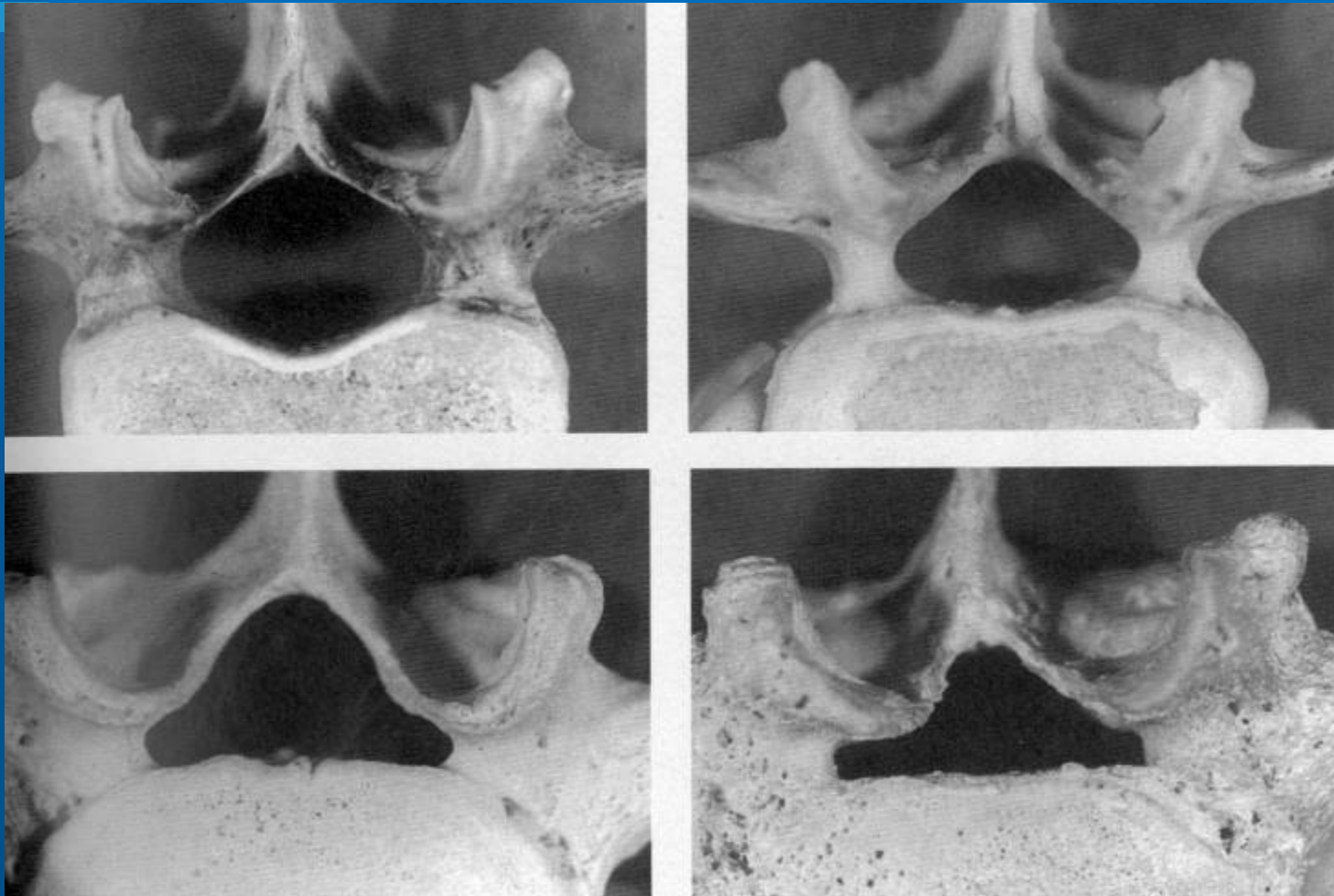


# **SURGERIES IN BACK PAIN MANAGEMENT**

Chaloupka R., Repko M.

# Variability of spinal canal shape



# Management of back pain

1. diagnosis - 1% organic origin
2. conservative
3. surgery only in known and clear diagnosis

# Spine deformities

- **Degenerative scoliosis – connected with spinal stenosis**
- **Pain unsuccessfully treated conservatively, with neural deficit**

# Spondylolysis

- isthmus reparation
- posterolateral fusion with instrumentation

# Spondylolisthesis

1. Decompression
2. Posterolateral fusion w/wo instrument.
3. PLF, decompression, instrumentation
4. partial – complete reduction, post. instrum.  
+ 360° fusion: PLIF - TLIF, ALIF



T.I.  
2.10.02

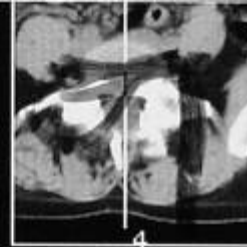


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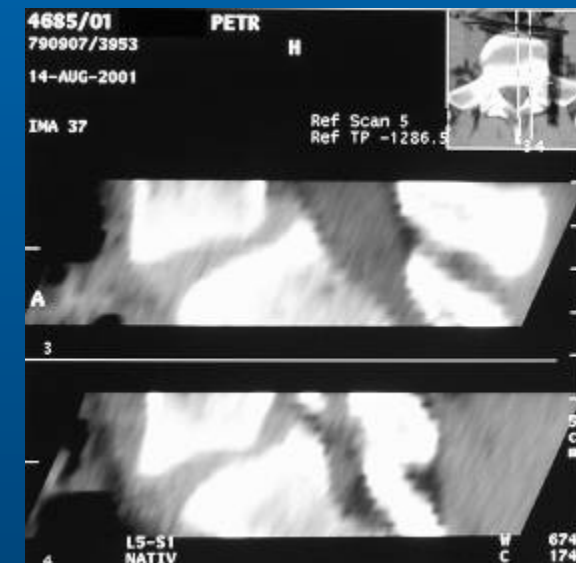
IMA 44

Ref Scan 3  
Ref TP -882.5



T.I.  
30.1.03







# Spine tumours

- imminent/present vert body colaps
- imminent/present neural deficit
- neural deficit progression

Life expectancy more than 3 months  
(6 weeks?)

# Indication of surgery type

- tumour localisation
- tumour extent
- age
- condition of patient

# Posterior surgery

- posterolateral decompression
- decompression+instrumentation
- decomp., instrum., fusion

# Anterior surgery - decompression, vertebral body replacement

- bone cement with K-wires
- pelvic autograft
- allograft
- cages - Harms
  - expansive – Synex,

X-tens

# Combined surgeries

- 2 simultaneous surgeries
- one day with turning the patient
- 2 stages – one week interval  
(bleeding during surgery)



# Goals of surgical treatment

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



SOMATOM DR  
KUCIAR STAN. 1973  
69-NOV-94  
14:20:29  
DU5:032  
SCAN 25

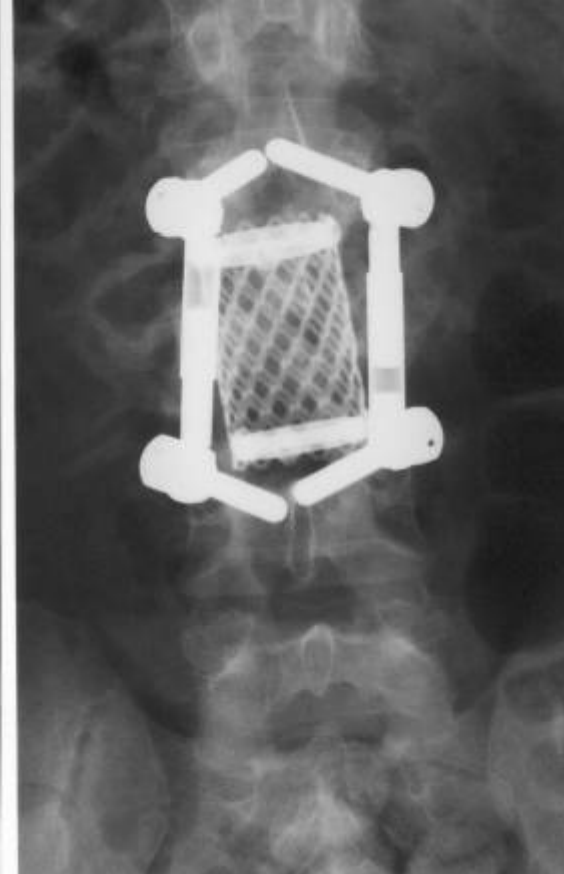
RADIOLOG. KL. IKA FN OLOMOUC  
FN 31A KU HC2  
1 25  
H/SP

