

# Spinal cord compression in spine tumours and injuries

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# Spine involvement in tumours

## *Pain is caused predominantly by*

- growing of tumour tissue
- nerve structures compression
- neural symptoms

## *Spine instability*

- in extensive involvement of one or more vertebrae
- small force results in pathological fracture and neural deficit

## *Neural deficit*

- growing of tumour and neural compression
- worsening of blood supply of spinal cord
- pathological fracture with neural compression
- combination of these mechanisms

# Goals of surgeries

- prevention / improvement of neural deficit
- pain relief
- restoring spine stability
- improving quality of life

# Indications

- present / imminent vertebral collapse
- present / imminent neural deficit
- to 24 hours after plegia onset (severe paresis)
- life expectancy – 3 months minimum

# Diagnosics

- X-rays of C, Th, L spine – AP and lateral
- CT of affected part,
- MRI (optimum MRI of the whole spine, CT of brain, lung, abdomen)
- neurological,
- internal exam. (laboratory, lung X-ray, ultrasonography of abdomen)

# Tomita scoring system (Spine, 2001)

Spine metastases:

Necessary: bone scane - Tc

MRI of the whole spine

CT of brain, thorax and abdomen

## Grading of metastasis (according to origo):

1. low (mamma, prostata, thyroid gland) 1 point
2. middle (kidney, uterus) 2 points
3. high (pulmo, intestinum, stomach, liver, unknown) 4 points

## Organ metastases:

- |                |         |
|----------------|---------|
| 1. none        | 0 point |
| 2. Resectable  | 2 body  |
| 3. untreatable | 4 body  |

## Bone metastases:

- |             |          |
|-------------|----------|
| 1. Solitary | 1 point  |
| 2. Multiple | 2 points |

## According to the score value we indicate the extent of surgery:

- |      |                                     |
|------|-------------------------------------|
| 2-3  | wide – marginal resection (en bloc) |
| 4-5  | marginal – intralesional resection  |
| 6-7  | paliative surgery                   |
| 8-10 | conservative – no surgery           |



# Treatment

Extent of surgery depends on

- tumour localisation and extent
- patient's age and condition

## **Quick progression of neural deficit**

- quick decompression w / wo stabilization

# Examination

- X-rays of the whole spine
- CT – MRI
- Internal, neurological examination

# Unknown tumour aetiology

- Bone scan - Tc
- MRI of the whole spine
- CT of brain, thorax, abdomen

# Surgery types

- Wide / marginal resection
- Marginal / intralesional resection
- Palliative surgery

# Surgery

- Anterior – posterior
- Combined  
(1 stage – 2 stages)

## Occiput – C2

- decompression – anterior / posterior
- posterior fusion and instrumentation





# C 3-7

- Bone cement with K - wires
- autograft
- spacer

Š.F.

