

Thoraco-lumbalis gerinctraumák sebészi kezelése

Tóth Tamás

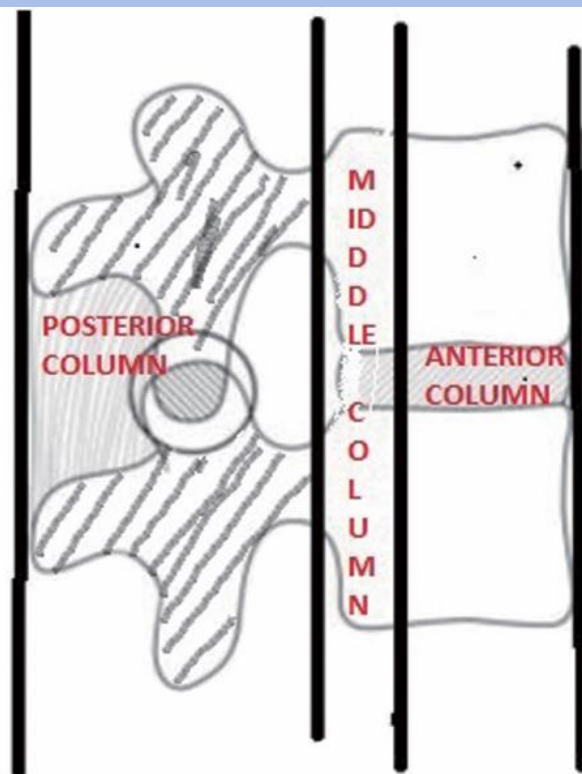
SZTE Idegsebészeti Klinika

2024, Szeged továbbképzés

Egységes klasszifikáció

- könnyen használható, de megbízható
- sebészek közötti kommunikációt segíti
- kezelési útmutatást ad
- prognózist ad

Denis féle 3 oszlop teória



Posterior column

Posterior bony arch+
supraspinous ligament+
interspinous ligament+
ligamentum flavum

Middle column

Posterior longitudinal
ligament+posterior
vertebral wall+
posterior annulus fibrosus

Anterior column

Anterior longitudinal
ligament+anterior
annulus fibrosus+
anterior vertebral body

Thoraco-
lumbar
injury
classification
and severity
score
TLICS

	Assessment - Score
Identify morphology of injury	Compression - 1
	Burst fracture - 2
	Lateral angulation >15° - 2
	Translation / rotation - 3
	Distraction - 4
Assess posterior ligament complex integrity	Intact - 1
	Ruptured - 3
	In-determinant - 4
Assess neurological status	Intact - 0
	Incomplete cord - 3
	Complete cord - 2
	Nerve root - 2
	Cauda equine - 3



Total score	Proposed management guide line
<3	Non-operative
4	Non-operative or operative
>4	Operative
Operative in presence of clinical qualifier: extreme kyphosis, severe lateral angulation, adjacent rib fracture, soft tissue compromise, inability to brace, polytrauma	

MRI-t igényel !

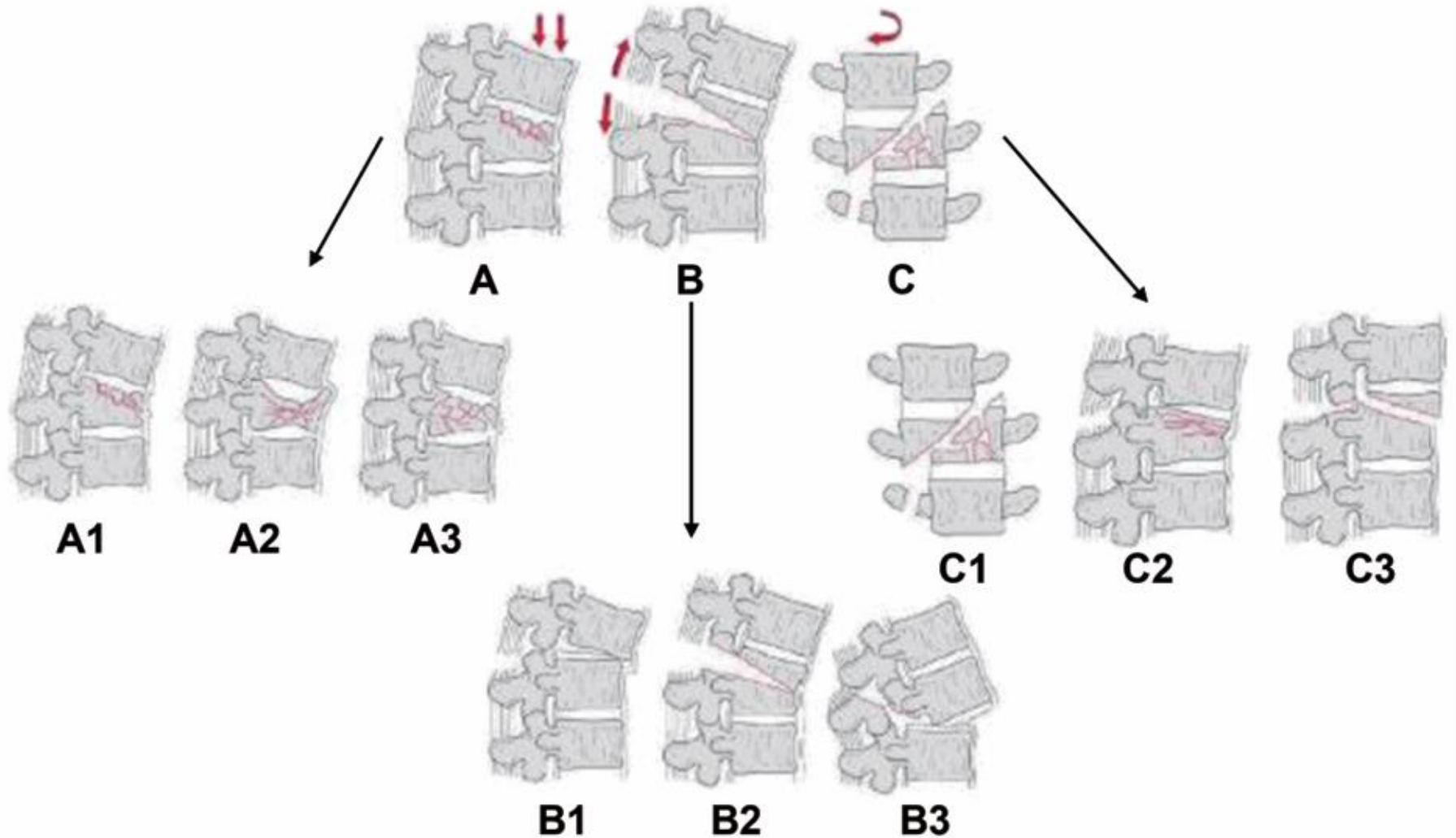
Thoraco-lumbalis törések

1. A törés morfológiai klasszifikációja
2. Neurológiai állapot
3. Klinikai befolyásoló paraméterek

Amiről beszélünk:

- Thoraco-lumbalis törések AO klasszifikációja
- A törés típusától függő terápiás opciók
- Nyílt műtéti eredmények
- Minimál invazív műtéti eredmények

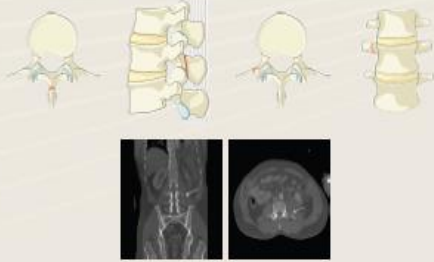
AO klasszifikáció



Type A. Compression Injuries

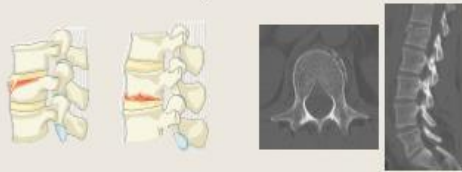
A0. Minor, nonstructural fractures

Fractures, which do not compromise the structural integrity of the spinal column such as transverse process or spinous process fractures.



A1. Wedge-compression

Fracture of a single endplate without involvement of the posterior wall of the vertebral body.



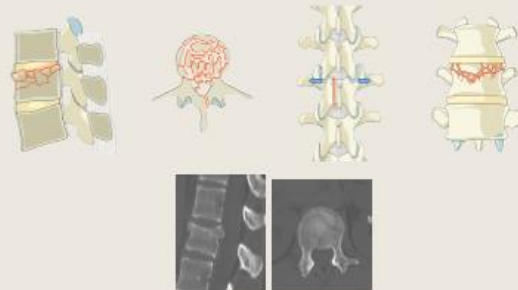
A2. Split

Fracture of both endplates without involvement of the posterior wall of the vertebral body.



A3. Incomplete burst

Fracture with any involvement of the posterior wall; only a single endplate fractured. Vertical fracture of the lamina is usually present and does not constitute a tension band failure.



A4. Complete burst

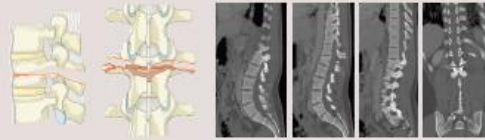
Fracture with any involvement of the posterior wall and both endplates. Vertical fracture of the lamina is usually present and does not constitute a tension band failure.



Type B. Distraction Injuries

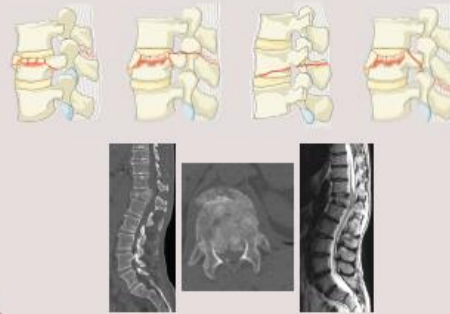
B1. Transosseous tension band disruption Chance fracture

Monosegmental pure osseous failure of the posterior tension band. The classical Chance fracture.



B2. Posterior tension band disruption

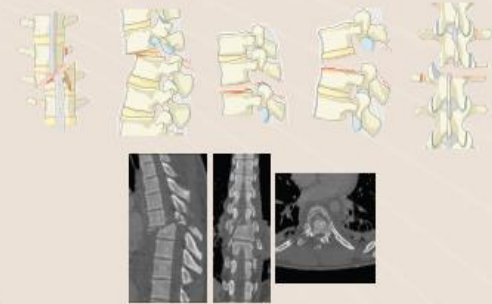
Bony and/or ligamentary failure of the posterior tension band together with a Type A fracture. Type A fracture should be classified separately.



Type C. Translation Injuries

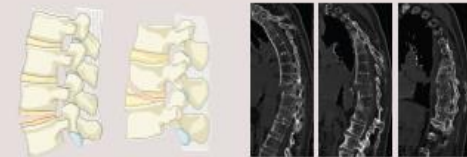
C. Displacement or dislocation

There are no subtypes because various configurations are possible due to dislocation/dislocation. Can be combined with subtypes of A or B.



B3. Hyperextension

Injury through the disk or vertebral body leading to a hyperextended position of the spinal column. Commonly seen in ankylosing disorders. Anterior structures, especially the ALL are ruptured but there is a posterior hinge preventing further displacement.