FRONT

LEFT

5 CM

TI 7  
KV 125  
AS .41  
SL 4  
GT 0  
TP 111  
NATIV  
L3  
W 350  
C 40



# Osteomyelitis of spine

- unsuccessful antibiotic treatment  
(2 weeks)
- fistula, abscessus formation
- neural deficit and its worsening



# Anterior surgeries

- removal of involved tissues
- autograft replacement
- instrumentation (anterior - posterior)



# Degenerative disc disease (osteochoondrosis)

- dysfunction
- instability
- stabilization

# Disc herniation

- only clear cases (symptoms, MRI, exam)
- radicular symptoms, unsuccessful conservative treatment - 6 weeks
- cauda equina syndrome

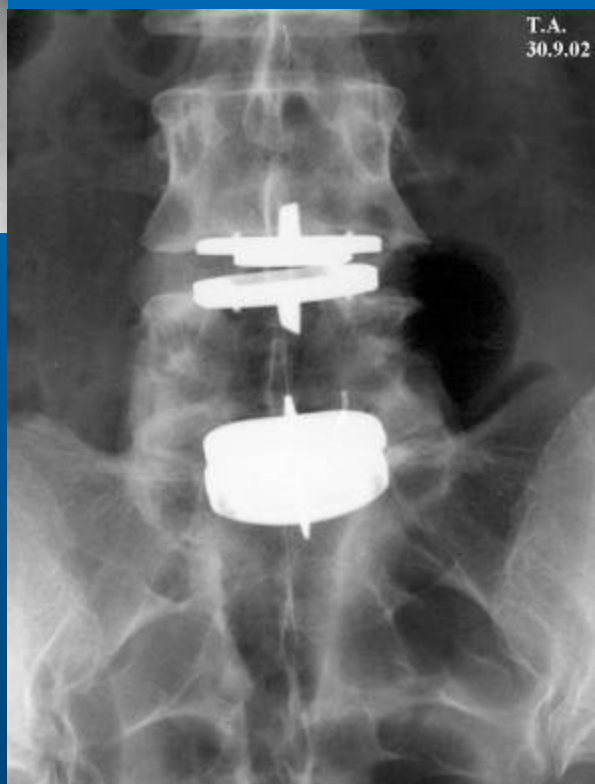
**!! Disc protrusion - no indication of surg !!**

# Discectomy - decompression

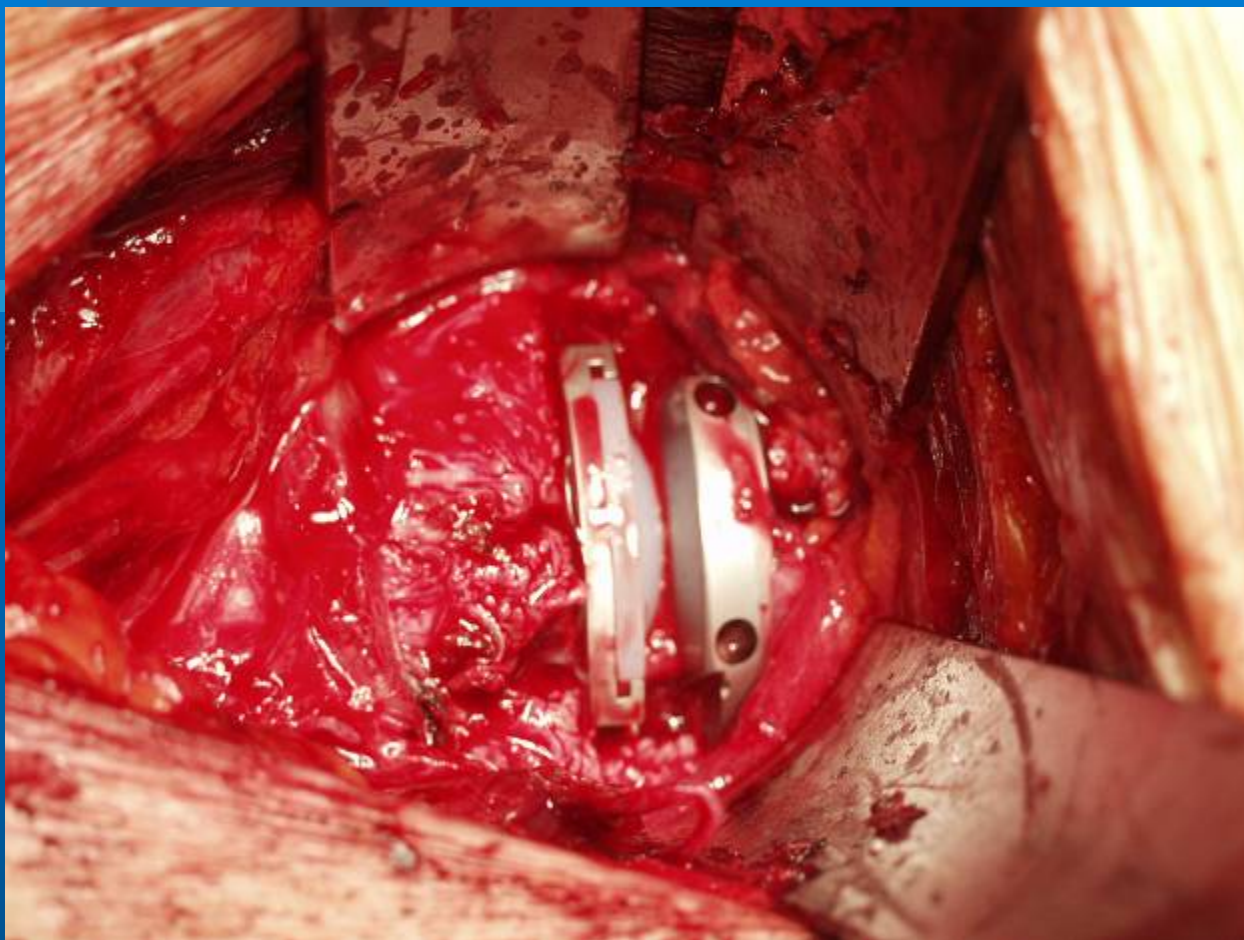
- conventional - open
- with microscope – less invasive
- endoscopic

# Total disc endoprosthesis - Prodisc (titanium plates - PE)

- conservative treatment of back pain more than 6 months  
(L2 - S1)
- normal i.v. joints
- without spondylolisthesis
- spinal stenosis
- disc narrowing (4 mm)



