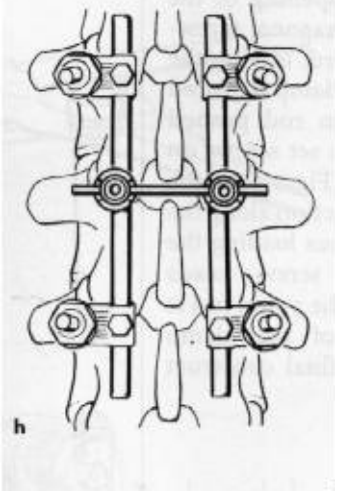
Transpedicular screw and rod instrumentation



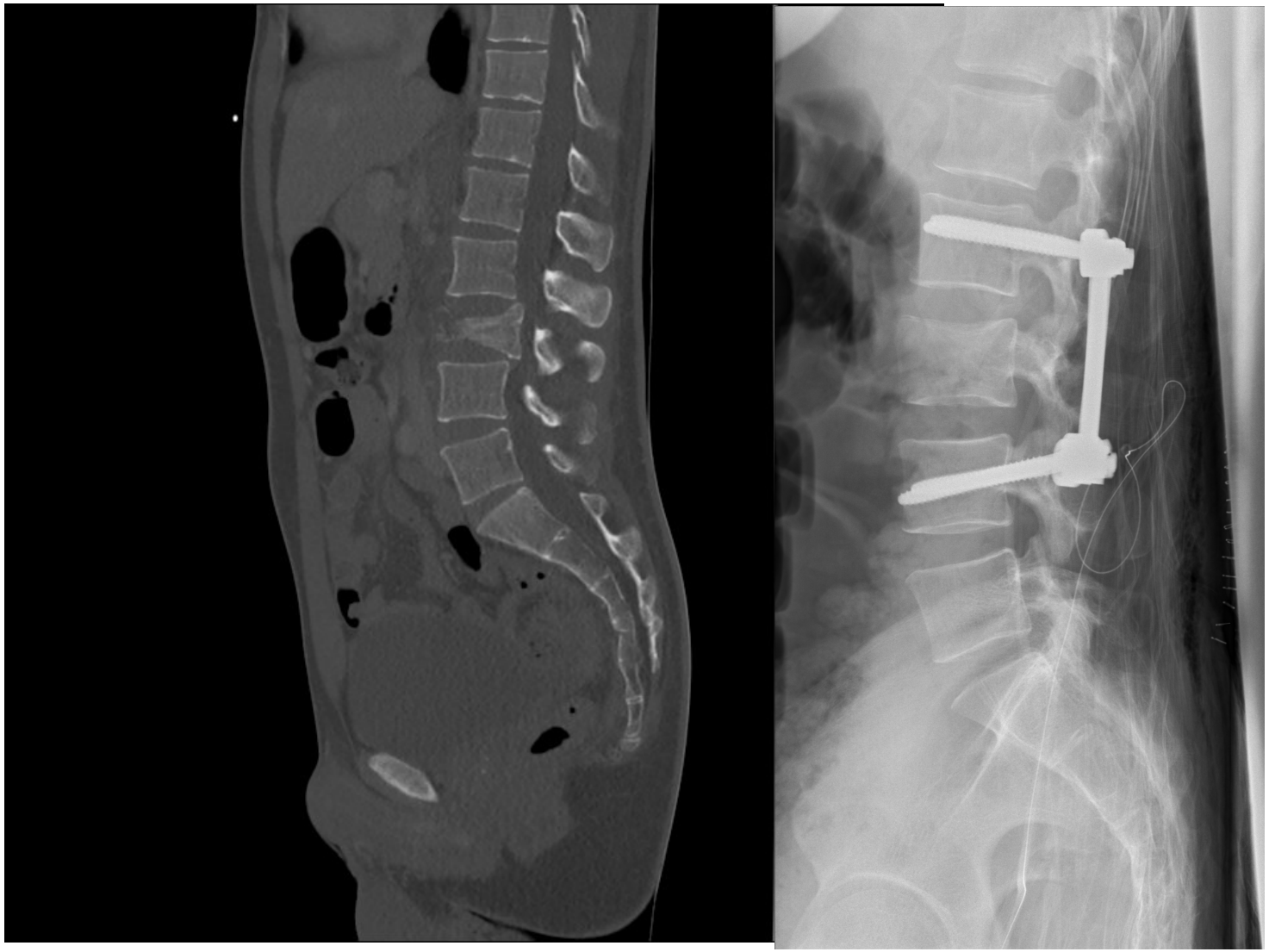


Application of a cross-link

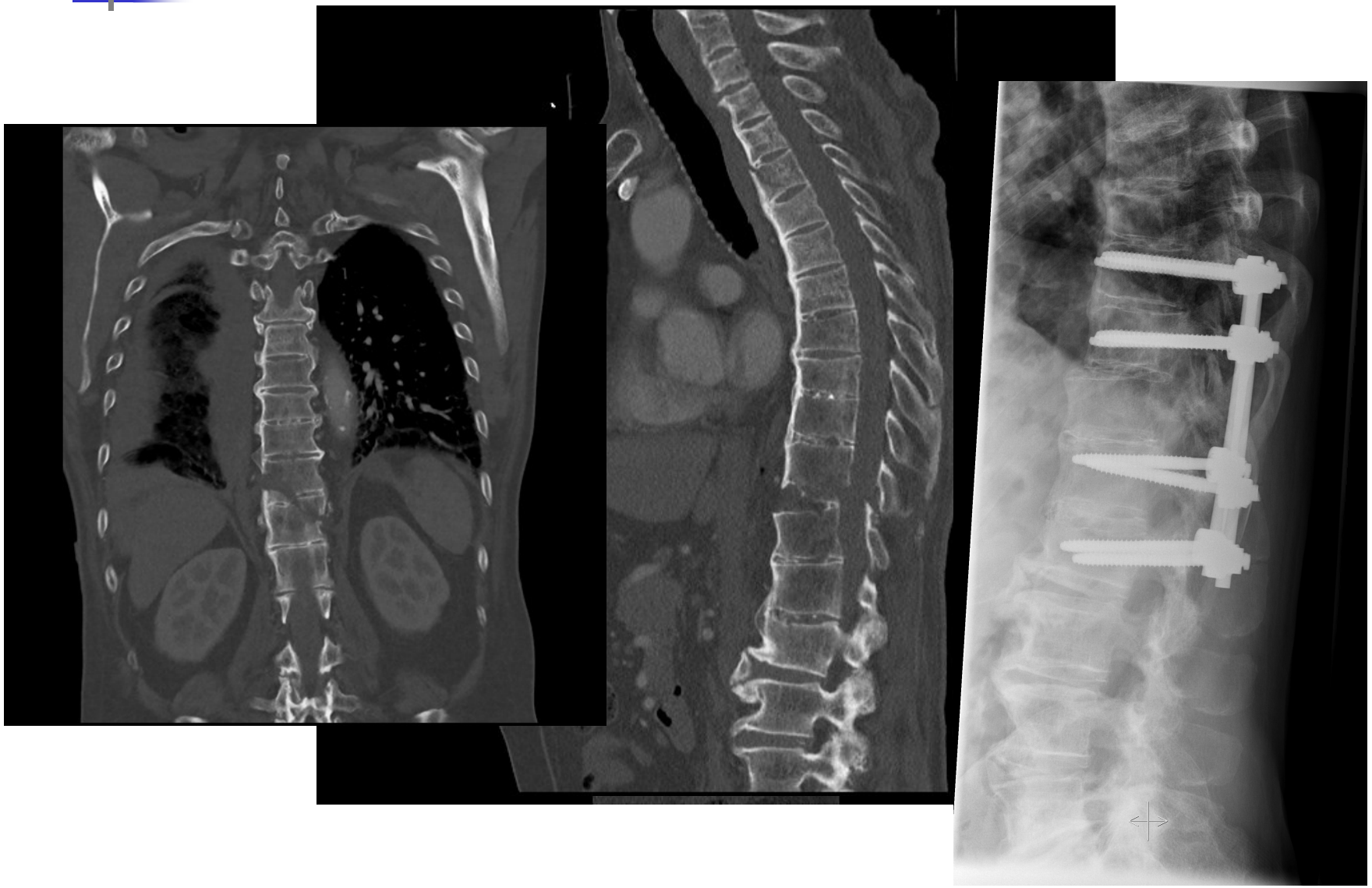