Morfológiai klasszifikáció

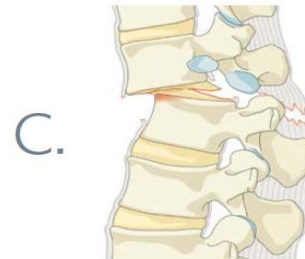
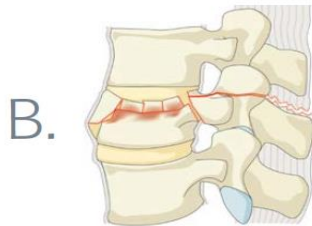
Ehhez legalább CT szükséges, de némely esetben MRI is a pontos beosztáshoz

- Type A: Kompressziós sérülésekből eredő anterior struktúrák károsodása
- Type B: Anterior és/vagy posterior disco-ligamenter sérülések
- Type C: Minden elem sérüléséből adódó diszlokáció vagy elmozdulás

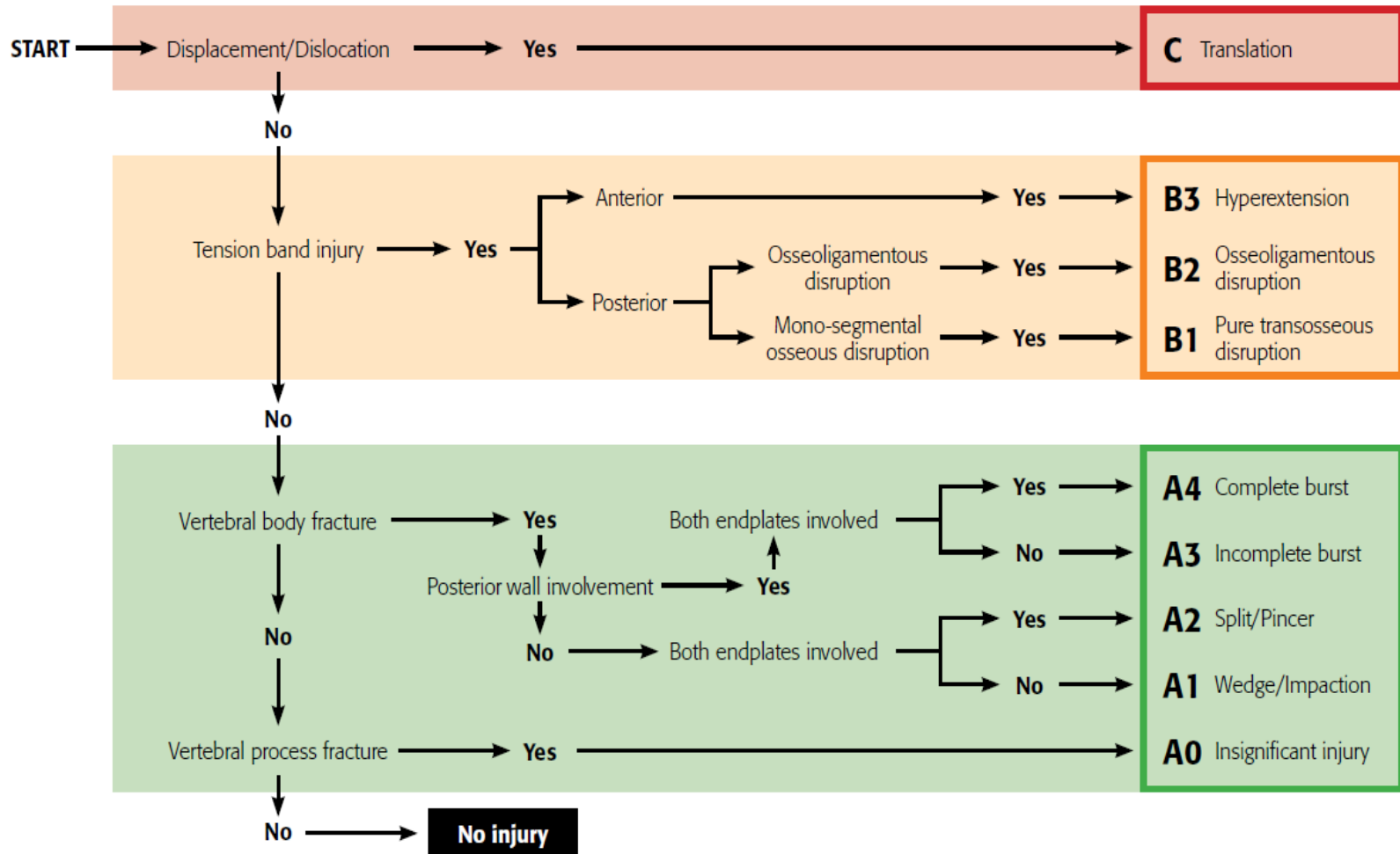
1. Morphologic classification

This is based on the Magerl classification modified by the AOSpine Classification Group. For this evaluation radiograms and CT scans with multiplanar reconstructions are essential. In some cases additional MR images might be necessary. Three basic types are identified on the basis of the mode of failure of the spinal column:

- **Type A:** Compression injuries. Failure of anterior structures under compression.
- **Type B:** Failure of the posterior or anterior tension band.
- **Type C:** Failure of all elements leading to dislocation or displacement.



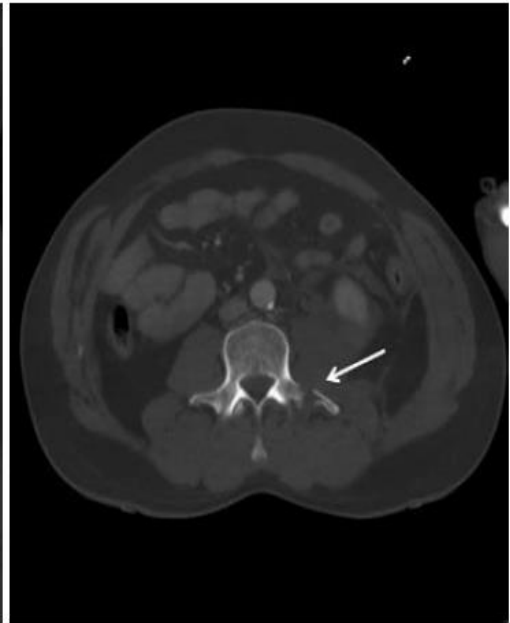
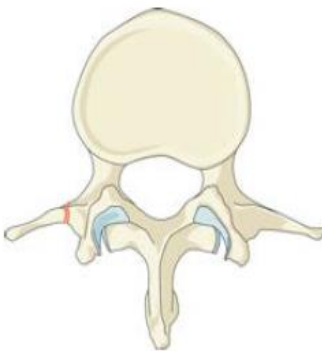
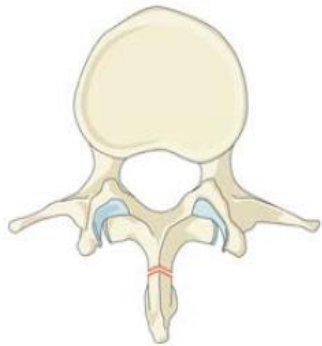
Algorithm for morphologic classification



Type A

A0. Minor, nonstructural fractures

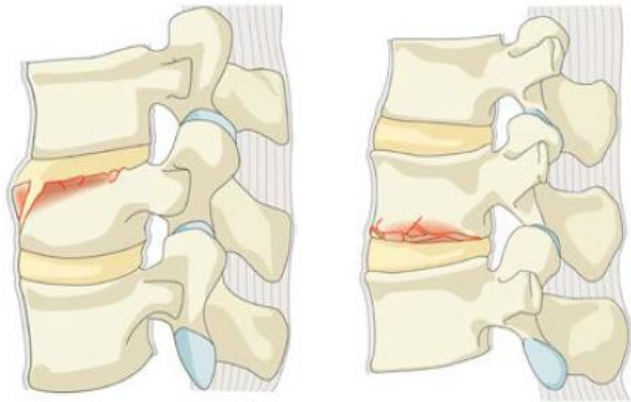
Fractures, which do not compromise the structural integrity of the spinal column such as transverse process or spinous process fractures.



Type A

A1. Wedge-compression

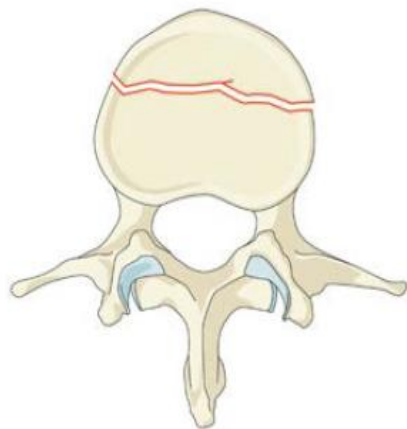
Fracture of a single endplate without involvement of the posterior wall of the vertebral body.



Type A

A2. Split

Fracture of both endplates without involvement of the posterior wall of the vertebral body.



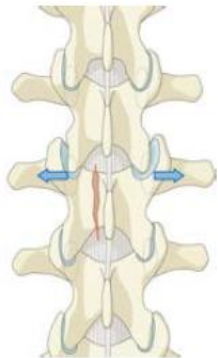
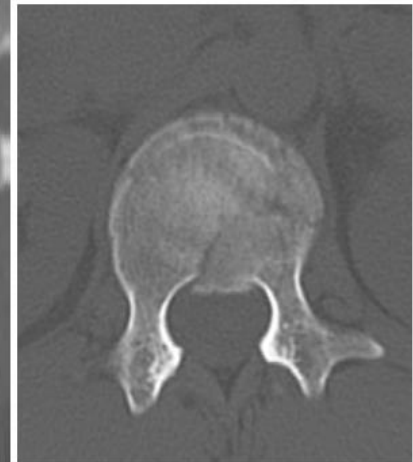
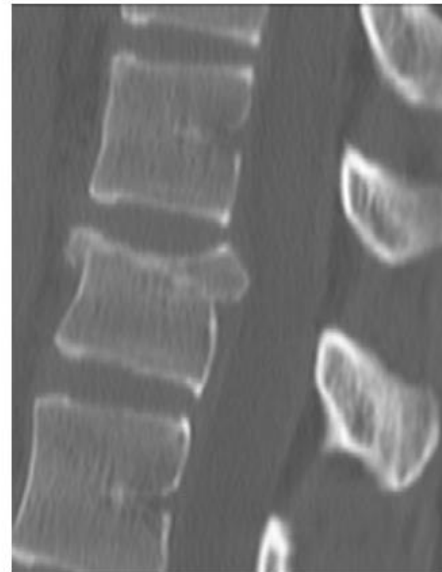
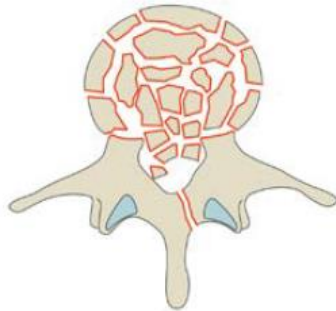
A0, A1 és A2

- A0, A1 és A2 törések konzervatívan is kezelhetők
- MRI mindig meggondolandó, különösen nagy sebességű sérülésnél, kizárandó:
 - szalag sérüléseket
 - hyperflexiós sérüléseket

Type A

A3. Incomplete burst

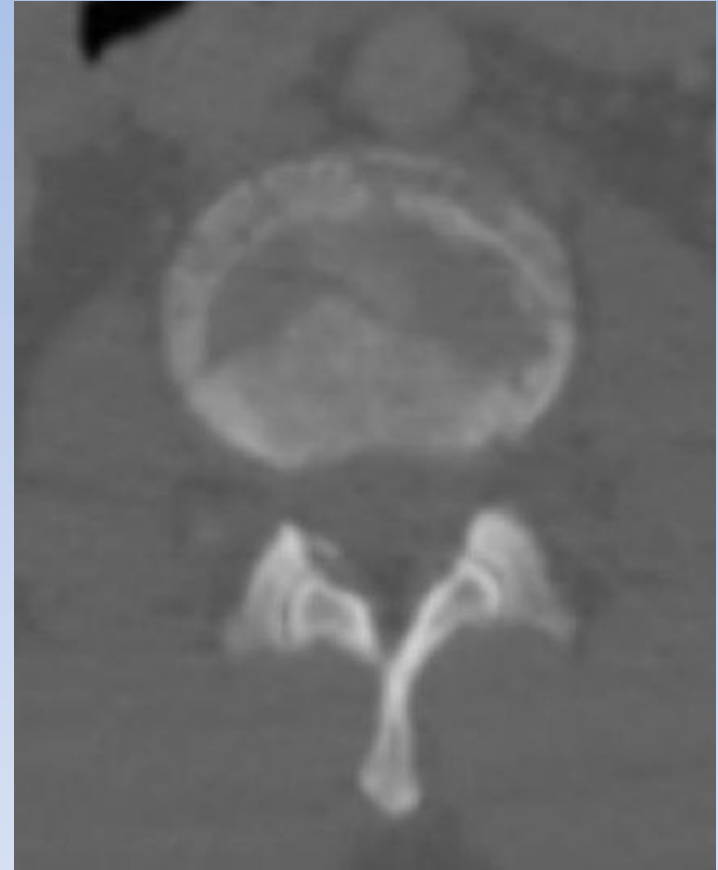
Fracture with any involvement of the posterior wall; only a single endplate fractured. Vertical fracture of the lamina is usually present and does not constitute a tension band failure.