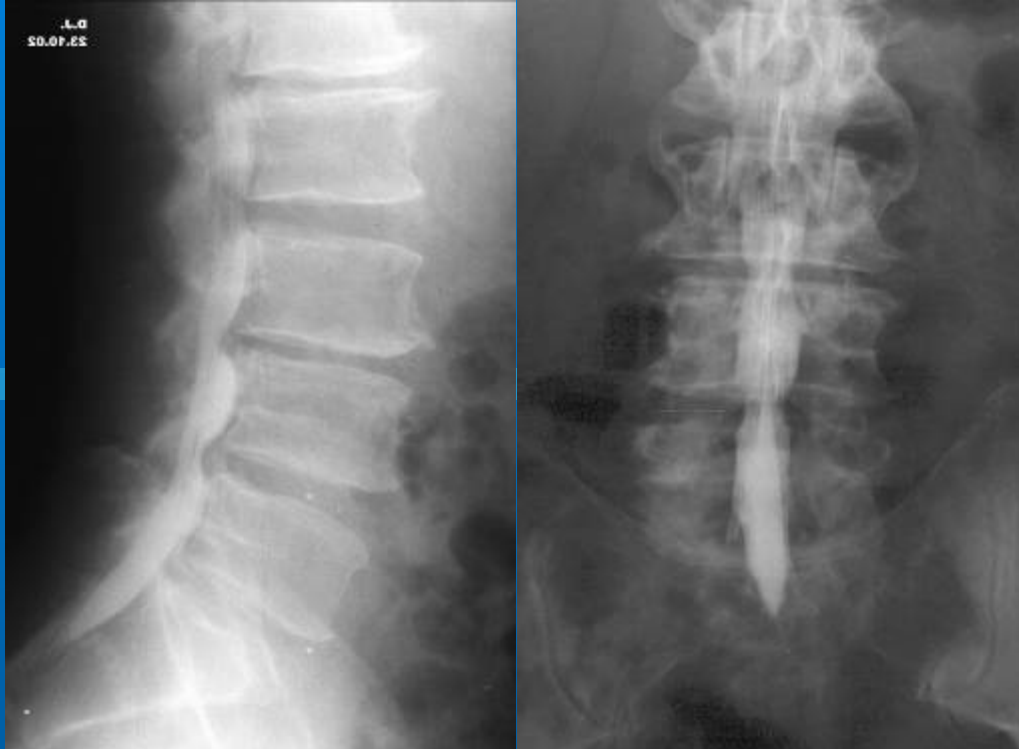




# Dynamic stabilization - DYNESYS

Titanium screws connected with cord and plastic spacer (without fusion)

- angle, translational instability
- connected with disc herniation
- spinal stenosis

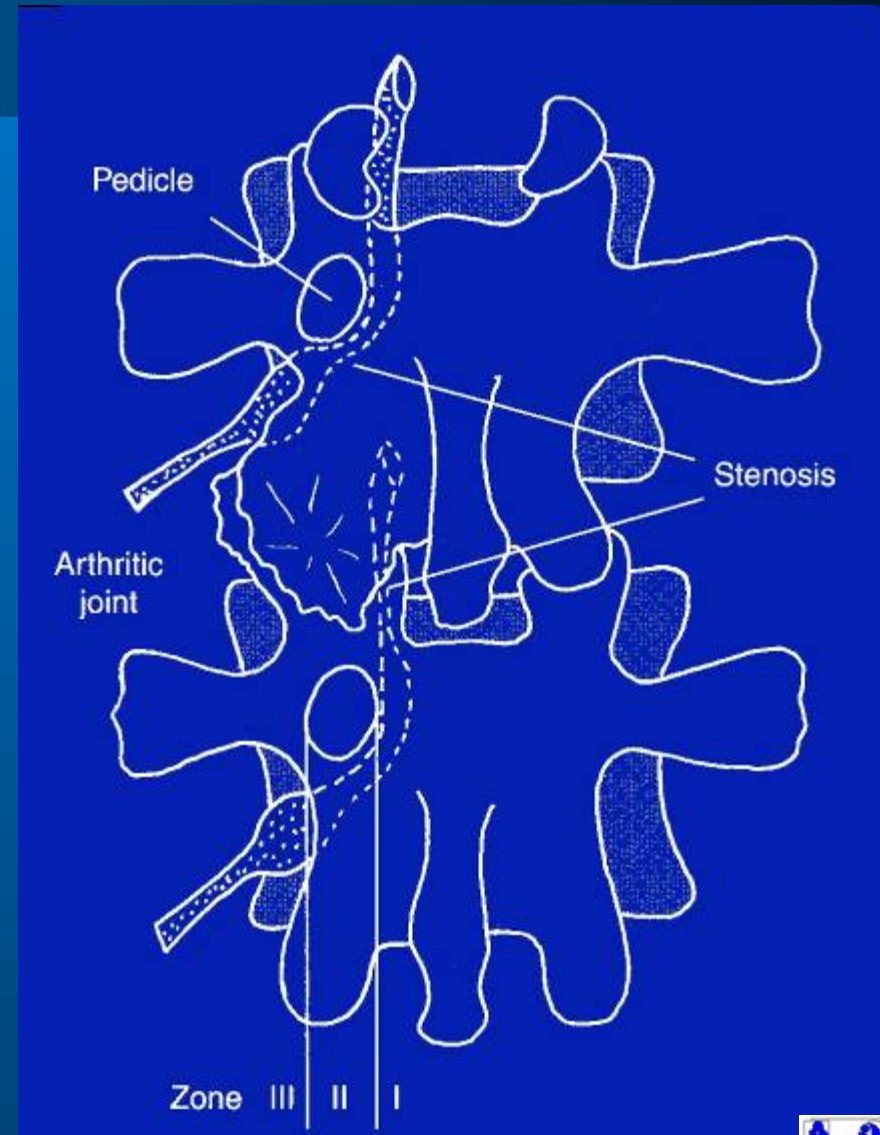




# Spinal stenosis

## 2. Lateral

- lateral recessus
- radicular canal
- foramen



# Etiology, pathomechanism

- Theory of nerve structures compression (ischemia, oedema, inflammation)
- Theory of vascular compression – multilevel stenosis (venous congestion)



# clinical cases

- congenital stenosis 3 – 13%
- acquired 75%
- combined others

# Radiological definition of LS stenosis

Verbiest – AP canal diameter

- relative 10 – 12 mm

- absolute below 10 mm

Dural sac area below 75 mm<sup>2</sup>

two levels below 100 mm<sup>2</sup>

Lateral recessus below 3 mm

# Clinical symptoms = LS stenosis

- none ( 20% pts. above 60 yrs. )  
= „narrow spine canal“
- radicular syndrome
- cauda equina syndrome
- neurogenic claudication

# Neurogenic claudication

- standing, gait – pain, paresthesia, weak lower extremities
- worsening – extension, downhill gait
- improvement – sitting, squatting, flexion
- gait omezena - fluctuate