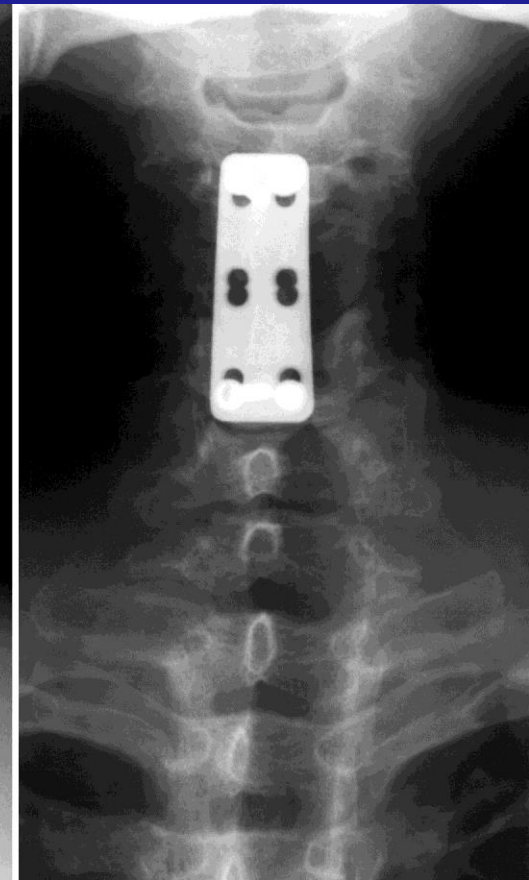


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