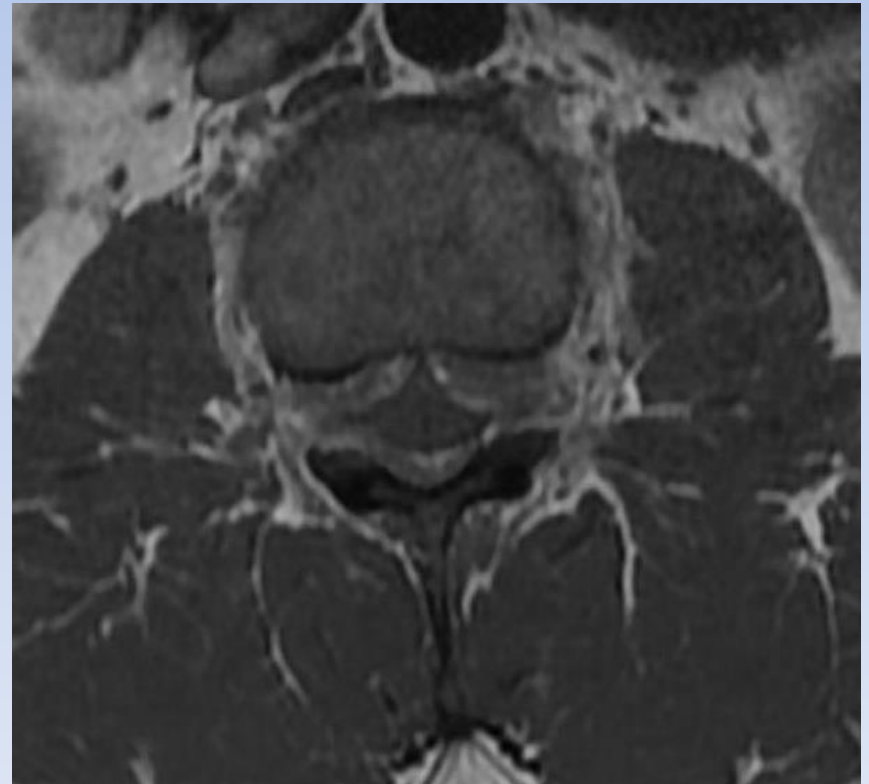
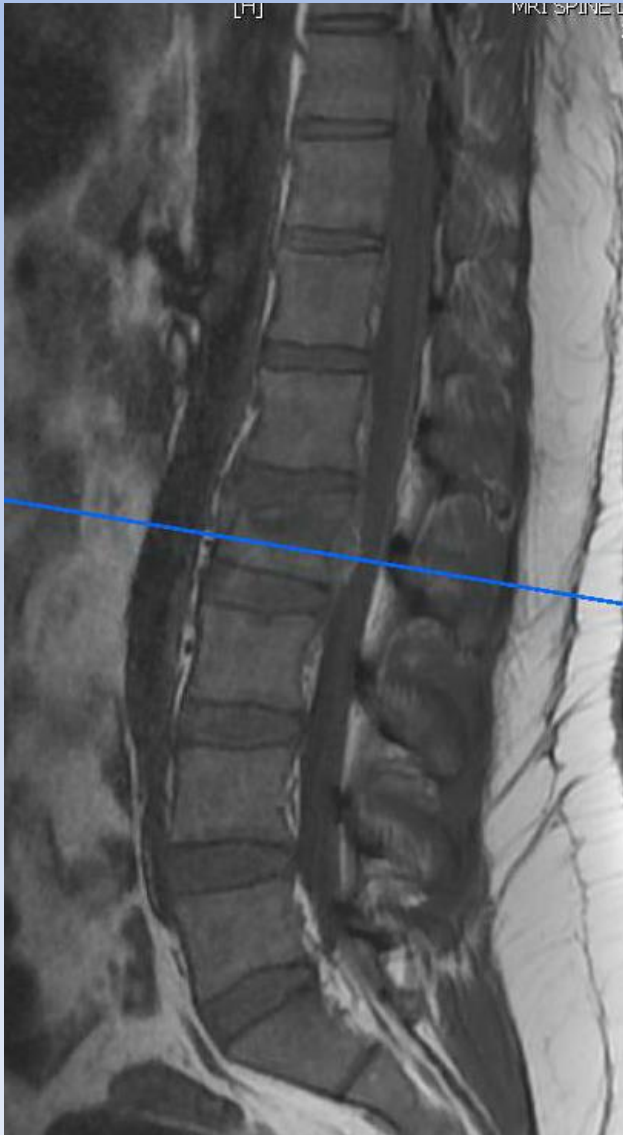
A3 típusú törés – példa

- 27 éves férfi
- gyorsajtás, autó többször átfordult
- saját lábán szállt ki
- felvételkor:
 - tudata tiszta
 - motoros eltérés nincs
 - erős gerincfájdalom
 - más sérülése nincs

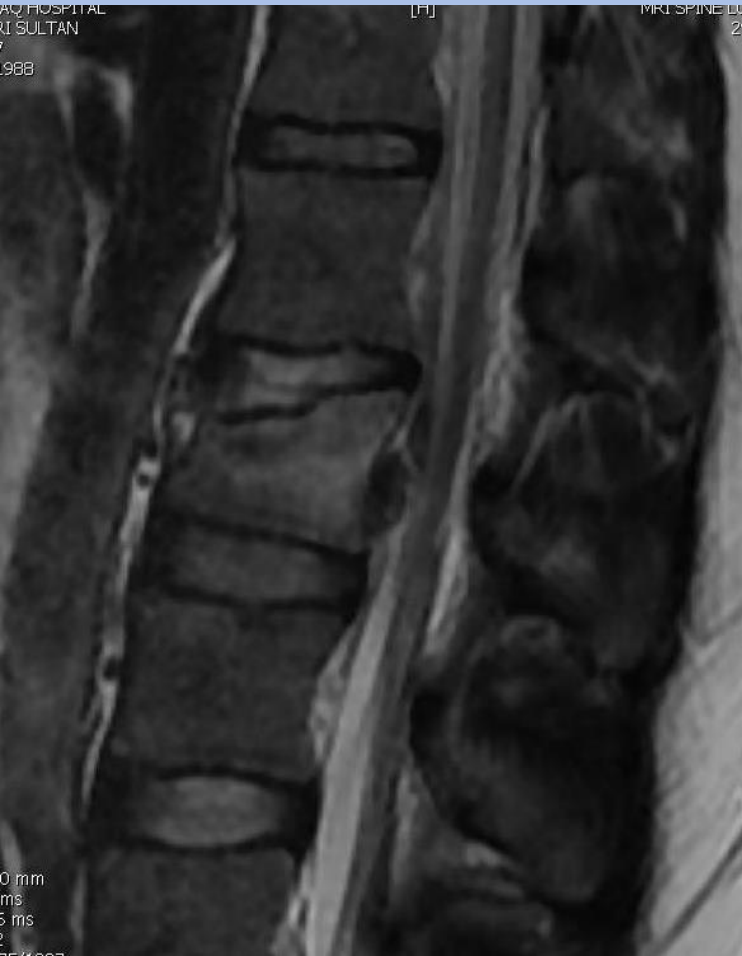
A3



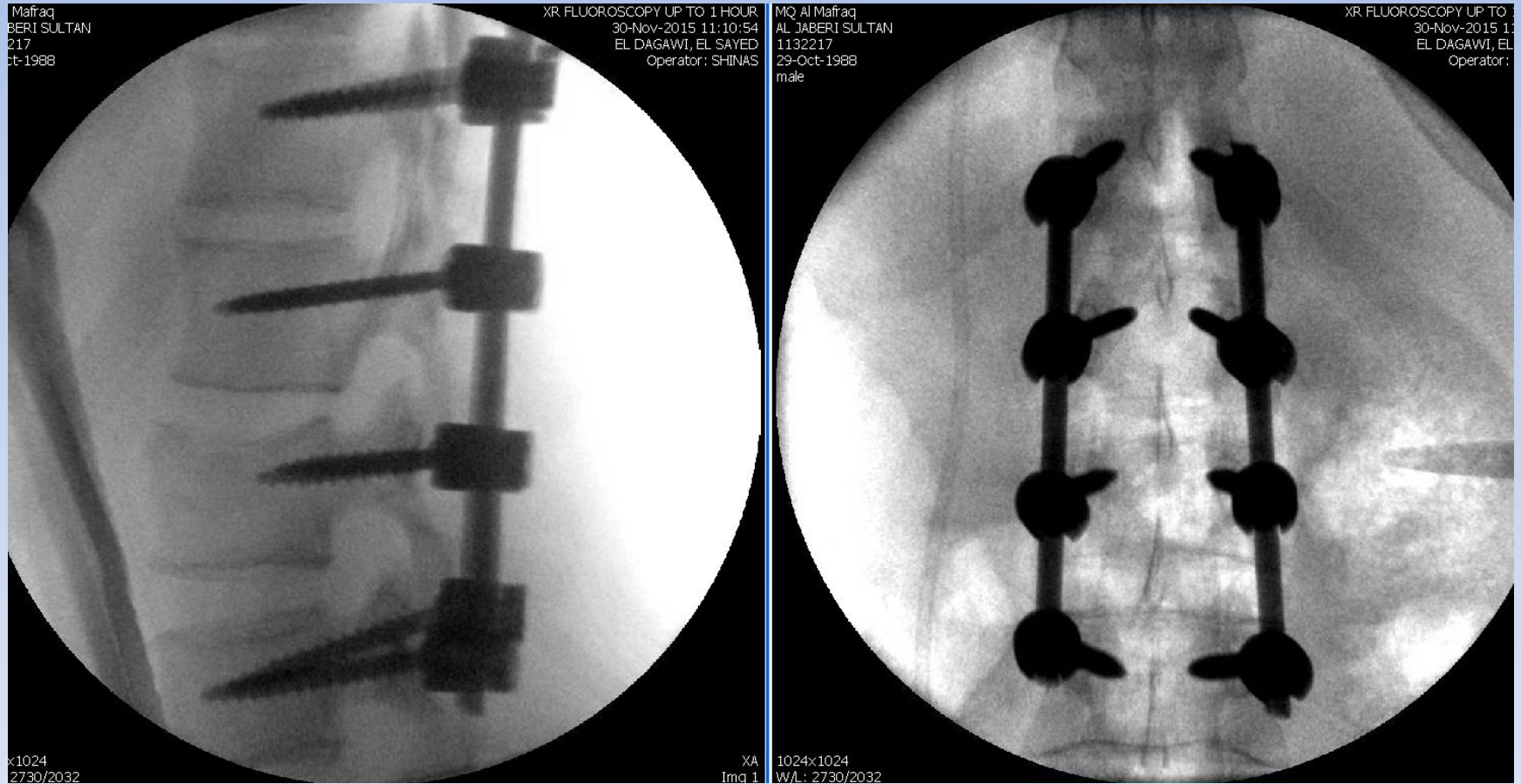
A3



A3



Th XII-L III nyitott fixatio



A3 kezelési eredmény

- 6 nap után otthonában
- önállóan sétál
- vegetatív tünet nincs
- munkába áll 2 hónap múlva