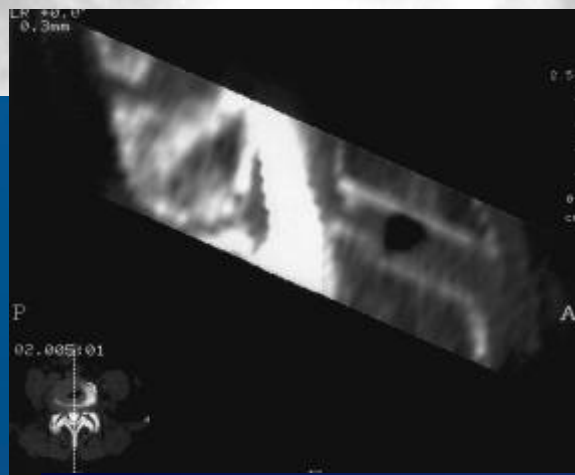
# Neurogenic claudication

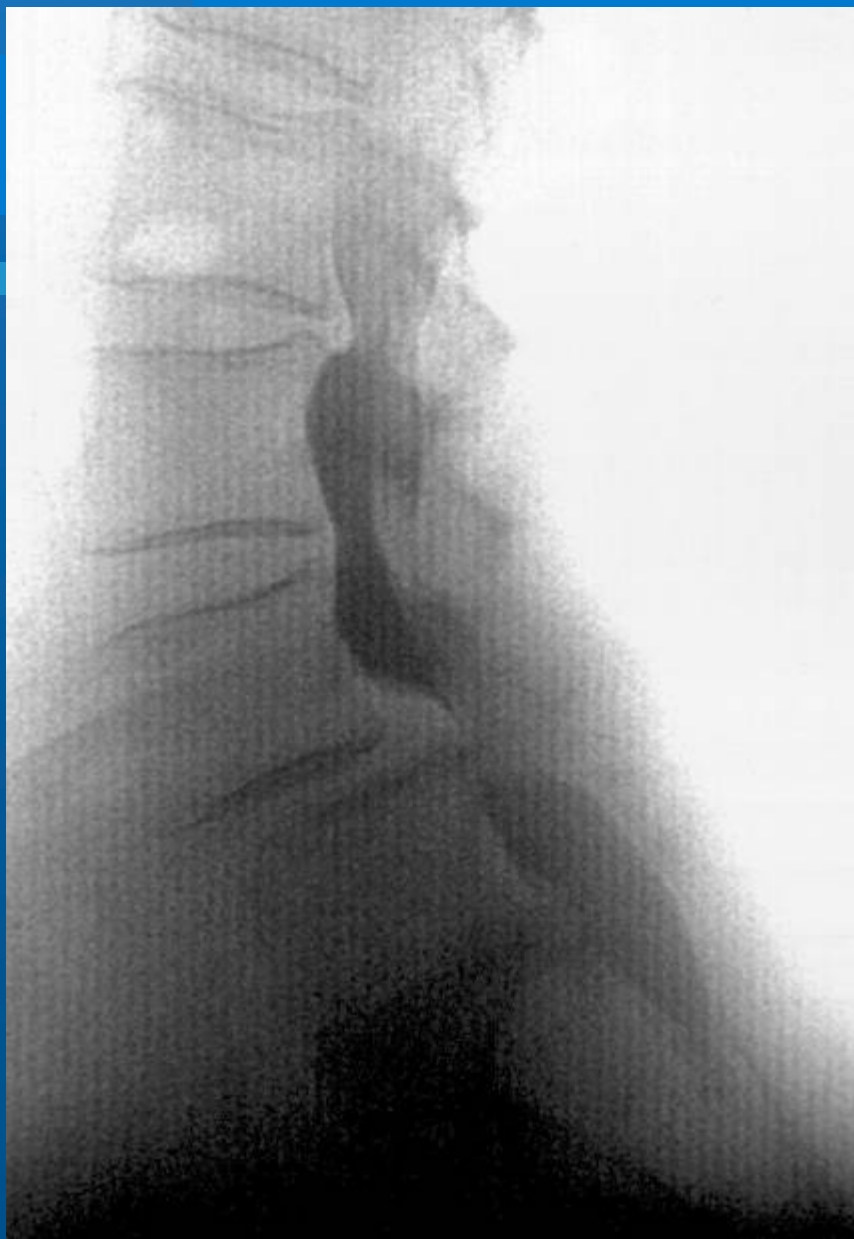
- stenosis of minimum 2 levels
- intermittent hypoxia of cauda equina
- disorder of venous drainage
- mild back pain
- 1/3 of pts. with paresis



# Diagnostics

- anamnesis, Oswestry quest.
- neurological examination
- treadmill gait
- EMG
  - 50% pts. radiculopathy bilat.
  - 20% monoradiculopathy
- EMG after stress

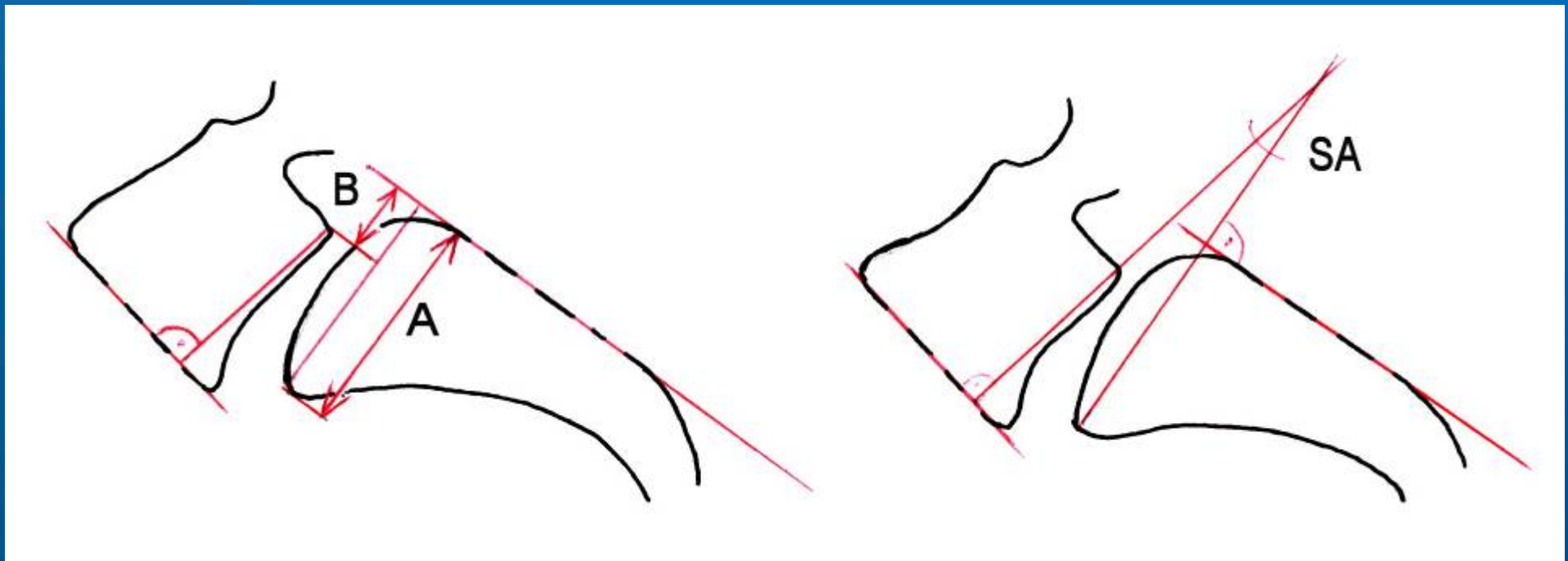




# X-rays of L spine

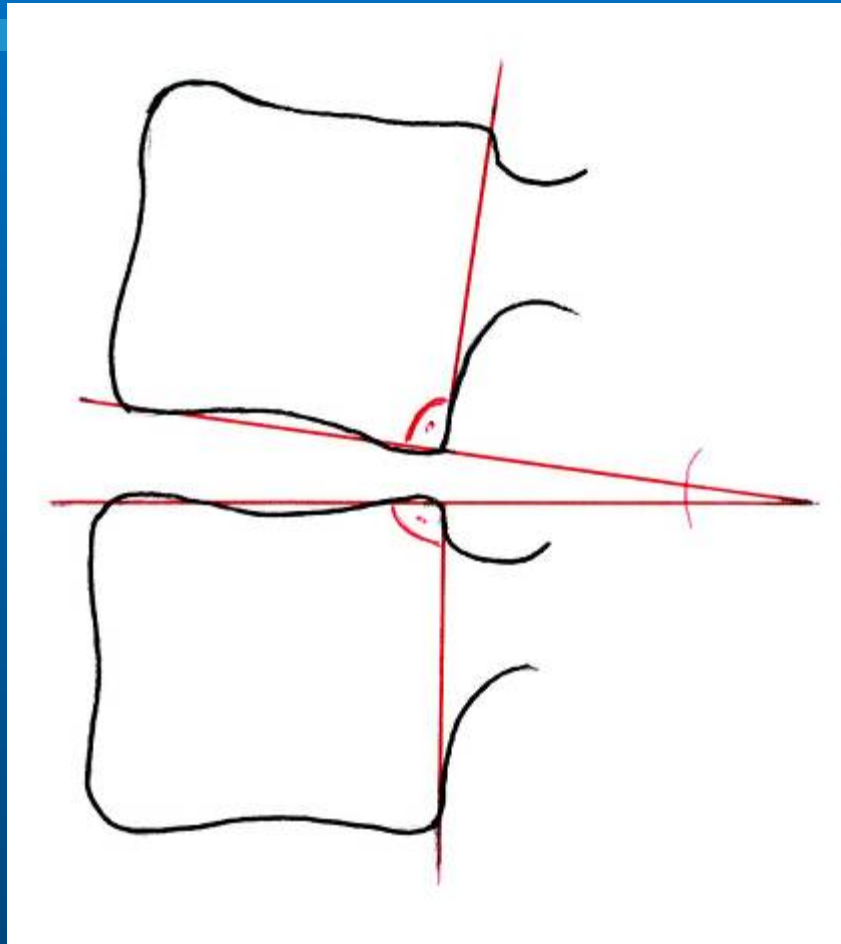
- plain: AP and lateral
- functional ( flexion / extension )