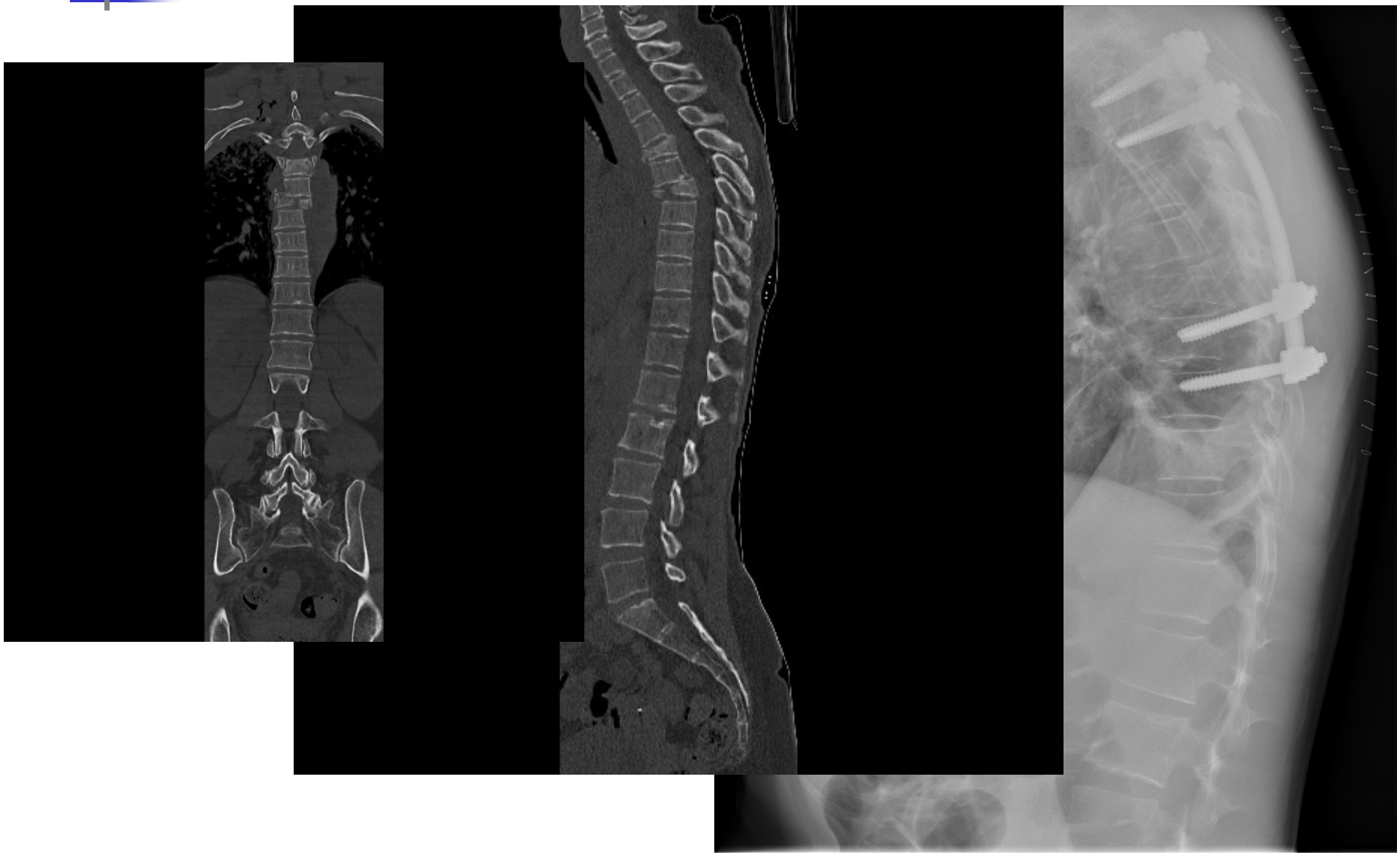
Transpedicular instrumentation of compression fx