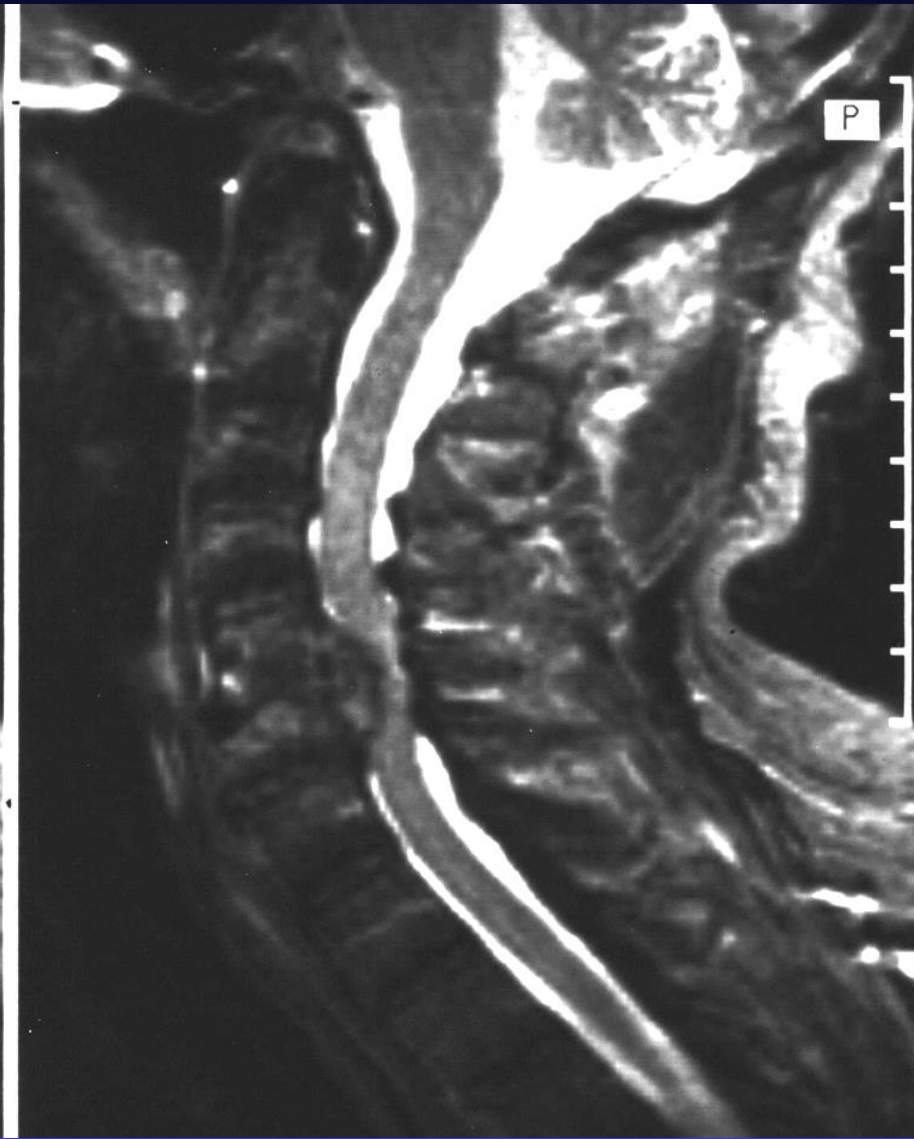
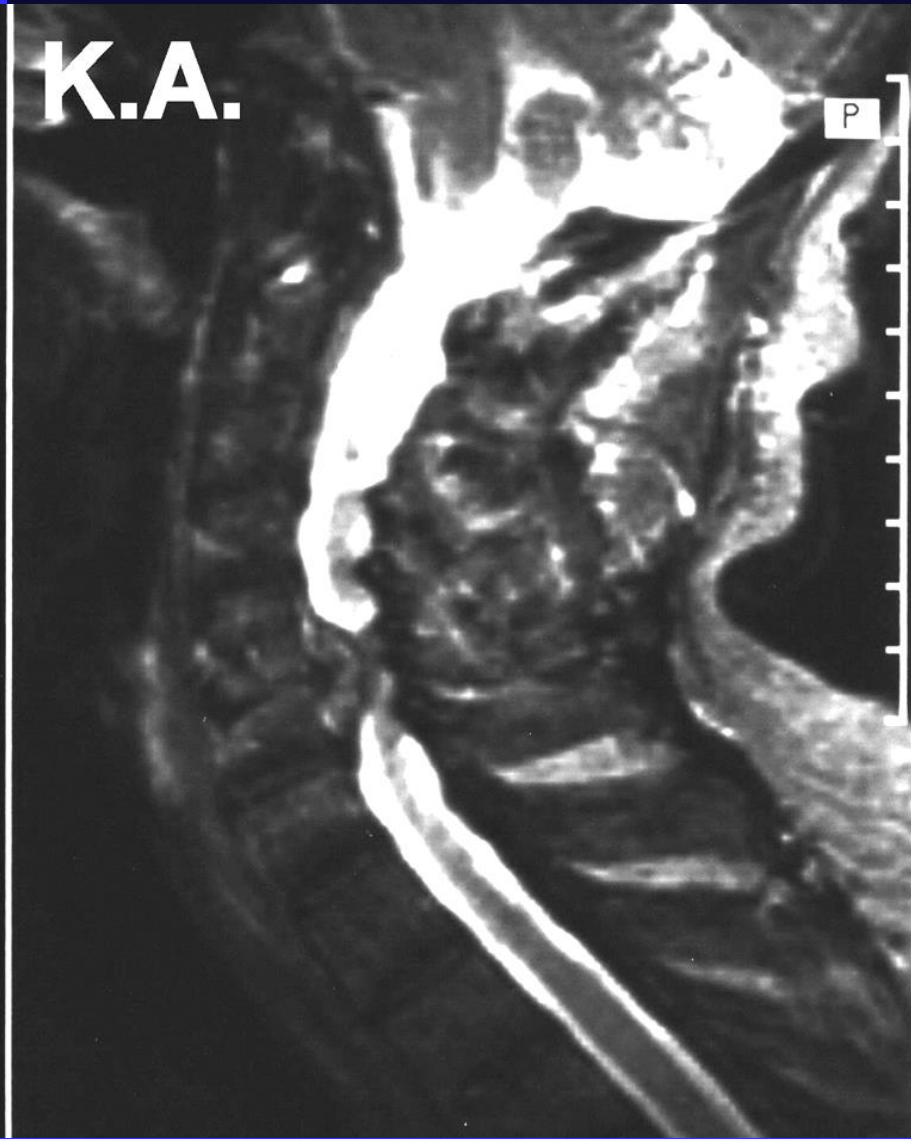
# Pelvic autograft and Caspar plate