# Wiltse and Winter method





# Dupuis et al. method



# Instability: flexion/extension

- translational  $\geq 8\%$

Wood et al. 1994

- rotational  $> 11^\circ$

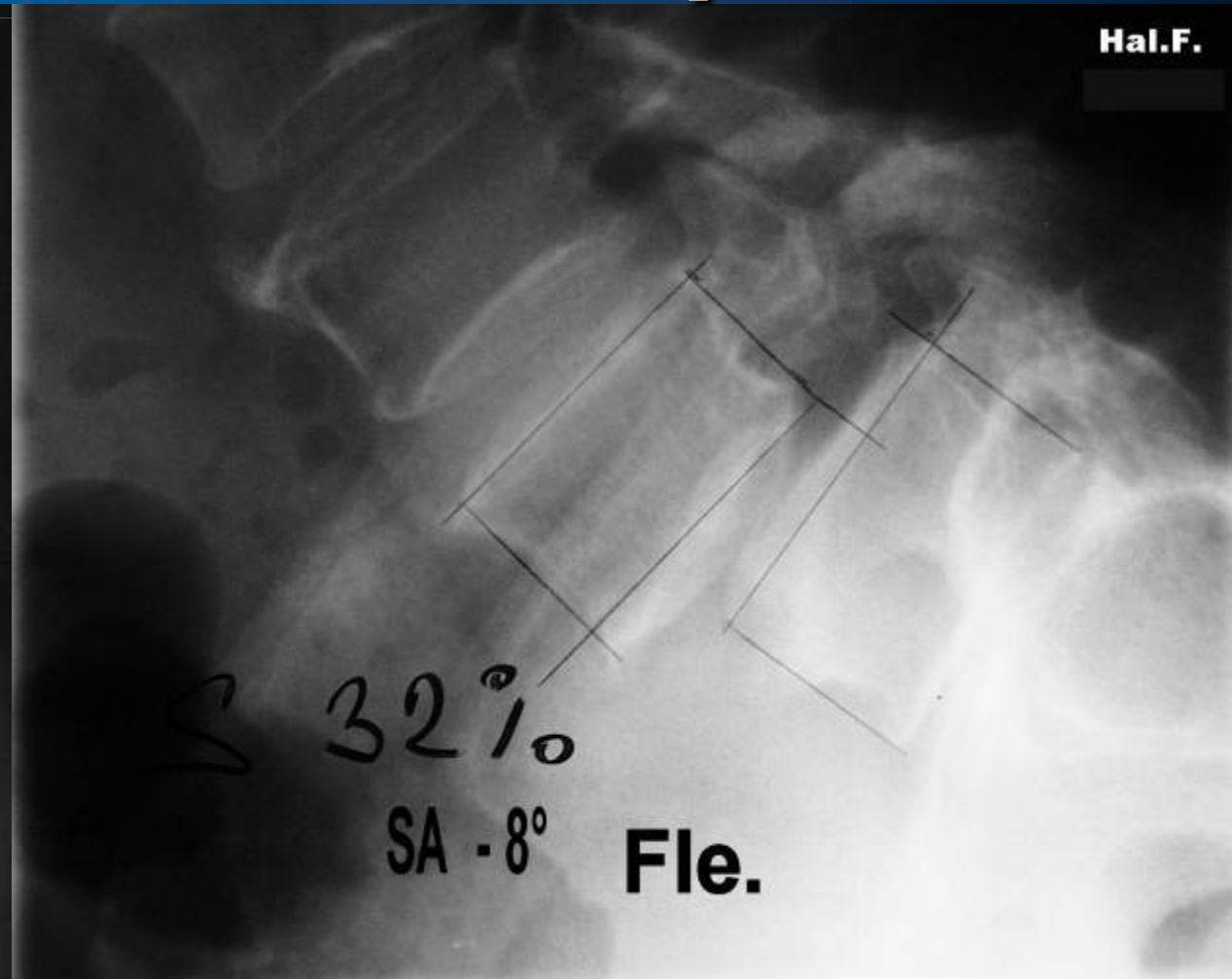
Louis 1985

Wood et al. 1994

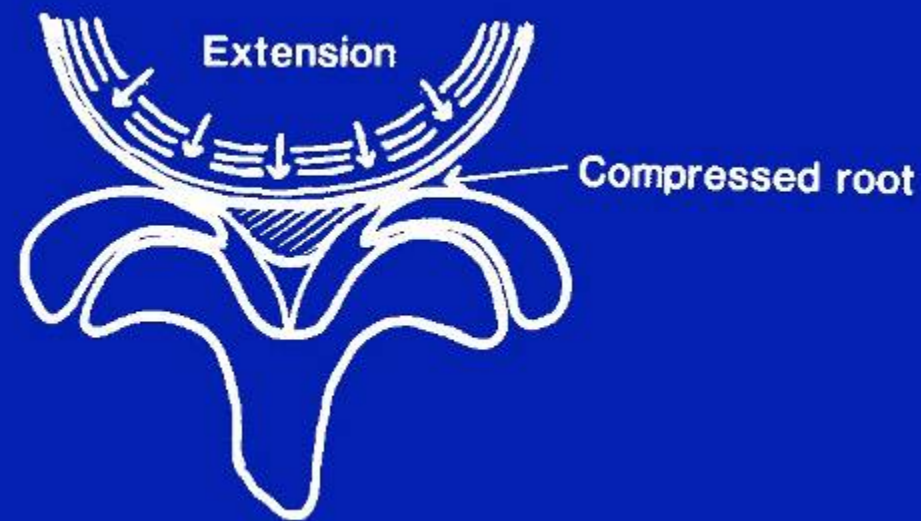
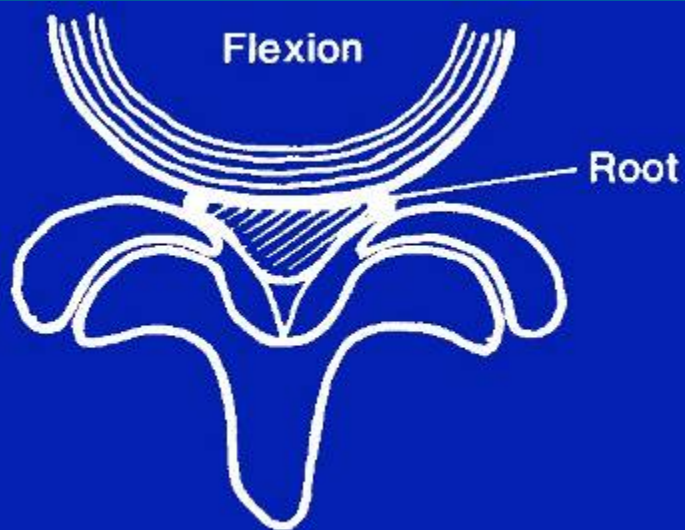
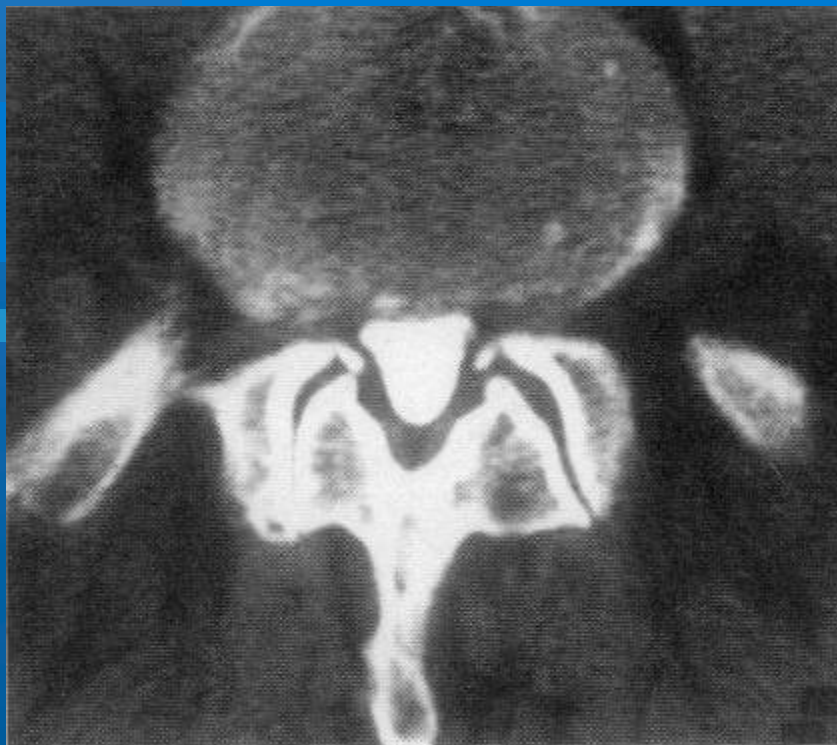
# **Instability surgery:**