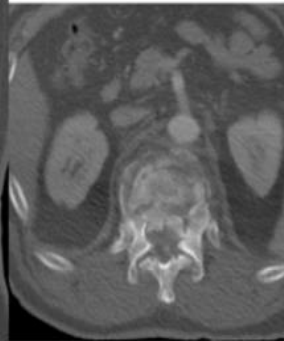
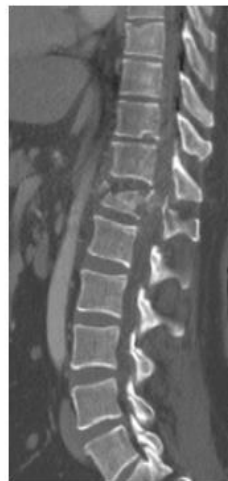
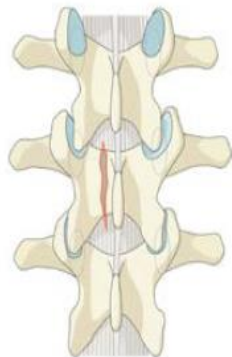
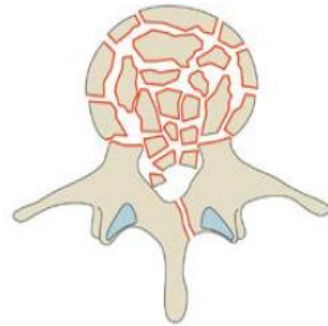
Lehetett volna? :

- Th XII-t muszáj volt?
- L I-II-III elég lett volna, esetleg vertebroplasticával?
- percutan fixatio jobb lett volna?

Type A

A4. Complete burst

Fracture with any involvement of the posterior wall and both endplates. Vertical fracture of the lamina is usually present and does not constitute a tension band failure.



A4 törés

-44 éves férfi, munka közben esett

- felvételekor:

- tiszta tudat
- motoros eltérés nincs
- erős gerincfájdalom

Th XII csigolya A4 törés kyphosisissal



Th XII csigolya A4 törés



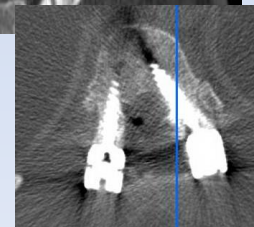
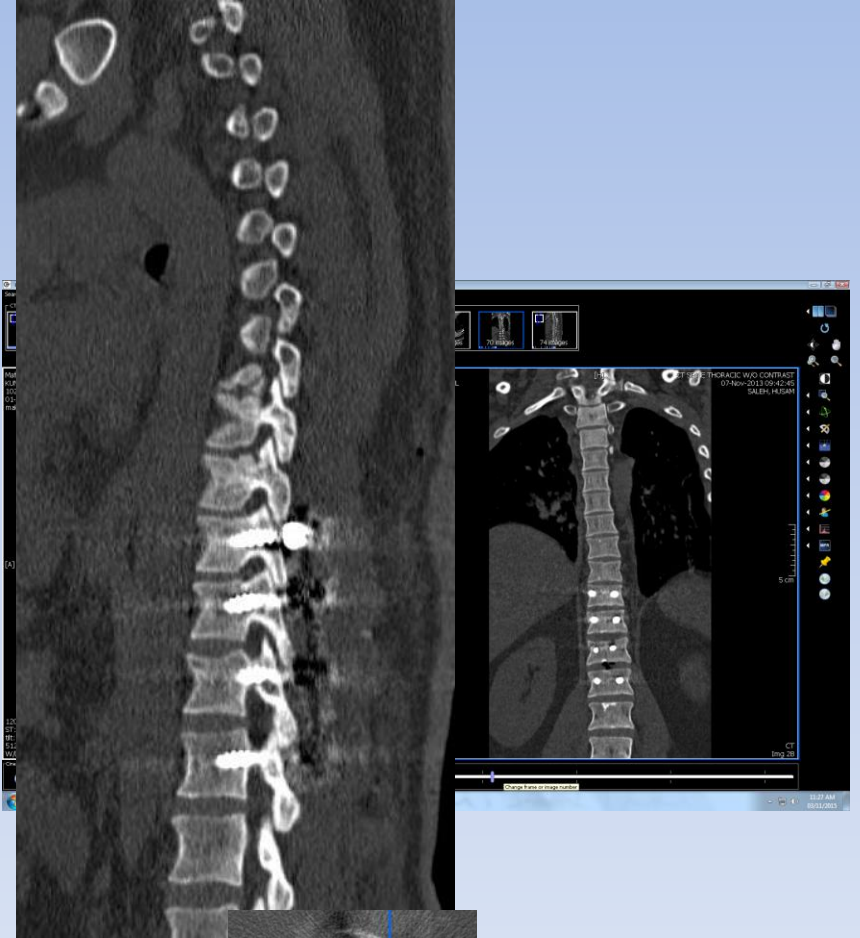
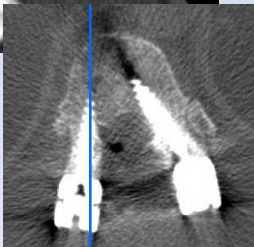
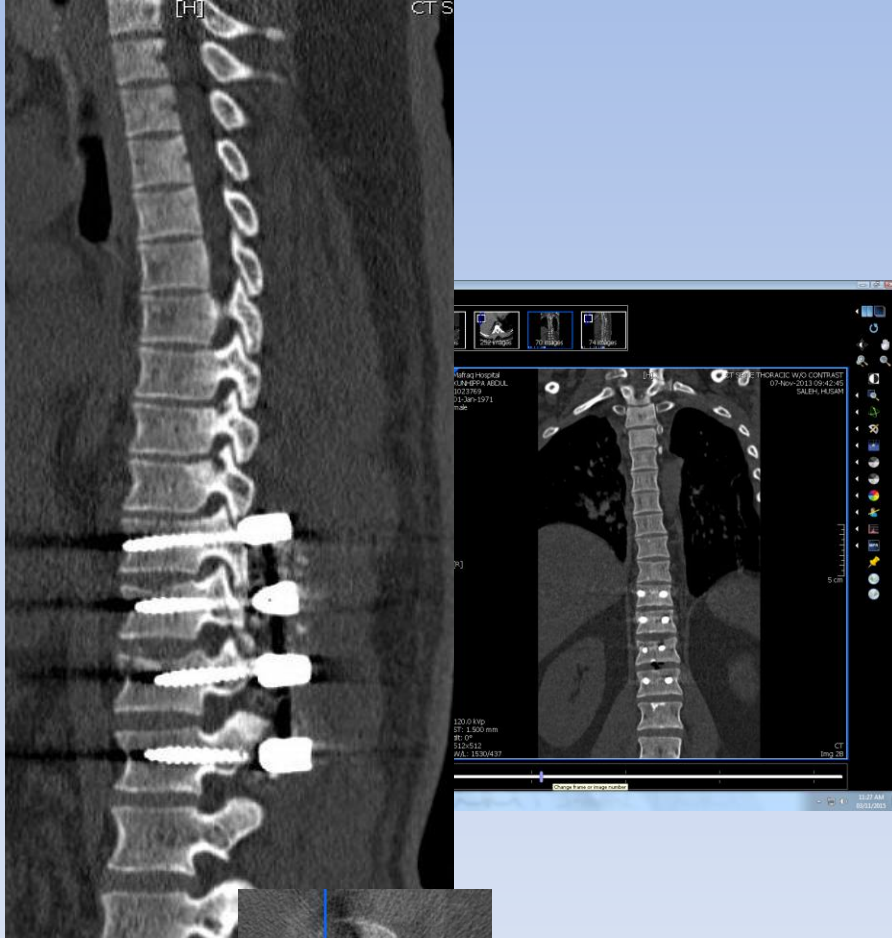
Th XII csigolya A4 törés



A4 - kezelés

- Hátsó fixatio
- Transpedicularis csavarok a törés felett 2 szegmentumba, alatta 1 szegmentumba
- Distractio és a csigolya magasságának helyreállítása - ligamentotaxis
- Autológ csontgraft vagy csont mátrix a mielőbbi csontosodás érdekében

A4



A4 kezelési eredmény

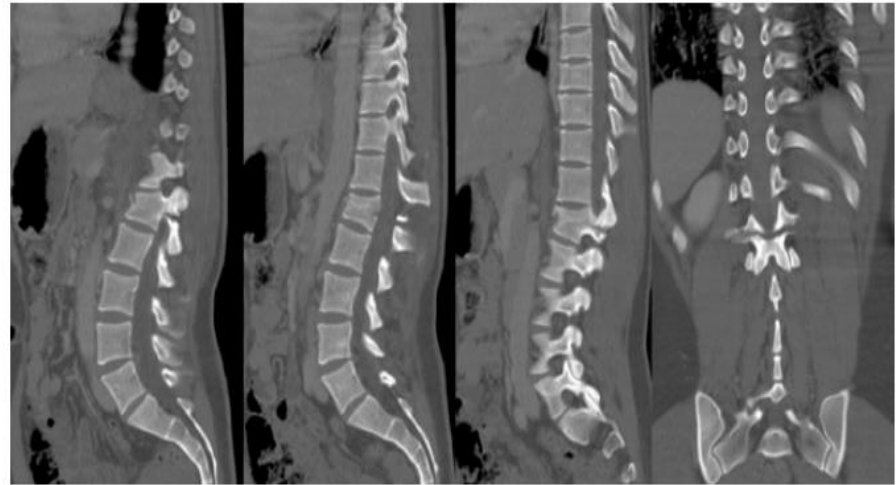
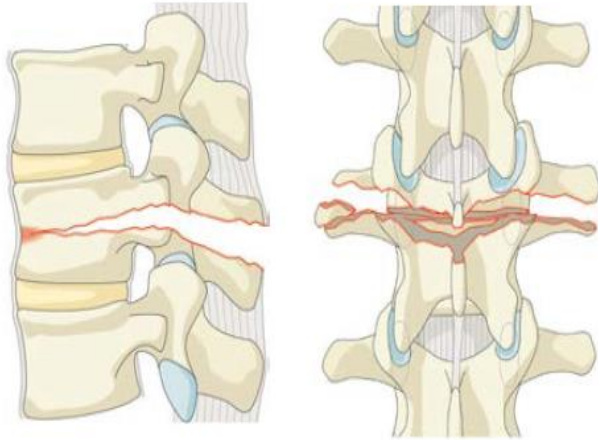
- 6 nap után otthonában
- önállóan sétál
- vegetatív tünet nincs
- munkába áll 2 hónap múlva

Lehetett volna? :