Š.F.



**K.A.**





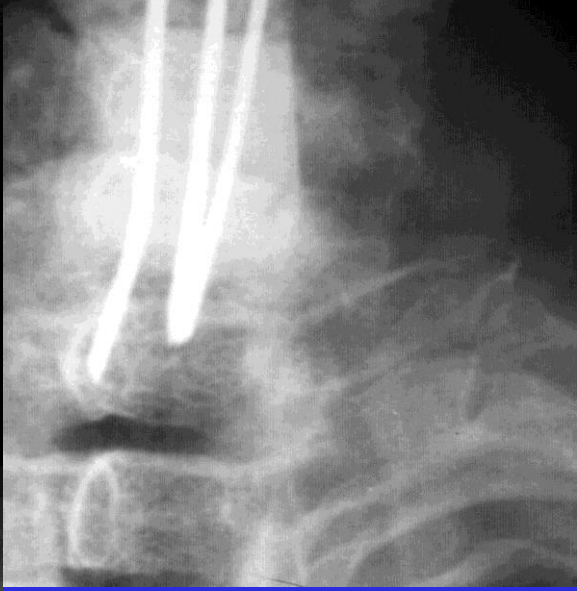
**K.A.  
80+10**



**K.A.  
83+5  
op 3+7**



**K.A.  
83+5  
op 3+7**



**Bone cement  
with K-wires**

# T and L spine

## Posterior surgery

- decompression +
- instrumentation +
- fusion

# Th and L spine

## Anterior surgery

- decompression
- vertebral body replacement
  - bone cement + K-wires
  - bone graft
  - spacer

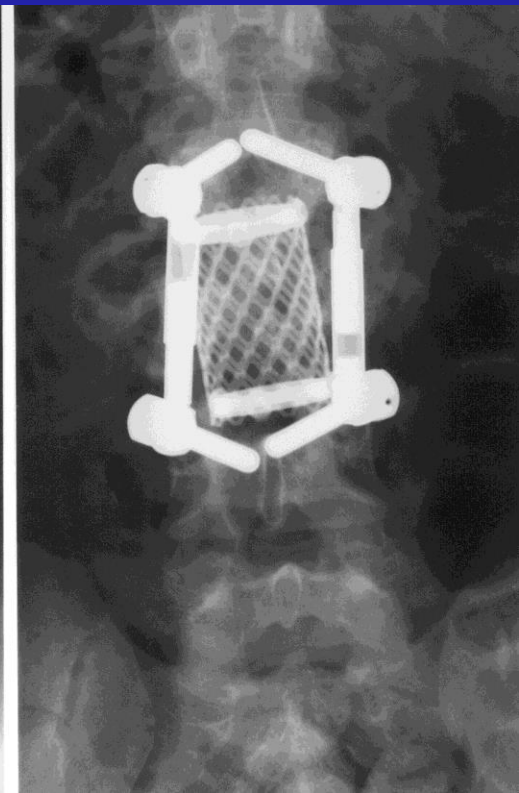
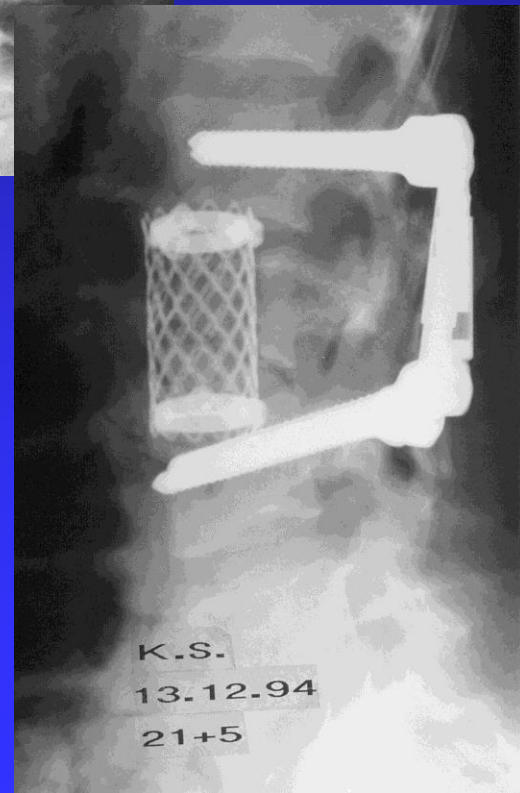
# Combined surgeries