- **fusion and instrumentation**
- **dynamic stabilization  
DYNESYS, other methods**

# Radicular deficit of L5 - 51 yrs









# MRI examination

- false positive 7-21%
- functional MRI flexion/extension
- MRI myelography

## Thompson scale

Grade 1



normal MRI

2



disc degeneration  
mild

3



moderate

4



severe

5

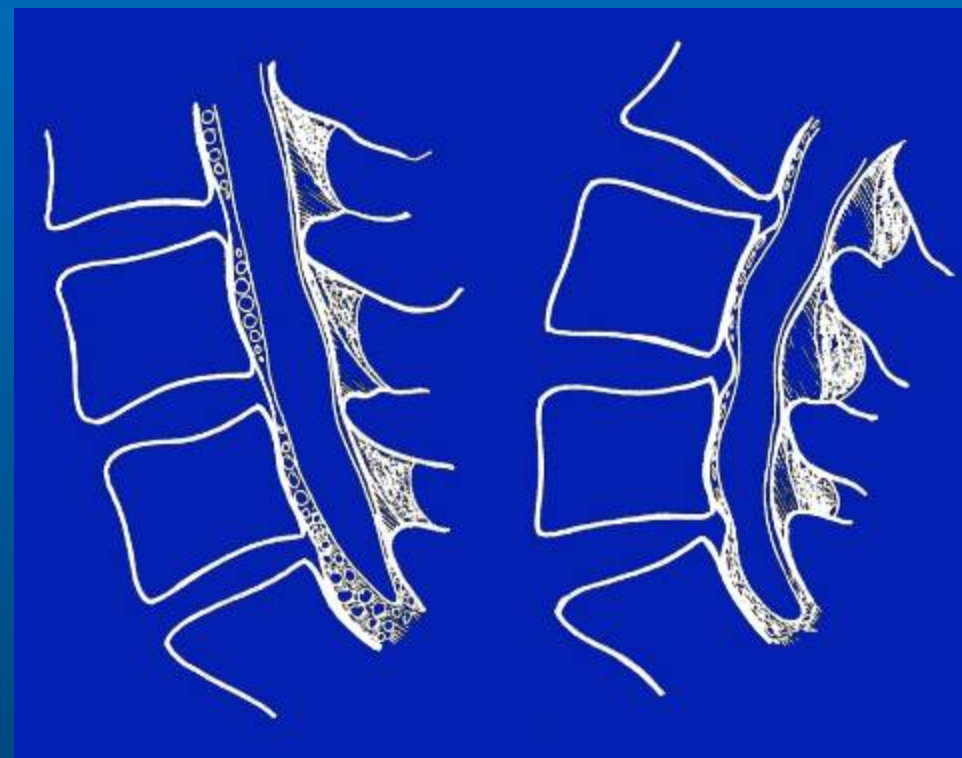
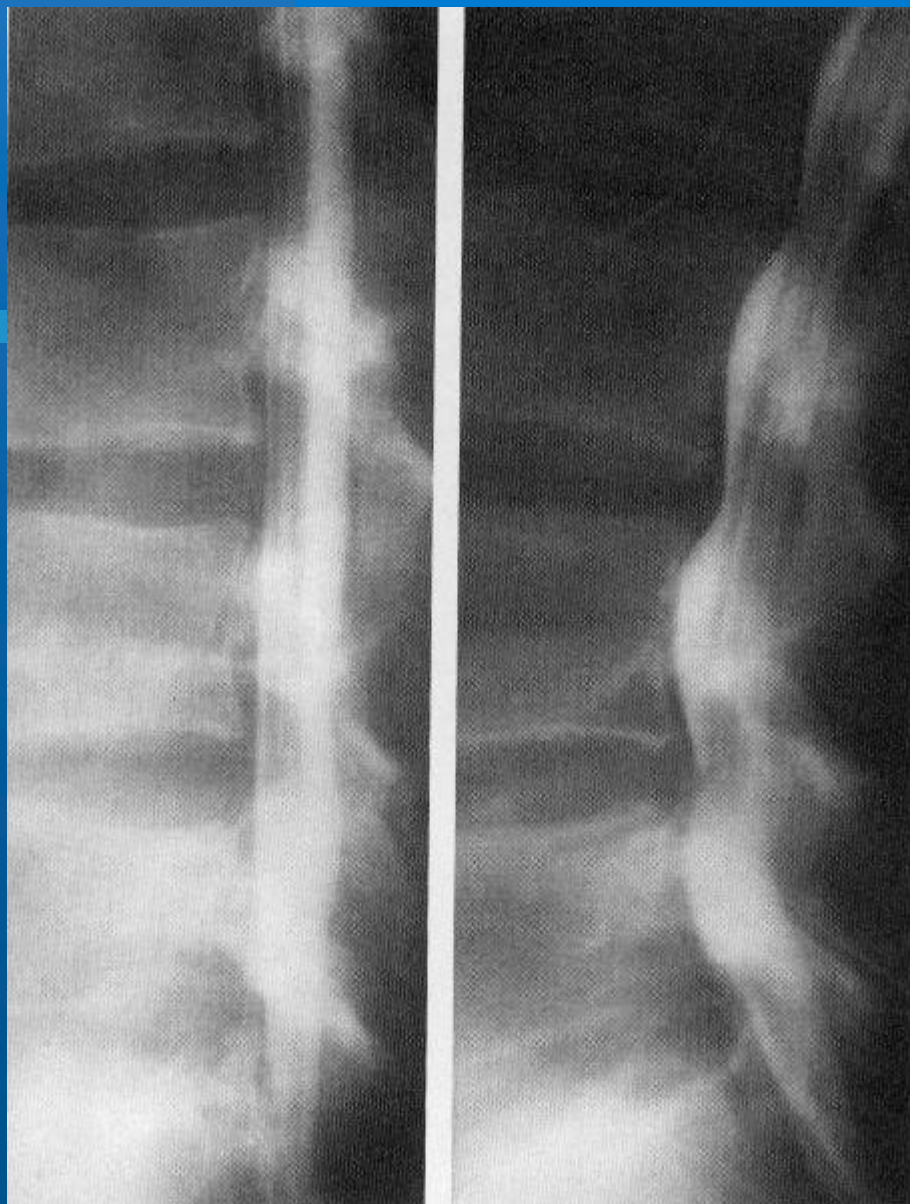


severe



# Contrast perimyelography

- standard?
- functional X-rays





# Management of mild and middle forms

- physiotherapy, orthotics, analgetics, NSAIR drugs
- psychopharm. / antidepressive
- calcitonin ?
- epidural corticosteroids ?