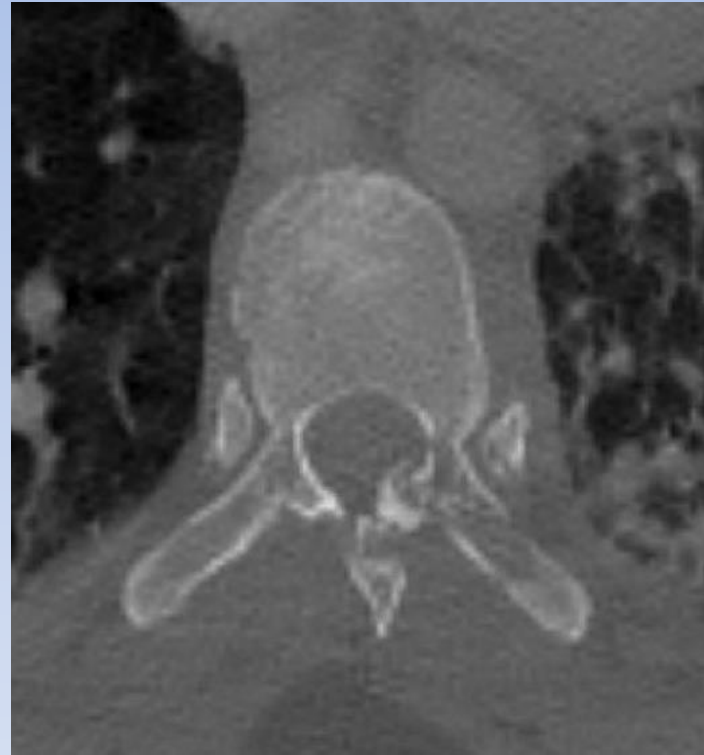
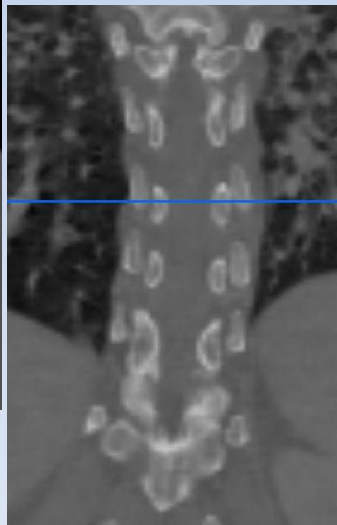
- short szegment fixatio?
- corpectomia?
- percutan fixatio jobb lett volna?

Type B

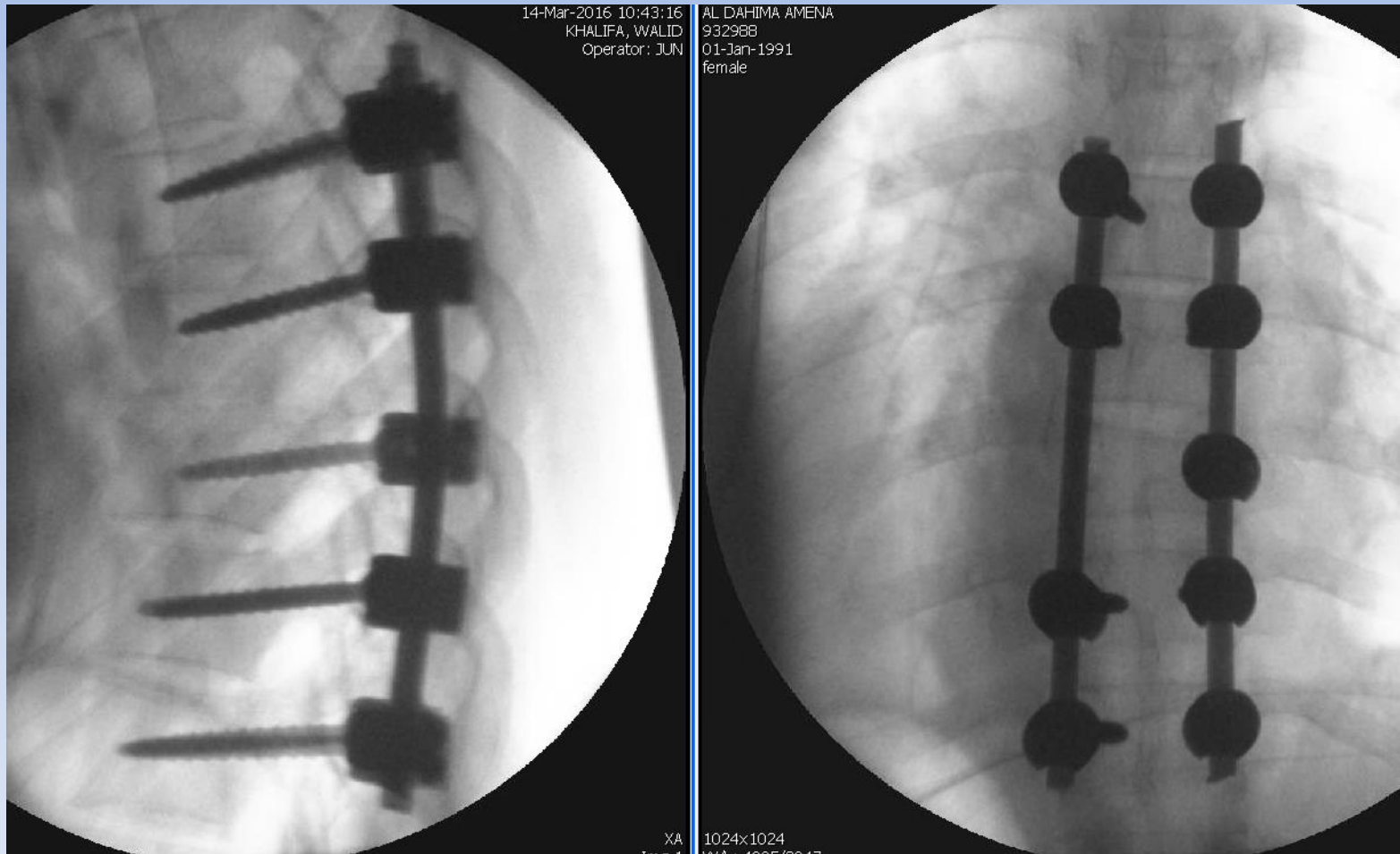
- B1.** Transosseous tension band disruption / Chance fracture
Monosegmental pure osseous failure of the posterior tension band.
The classical Chance fracture.



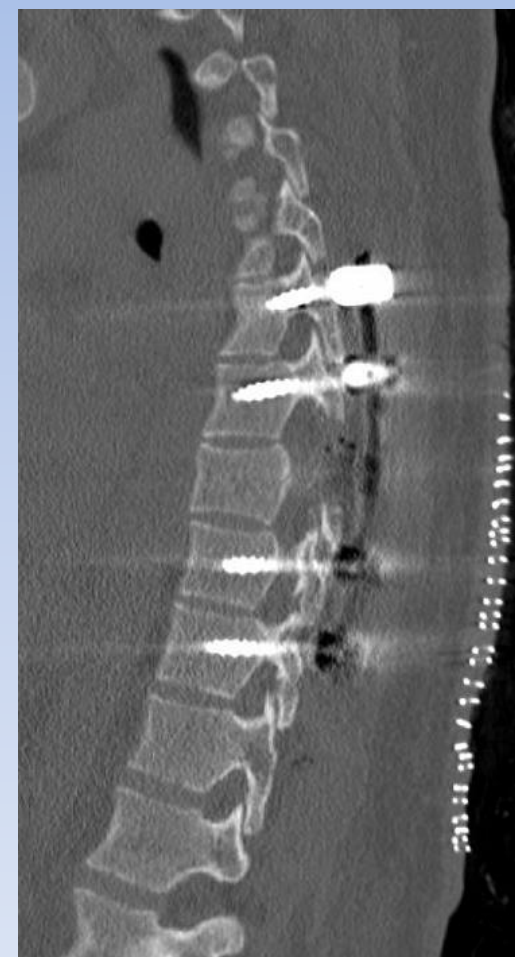
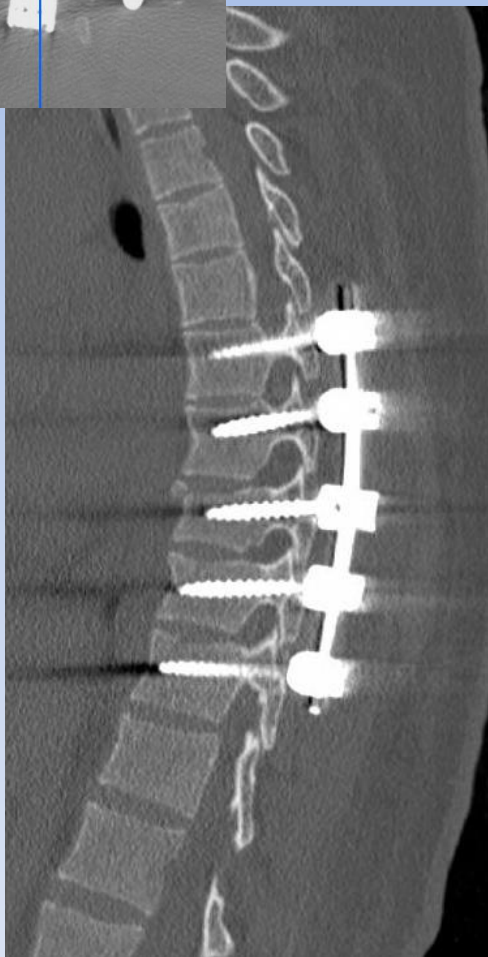
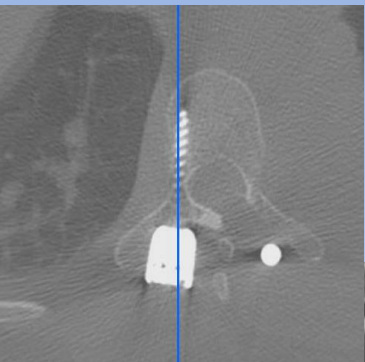
B1-Preop CT



B1 Intraop rtg



B1-Postop CT



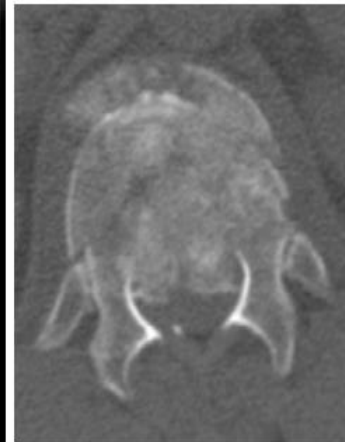
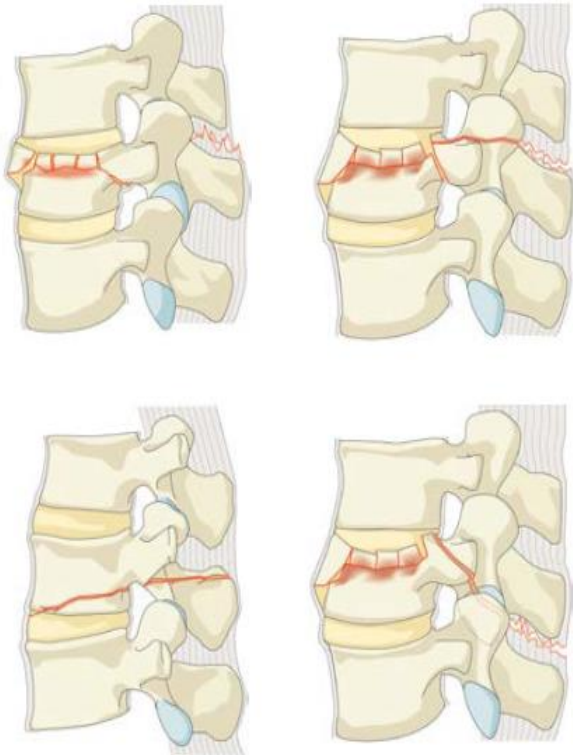
B1-Postop CT



Type B

B2. Posterior tension band disruption

Bony and/or ligamentary failure of the posterior tension band together with a Type A fracture. Type A fracture should be classified separately.