Anterior – vertebral body replacement

Posterior - fusion and instrumentation



# Harms cage and transpedicular fixator





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DROZDOV JAROSLAV 140kV 315mAs  
540808/0095 SC 240mm  
00171-5 SW 2mm  
BP 203.0mm ST 2.1s  
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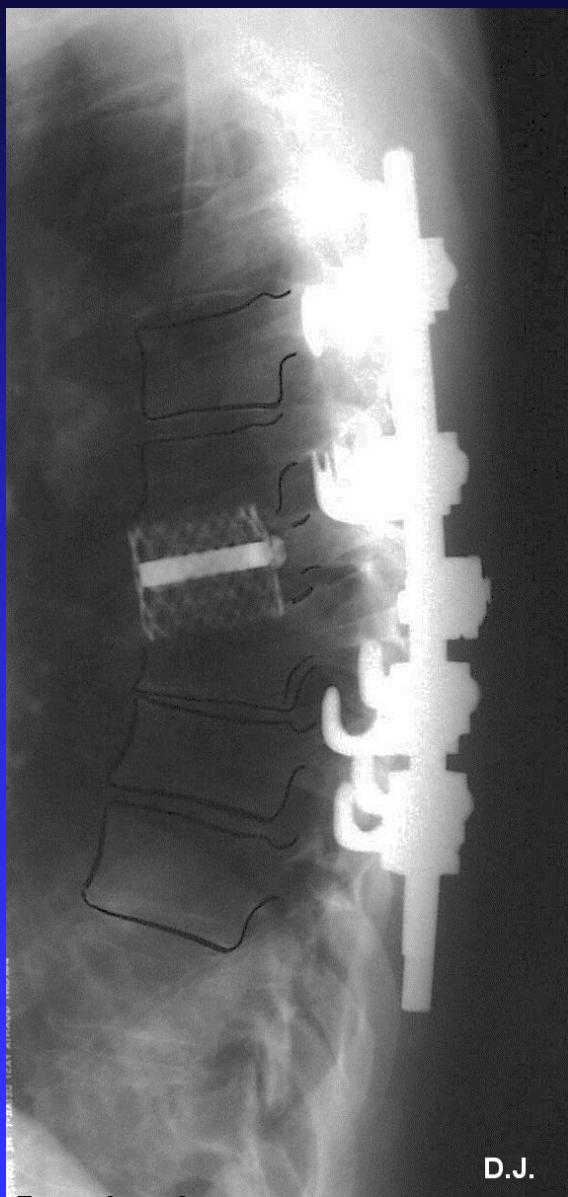
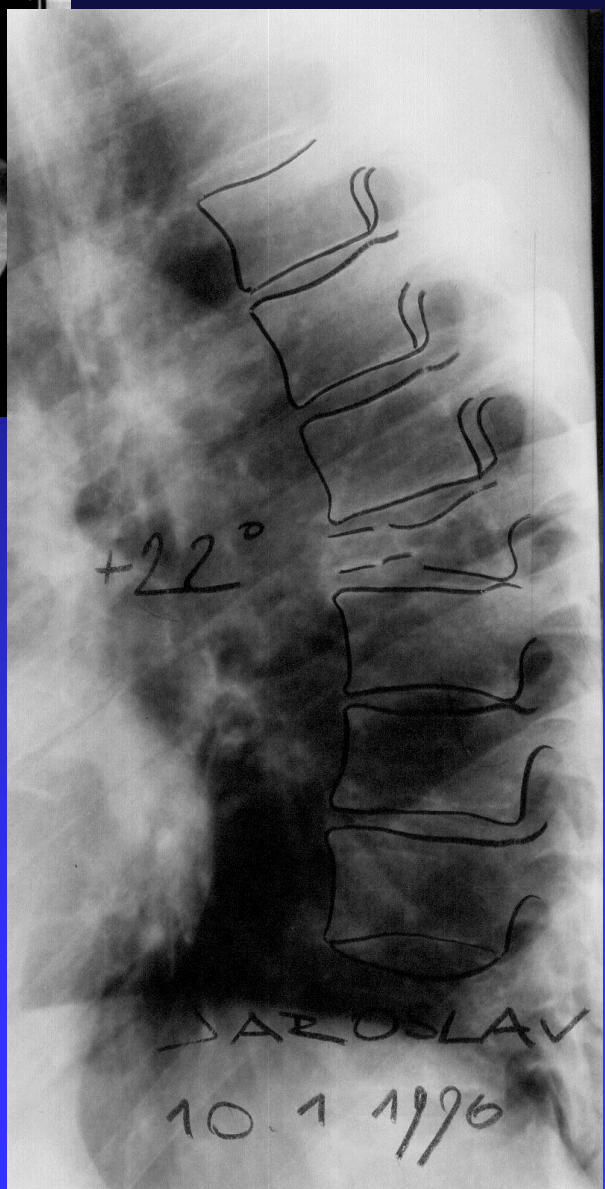
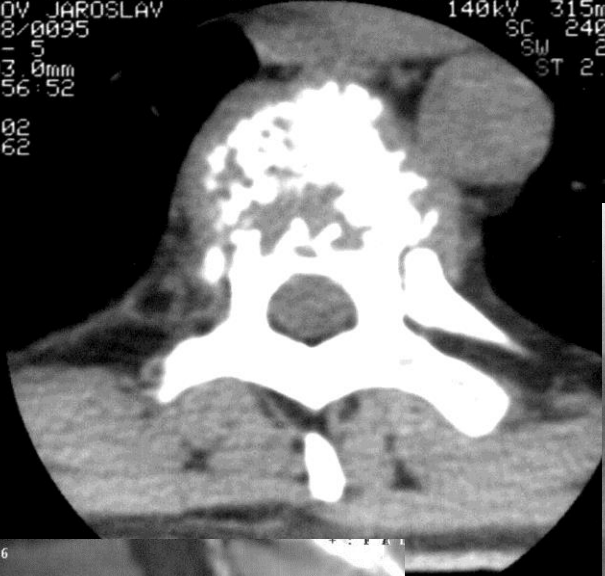
C1 102  
W1 462