# Pain clinic

- drugs
- nerve blocks, injections
- psychologist
- invasive implants technologies

# Spinal cord / epidural stimulation

- neuropathic pain
- careful selection of patients
- failed back surgery syndrome
  - only partial pain relief

# Spinal cord stimulation

- percutaneous implantation  
(electrodes 4 – 8 polar) epidural
- laminotomy in loc.anesthesia,  
testing period of 1 month  
pain relief more than 50%,  
then definitive implantation

# Middle form of LSS – surgery indication

- symptoms more than 3 months, unsuccessful conservative treatment

- gait 20 - 200 m

- Oswestry quest. 40 - 65 %

- VAS 4 - 7

- dural sac area below 100 mm<sup>2</sup>

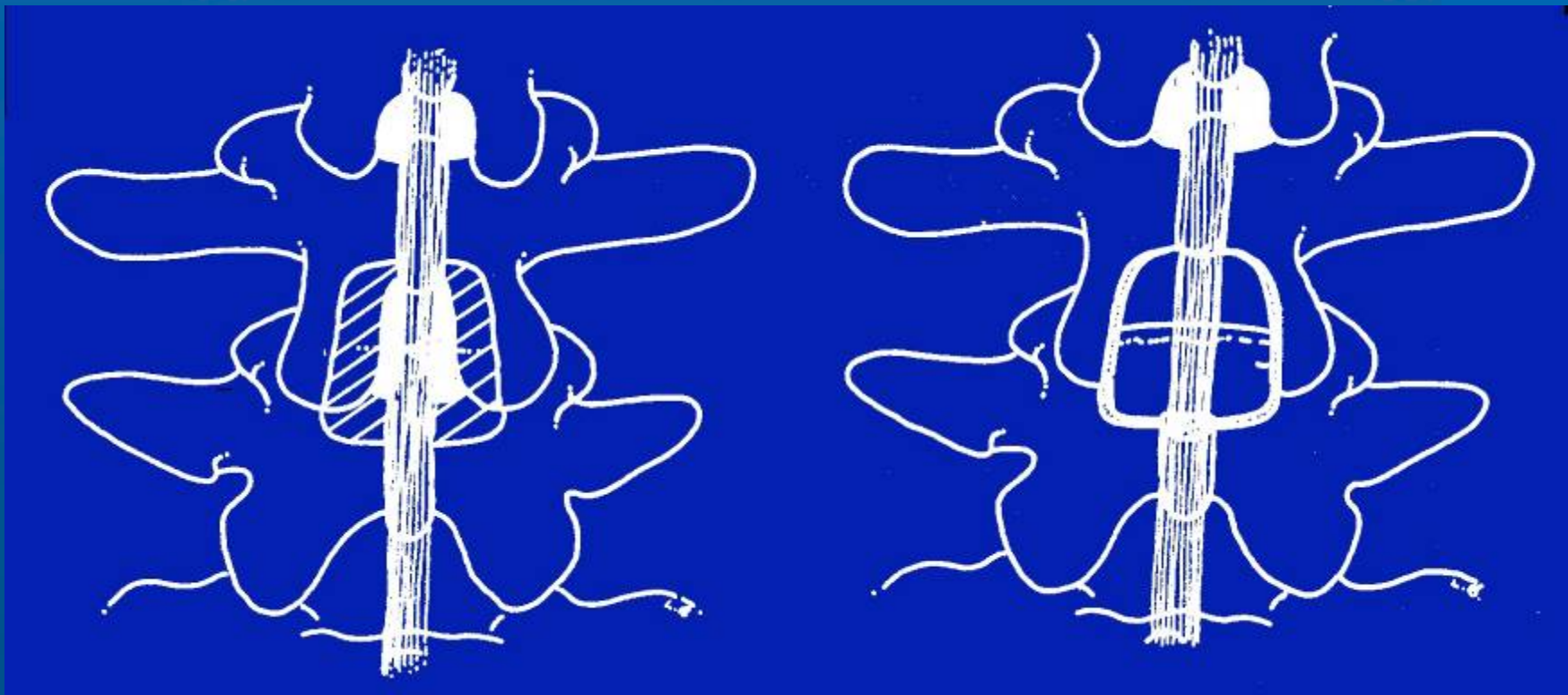


# Treatment of severe, progressive forms

- PosteroLat. Decompression
- PL. Dec. + fusion (F)
- PLD + F + instrumentation (translaminar screws)
- PLD + F + instrumentation (transpedicular screws)