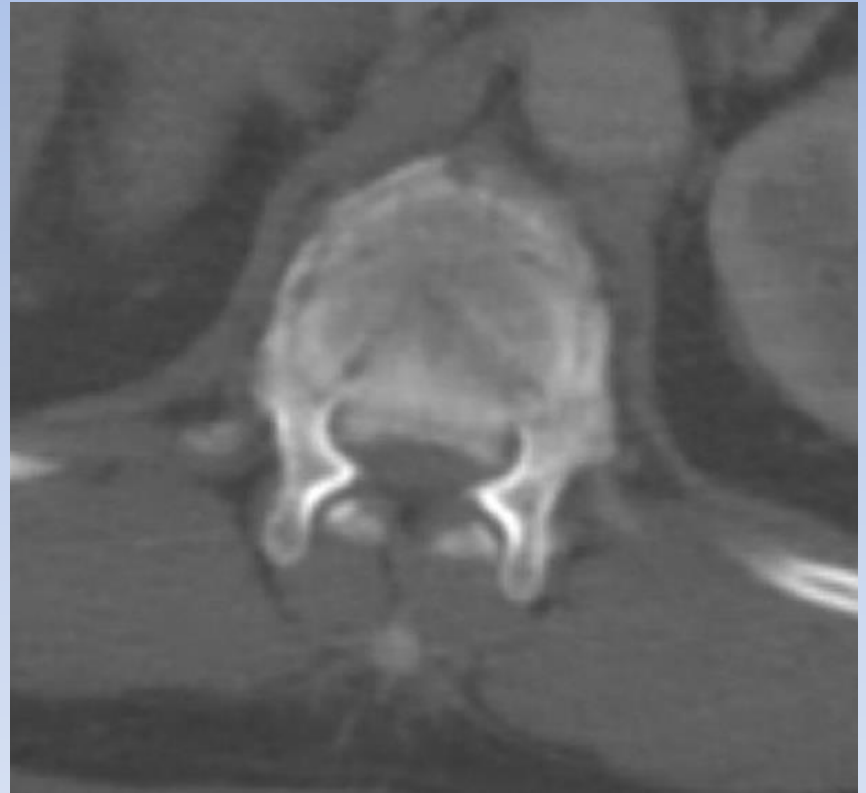


Example: This should be classified as: T12-L1 Type B2 with T12 A4 according to the combination rules.

Th XII – B2 típusú törése

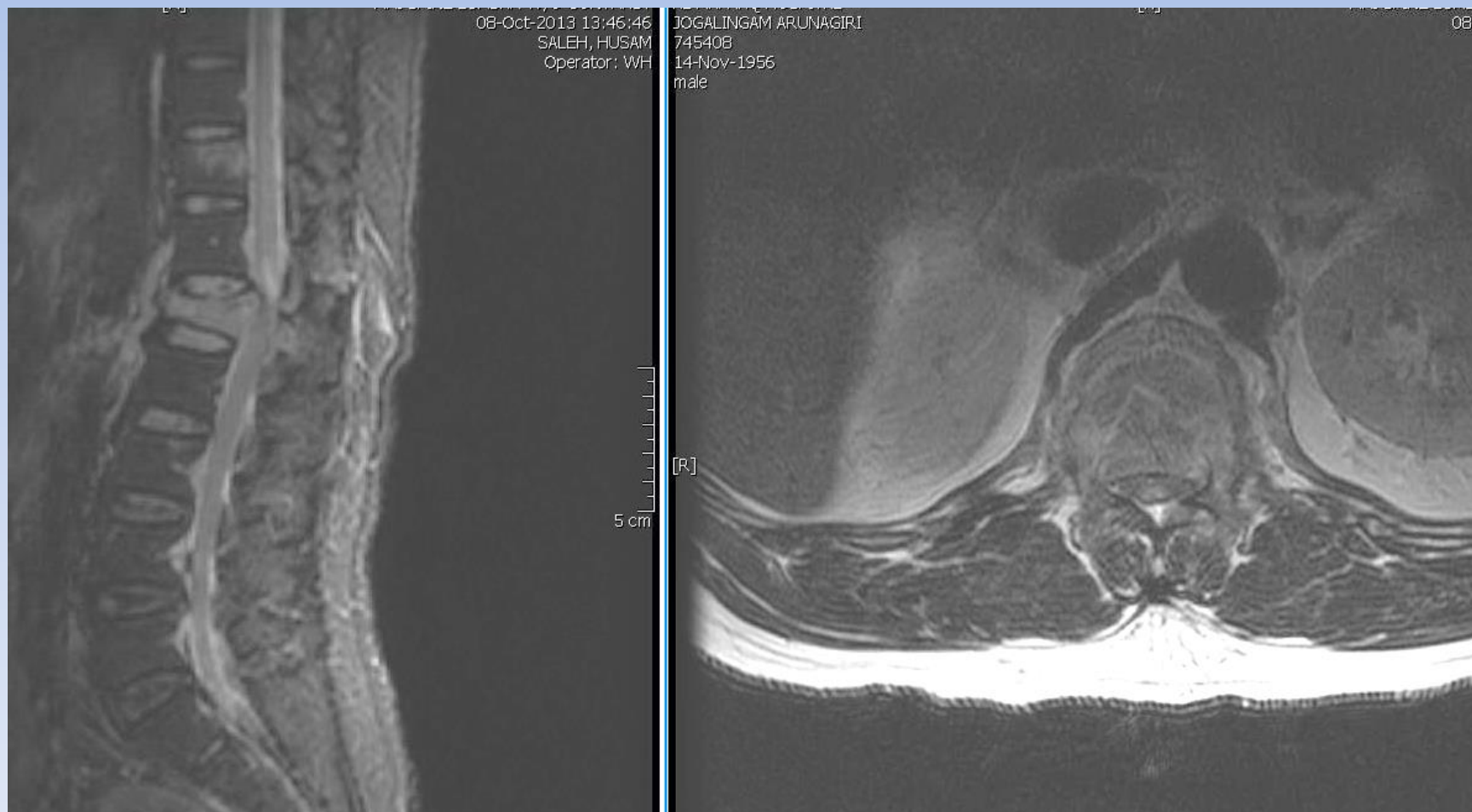


Th XII – B2 – hátramosduló fragmentummal



Th XII B2

MRI STIR sequence hátsó szalgsérülést jelez – nagyon instabil sérülés



B2

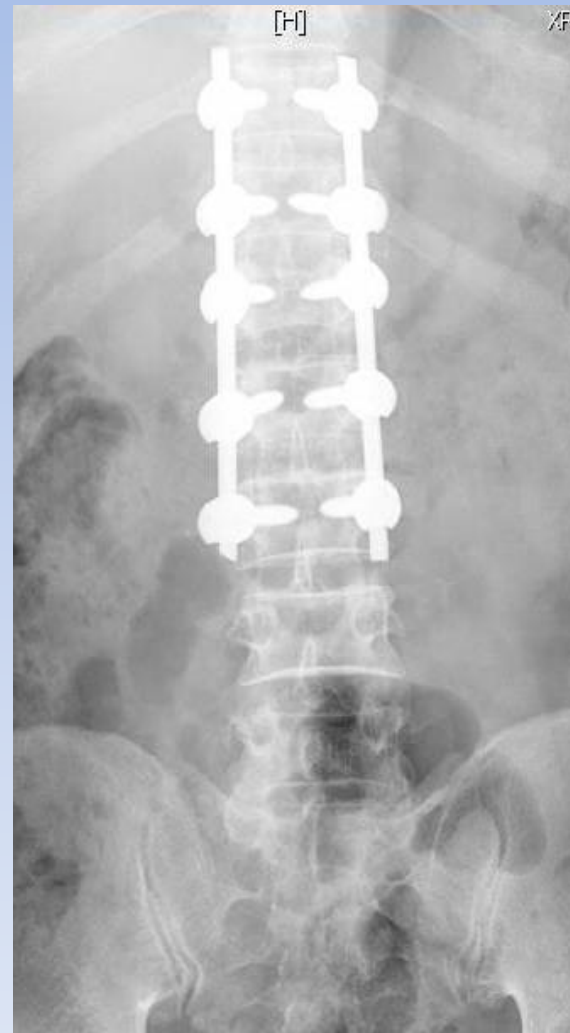
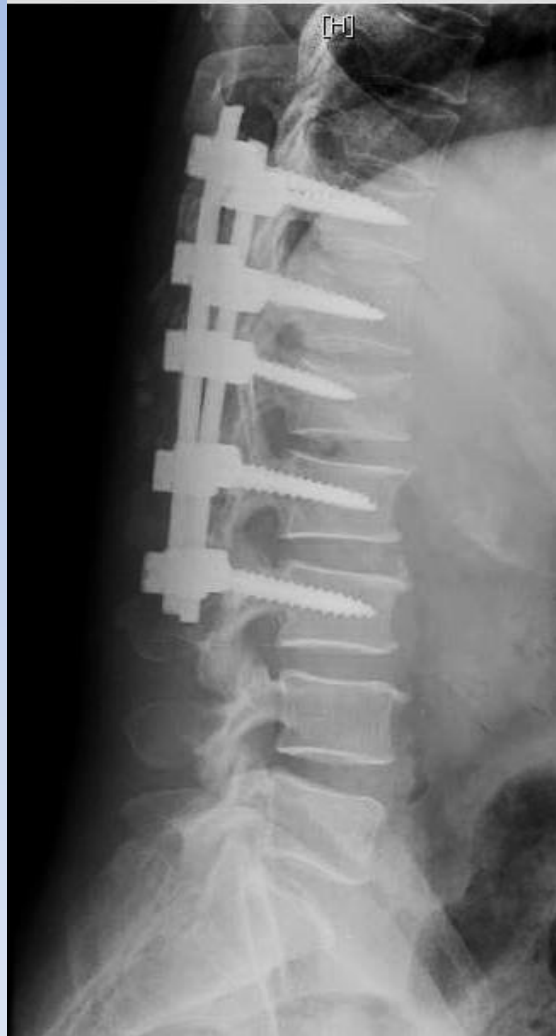