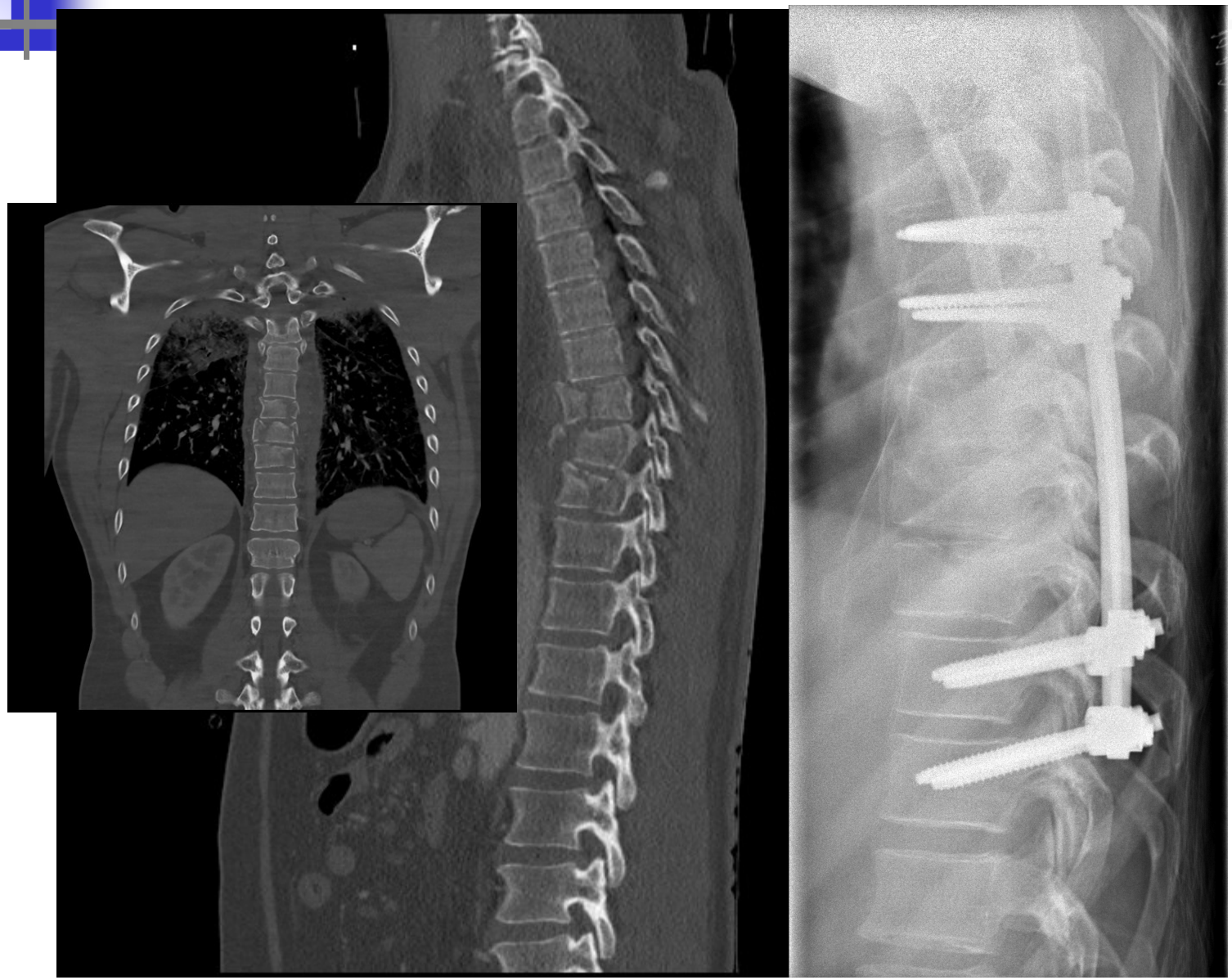
Transpedicular instrumentation of distraction fx



Transpedicular instrumentation of rot/transl fx



Transpedicular instrumentation of multi-level fxs



THANK YOU!