ZOOM  
2.13

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23-JAN-1996  
IMAGE 80  
STUDY 8  
RF 1.77

Droz.J.

SP -16  
SL 4.4  
23-JAN-1996



D.J.

# Unclear cases

## Biopsy

- thoracoscopic
- lumboscopic
- transpedicular

# Surgery in Czech Republic

- spine surgery departments
- specialized orthopaedic, neurosurgery,  
traumatology departments

-

# Orthotics

Orthoses – soft collars, Philadelphia collar, three-point body orthoses – Jewett orthosis, belts.



## 1984 – 2005

operated patients:	727
metastases	386
benign	98
malign	175
tumour-like affections	68

## **The most frequent metastases:**

mammar cancer 75

Grawitz. tumour 54

## **Malignant tumours:**

myeloma 72

chordoma 17

chondrosarcoma 12

# Surgeries

anterior	168
posterior	350
combined – 1 team	164
- 2 teams	45

## Frankel scale (now ASIA scale):

A plegia, anesthesia

B plegia, some sensory function

C useful motor function

D useful motor (gait)

E normal



# Complications

During surgery – heart failure,  
extensive blood loss

Chylothorax

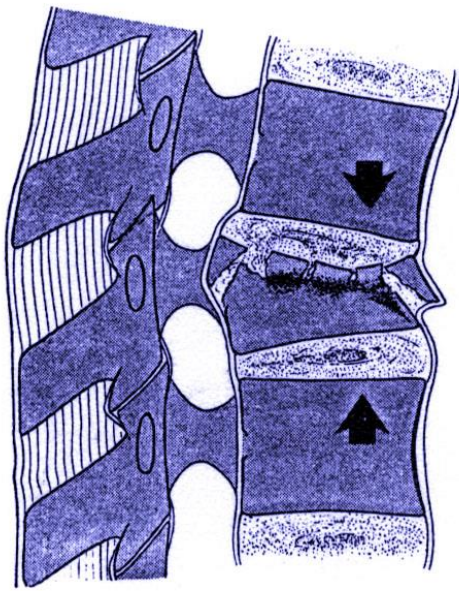
Infection

Exitus

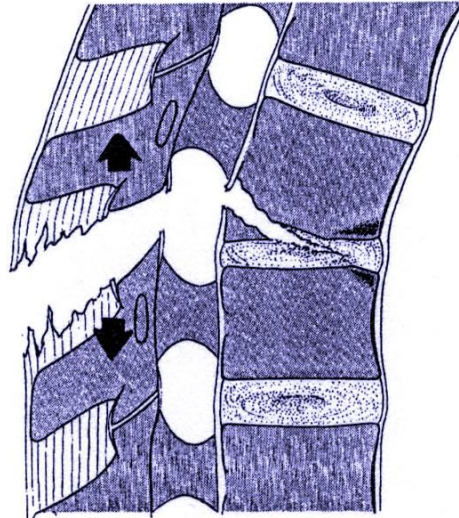
# Conclusion

Quick progression of paresis  
Surgery to 24 hours after plegia onset

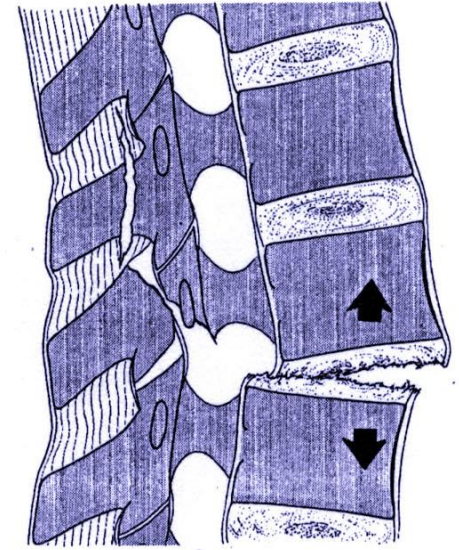
# SPINE INJURIES



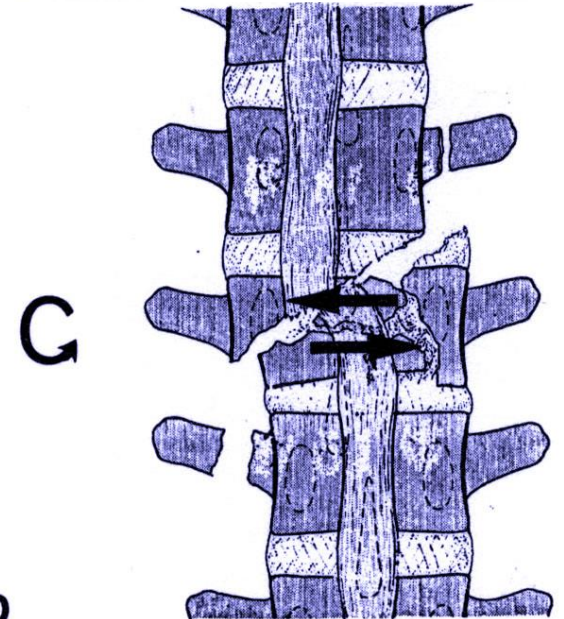
A



B



C



D

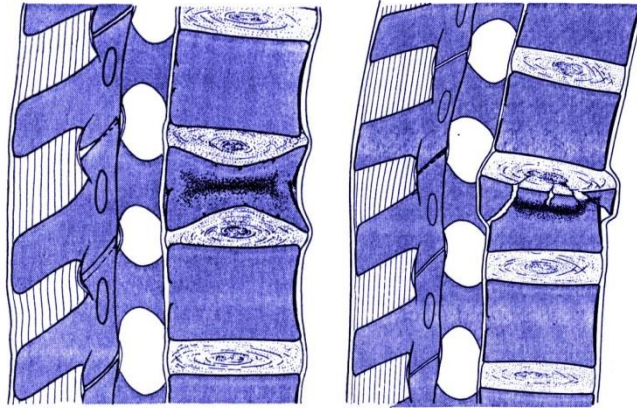
## AO classification of T+L injuries

- A anterior column injury (wedge, split, burst)
- B both columns – flexion distraction
- C both columns with rotation

# Neural deficit in Th + L spine

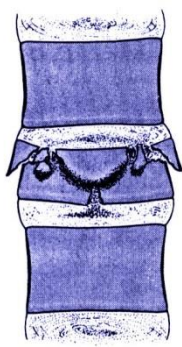
- A type – mainly burst fractures
- B type - seldom
- C type – majority of patients