right



left

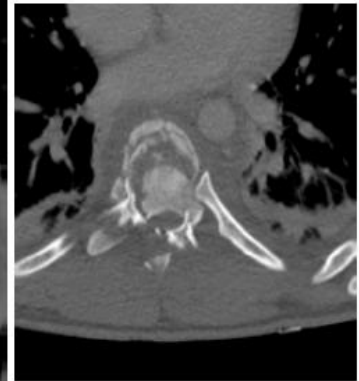
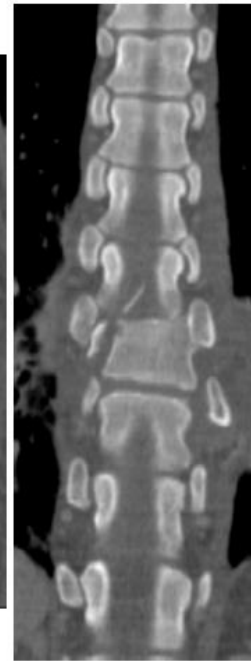
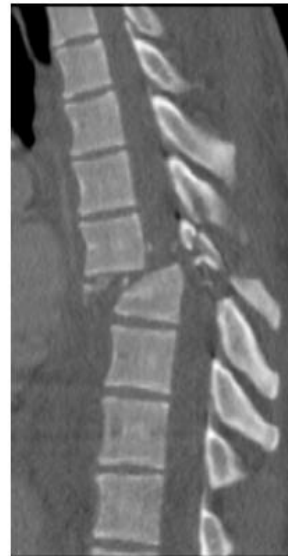
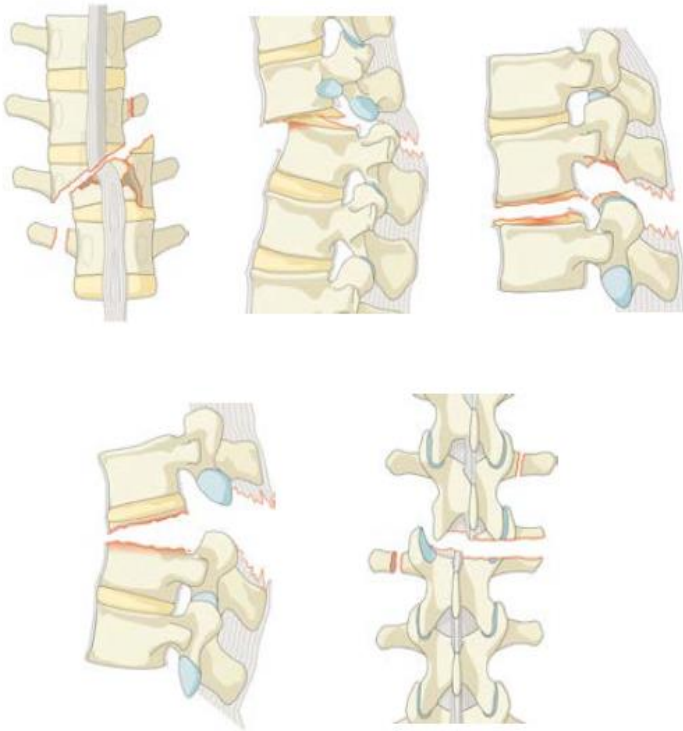
Th XII – B2 – 6 hetes postop rtg



Type C

C. Displacement or dislocation

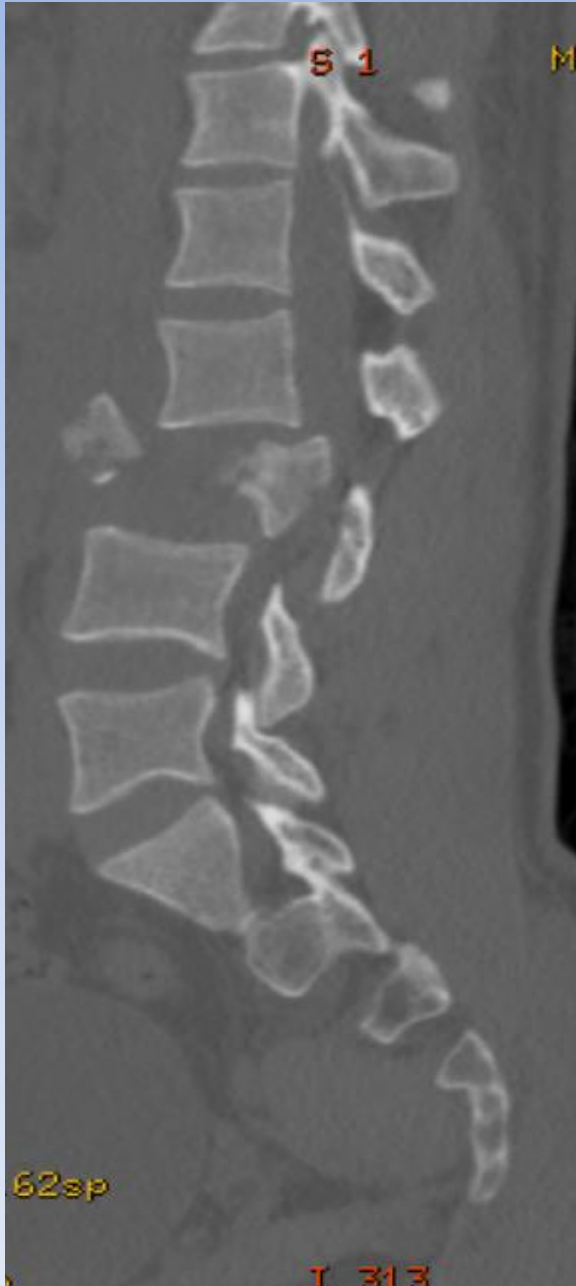
There are no subtypes as because of the dissociation between cranial and caudal segments various configurations are possible in different images. Is combined with subtypes of A if necessary.



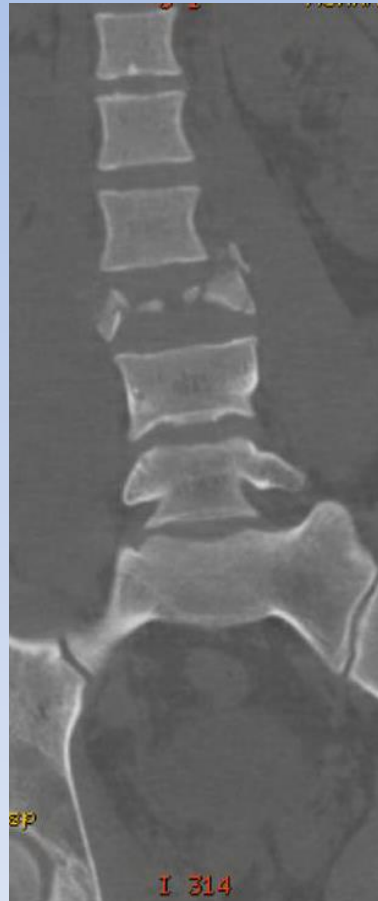
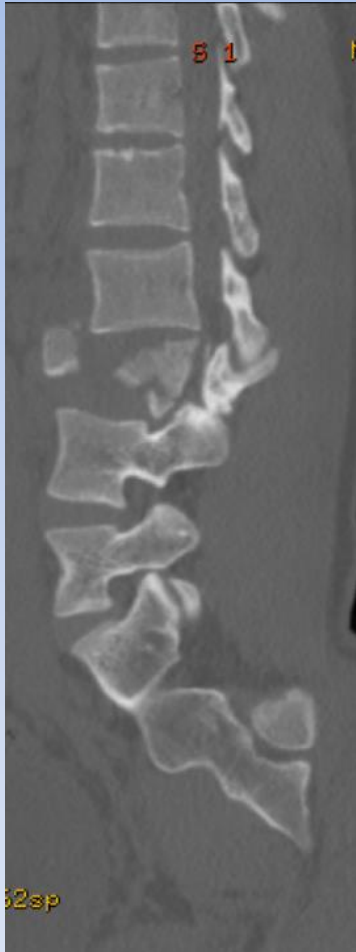
C típusú törés - eset

- 20 éves férfi
- magasból esett
- törés L III ,AO Type C, N3
(inkomplett cauda szindróma)

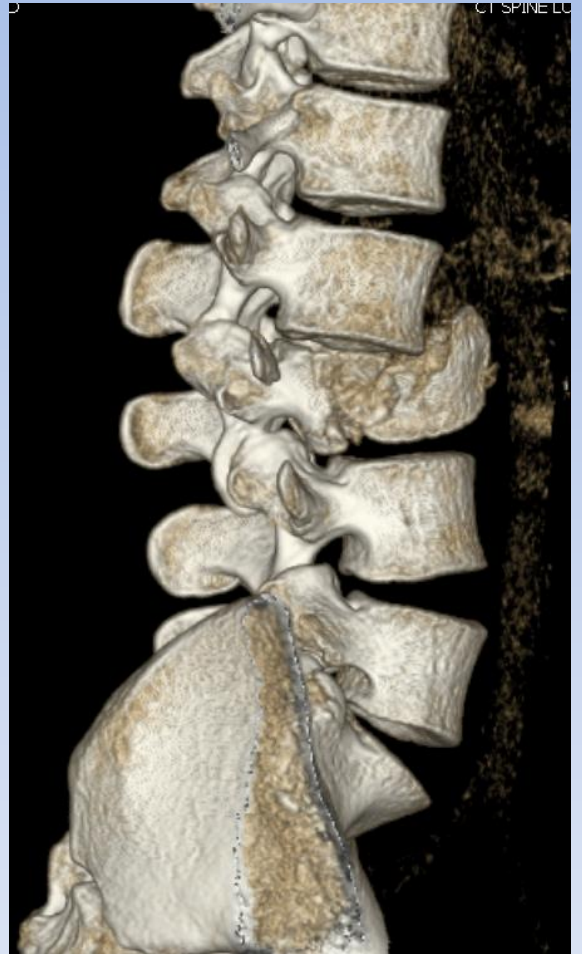
Preop CT



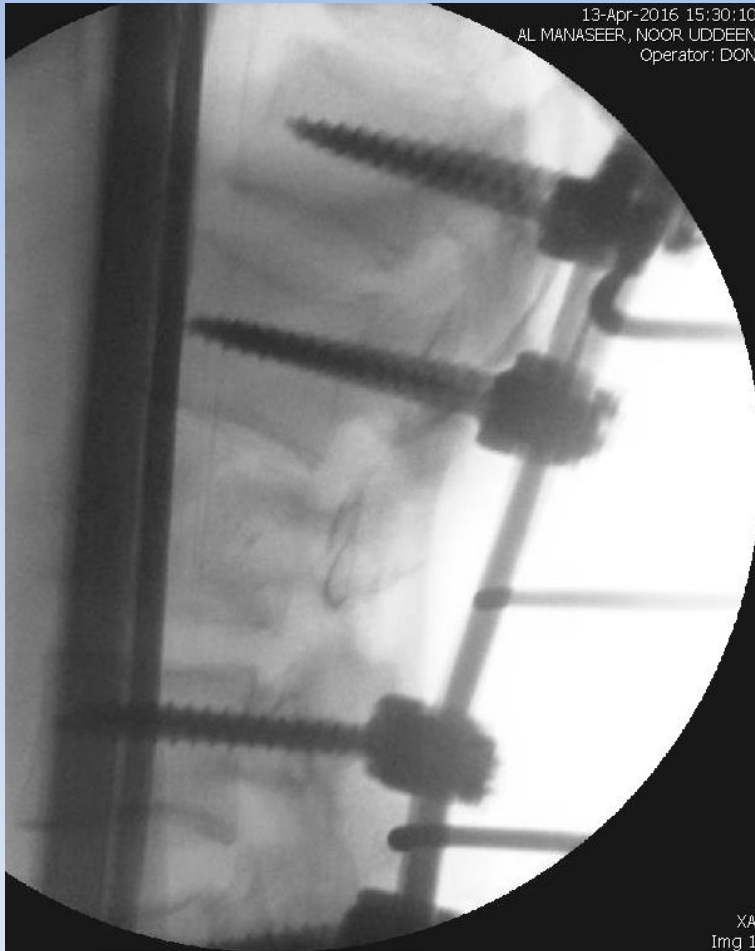
L III törés, C típus, cauda syndroma



L III törés, C típus, cauda syndroma



Intraop rtg



13-Apr-2016 15:30:10
AL MANASEER, NOOR UDDEEN
Operator: DON



MUHAMMAD MUHAMMAD
1148685
05-Feb-1996
male

13-Apr-2016 15:30:10
AL MANASEER, NOOR UDDEEN
Operator: DON

XA
Img 1
1024x1024
W/L: 4095/2047

Ir

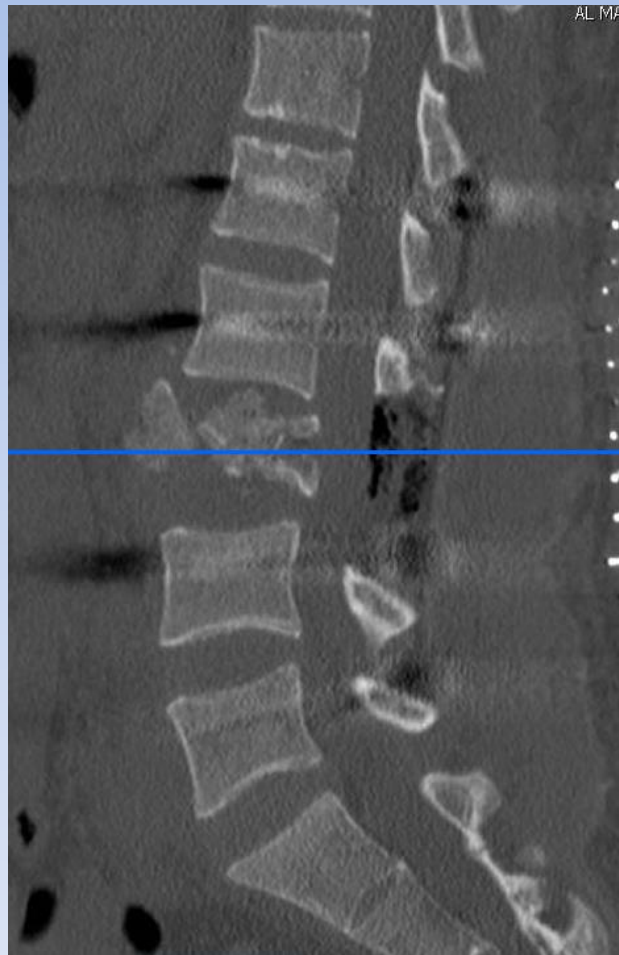
Posterior fixation L1-V Postop CT



Right

Left

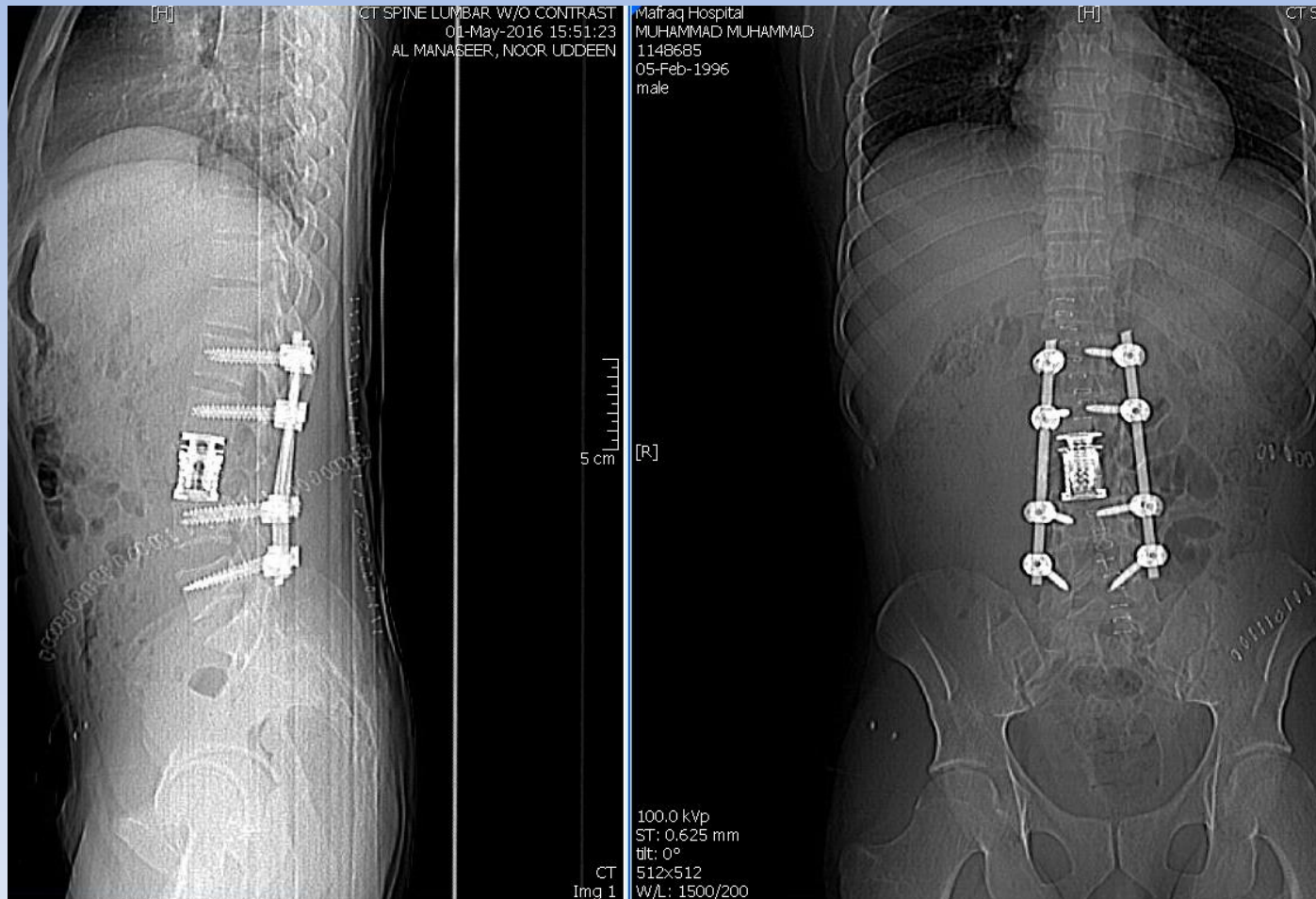
Posterior fixation L I-V Postop CT



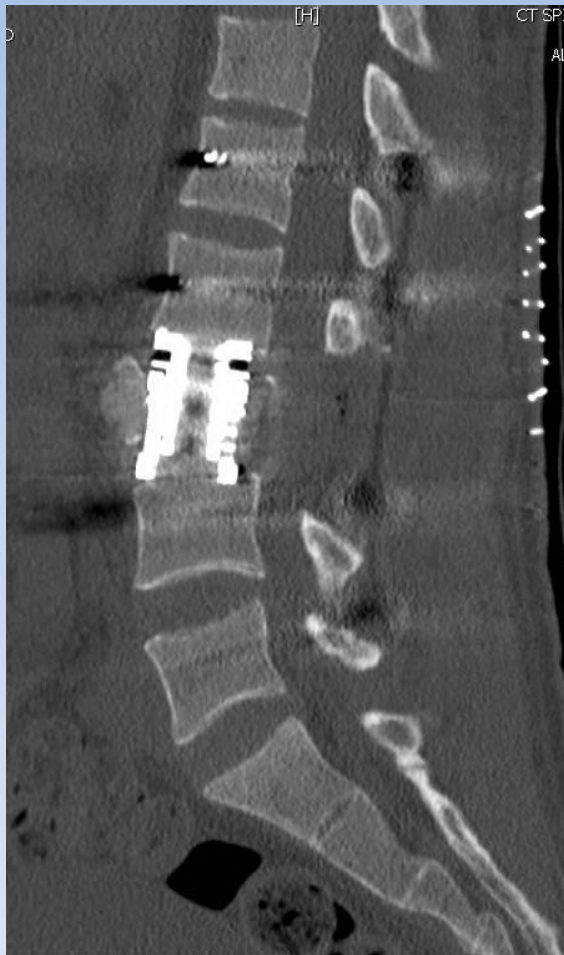
Post-op rtg L I-V fixation



10 nappal később antero-lateral corpectomia, cage impl.



10 nappal később antero-lateral corpectomia, cage impl.



10 nappal később antero-lateral corpectomia, cage impl.



C típusú törés - eredmény

4 héttel később:

- beteg sétál
- nincs neurológiai eltérés
- Alternatívák?
- egy lépésben 360 fokos rögzítés hátulról?

Mely esetekben jobb a MIS (percutan csavarozás)?



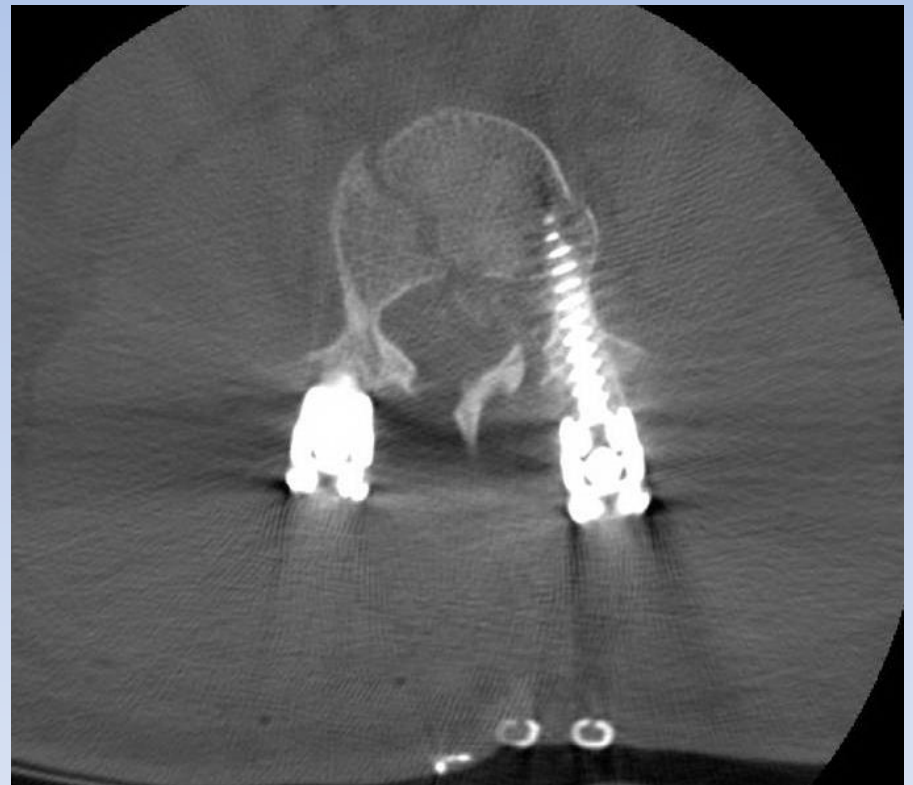
L II et IV törés, fiatalember



L II et V törés, Th XI – L V MIS fixatio



L II et V törés, Th XI – L V MIS fixatio



Percutan fixatio

- modern gerincsebészetben elengedhetetlen
- mind a degeneratív, mind a traumás esetekben
- a Th-L törések fixálásának 90%-a így történik
klinikánkon
 - Miért?
 - Rövidebb műtéti idő
 - Kevesebb vérzés
 - Kevesebb szövődmény
 - Izomleválasztás nincs
 - Posztoperatív fájdalom kisebb
 - Munkához visszatérés hamarabb

MRI

Az AO klasszifikáció alapján nem minden esetben kötelező.

De!

Az összes töréstípusnál javasoljuk!

Miért?

- szalagsérülések kizárása
- gerinccsatorna hematoma kizárása
- neurogén compressio kizárása
- kompressziós törésnél a régi törések kizárása
- jogi védelem!

Take home message

- AO klasszifikáció használata
 - a nem egyértelmű esetekben segít
 - jogi védelmet ad
- Percutan technika használata
- MRI minden törésnél