**A1.3**

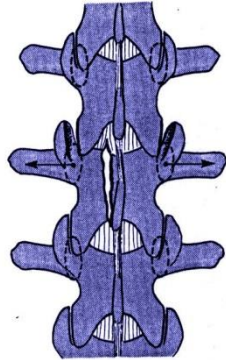


**A3.1.1**

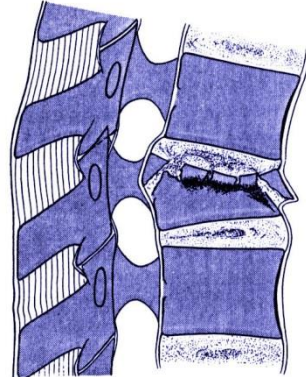
**A3.2.1**



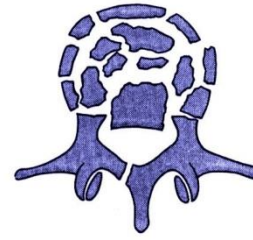
**A**



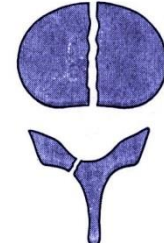
**B**



**C**

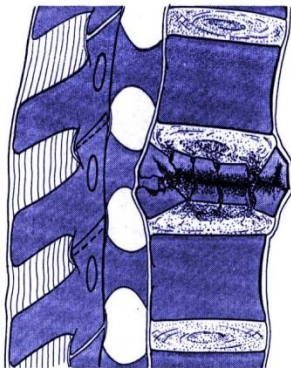


**D**

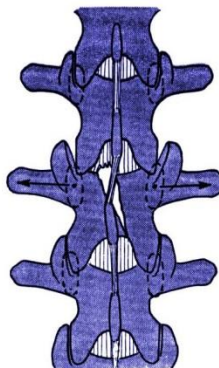


**E**

**A3.3.3**



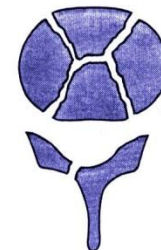
**A**



**B**



**C**



**D**

A3 burst

# Injuries with neural deficit

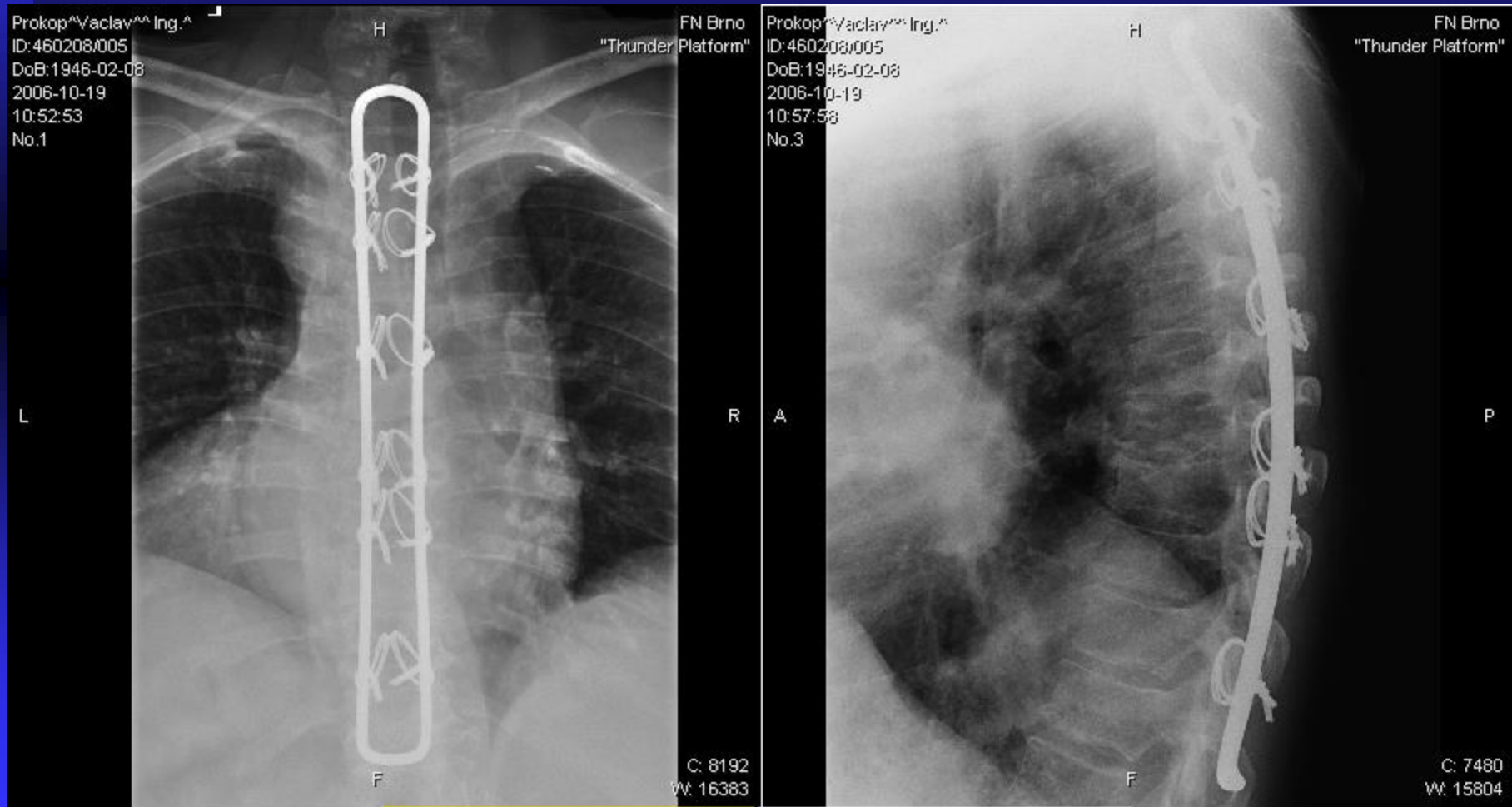
- Transport to spine surgery department
- X-rays, CT, (MRI), int., neurol.
- Surgery to 6 hours after injury in case of severe neural deficit

# Surgery types

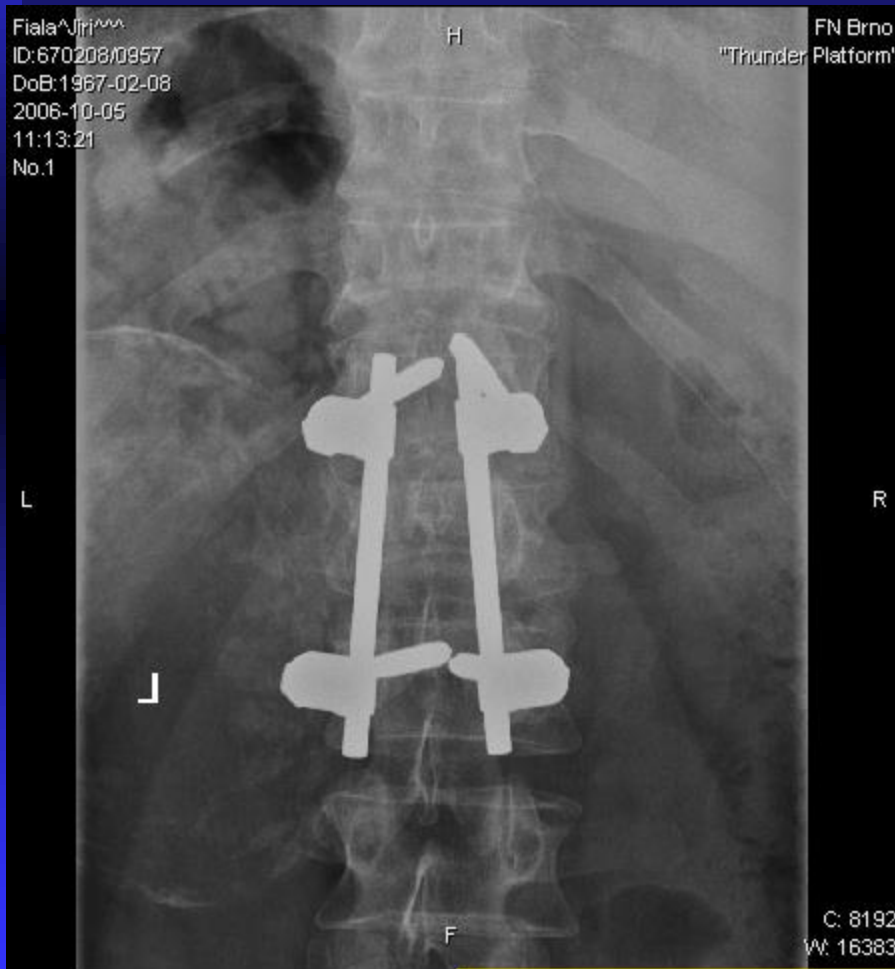
- Posterior – decompression, fusion, instrumentation
- Anterior – decompression, fusion, instrumentation – spacers, grafts
- Combined – posterior and anterior, anterior – vertebral body replacement in anterior column comminution - destruction



# Multiple Th fractures – post surg, Hartshill – sublaminar – seldom



# Posterior TL surgery – transpedicular fixation, fusion and decompression - majority



# C 3-7 INJURIES

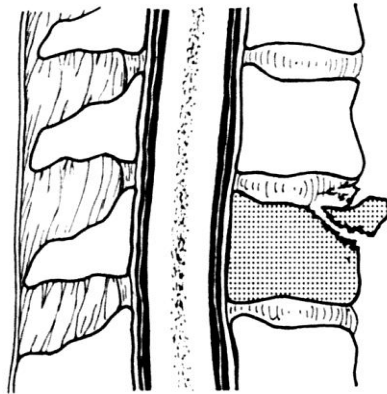
AO classification

- A. **Injury of** anterior **column**
- B. posterior
- C. both **columns**

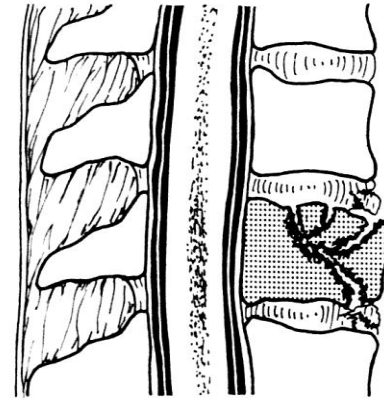
1. Bone **injury**
2. Bone-ligamentous
3. Ligamentous

# A1 type fracture - bone injury

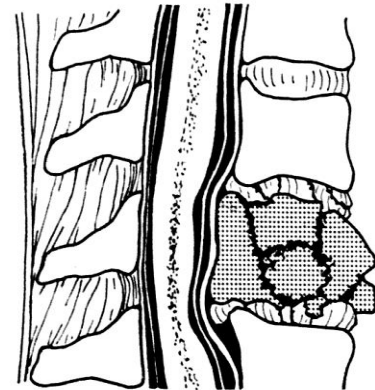
wedge



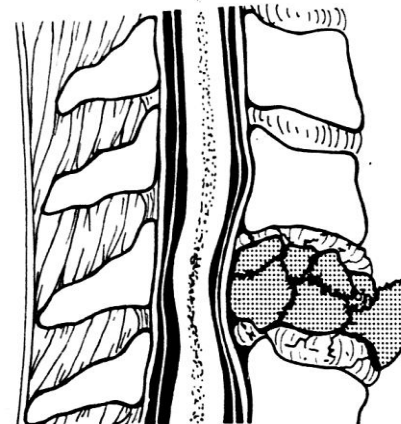
a



b



c



d

Neural deficit:  
burst fractures -  
majority of cases

# Combined C5-6 surgery



# C type - dislocation



# Neural deficit in C spine

A type – burst (C5-7) – majority of cases

B type – posterior column – seldom

C type – both columns – majority of cases

## Surgery

Anterior – decompression, anterior fusion and plates –  
majority of cases

Combined surgery – C type injuries