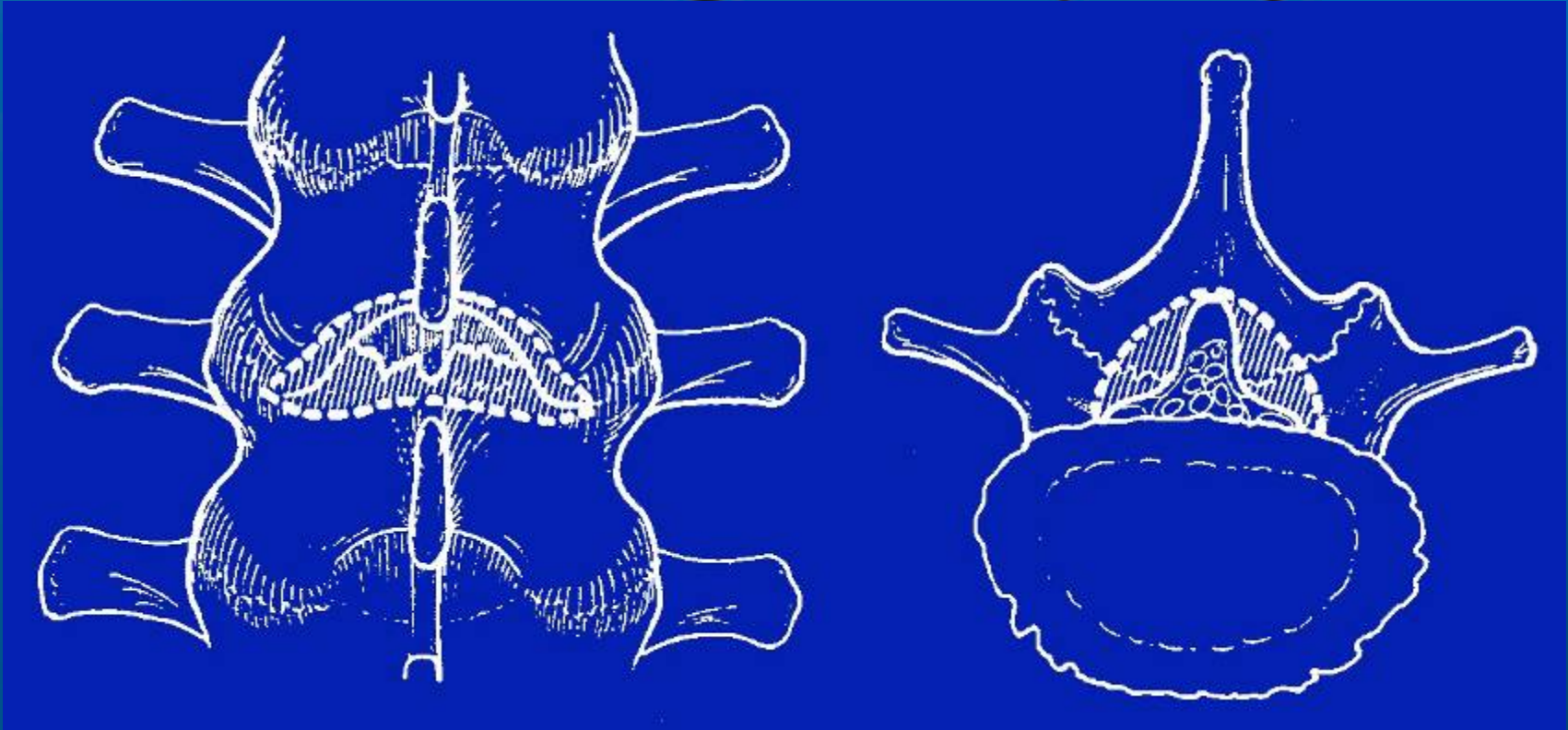
# decompression

## posterolateral – laminectomy

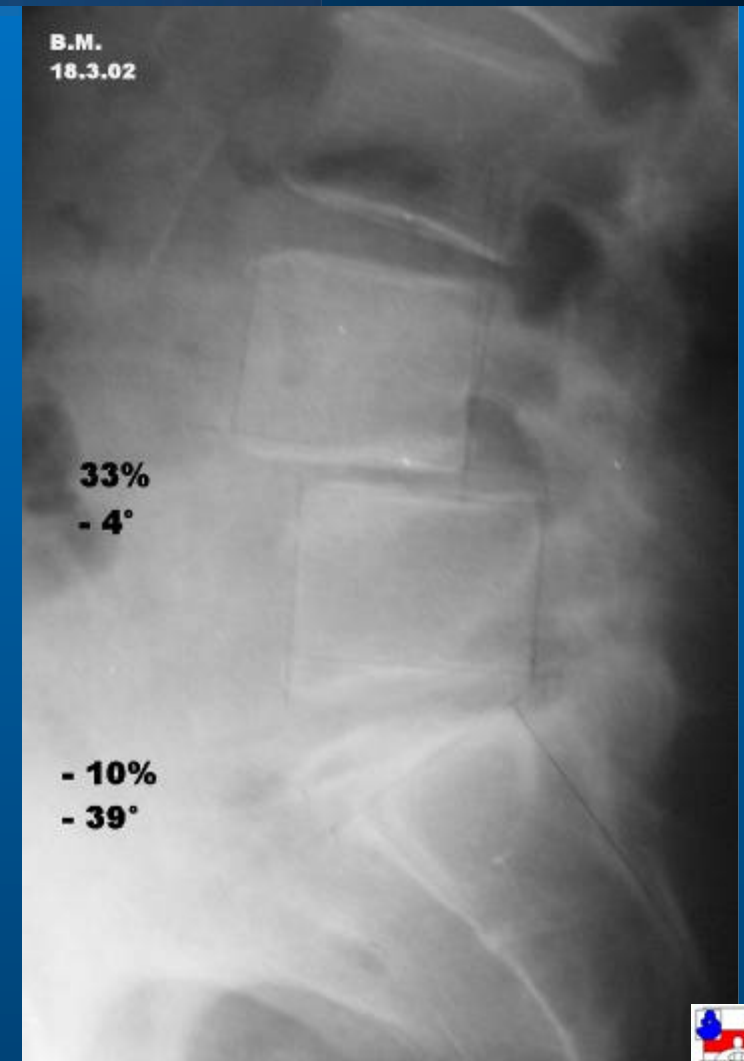
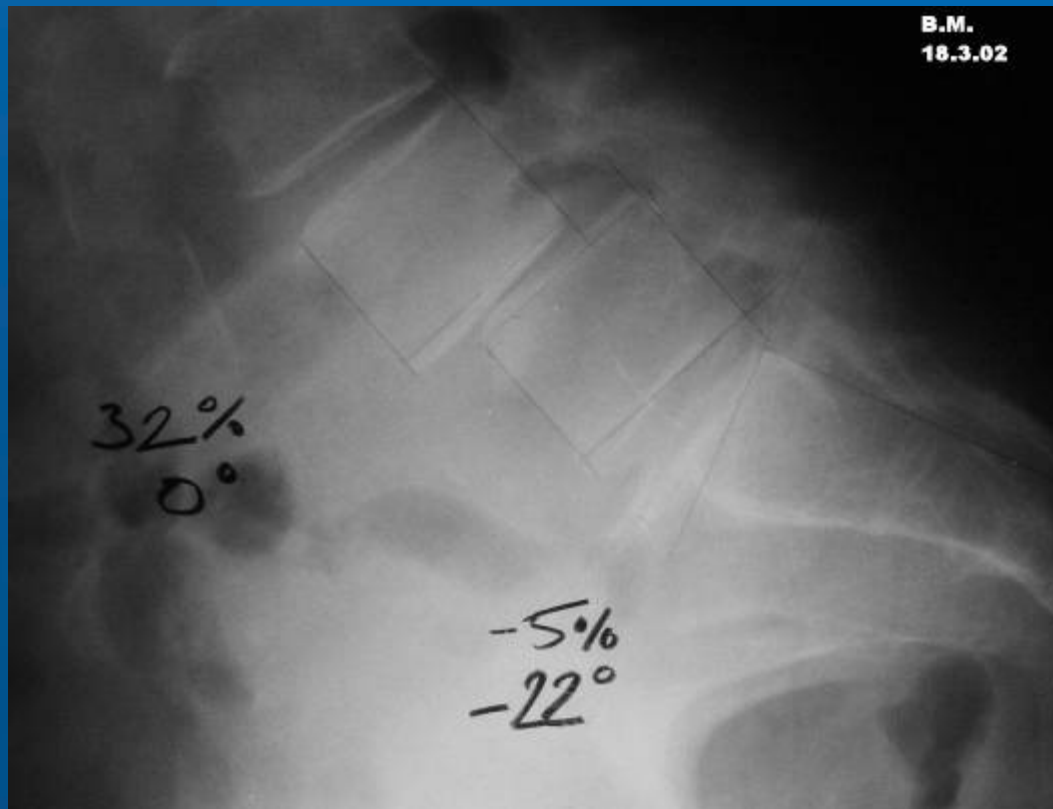


# Selective decompression

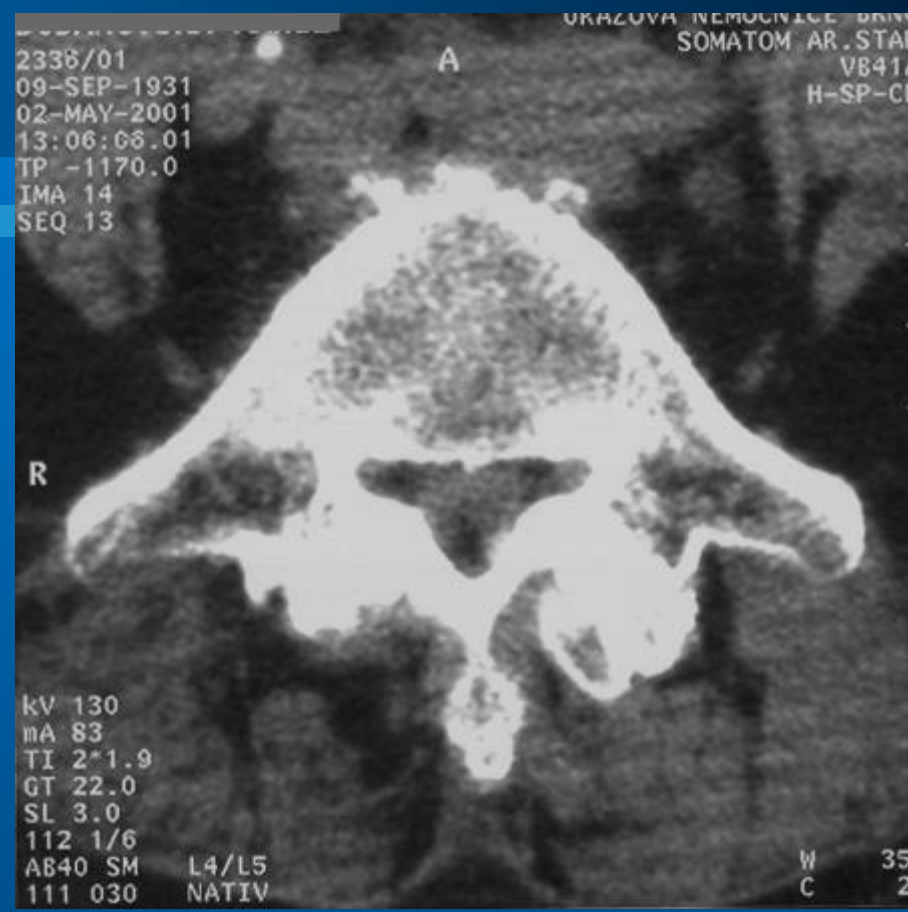
## undercutting laminoplasty



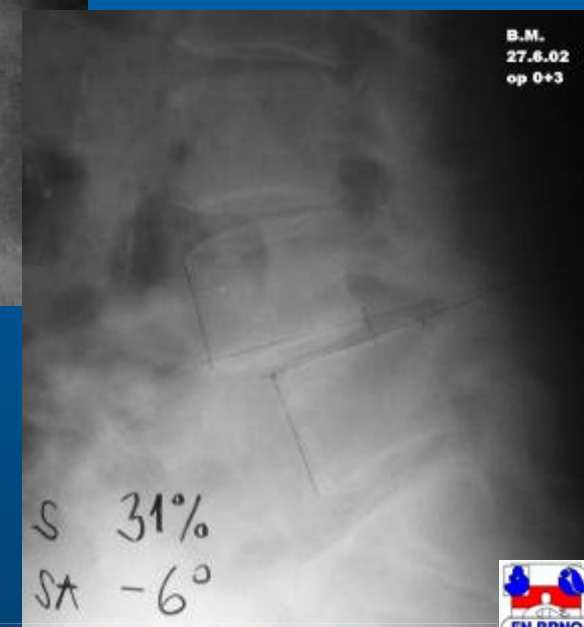
# Decompression + PL fusion



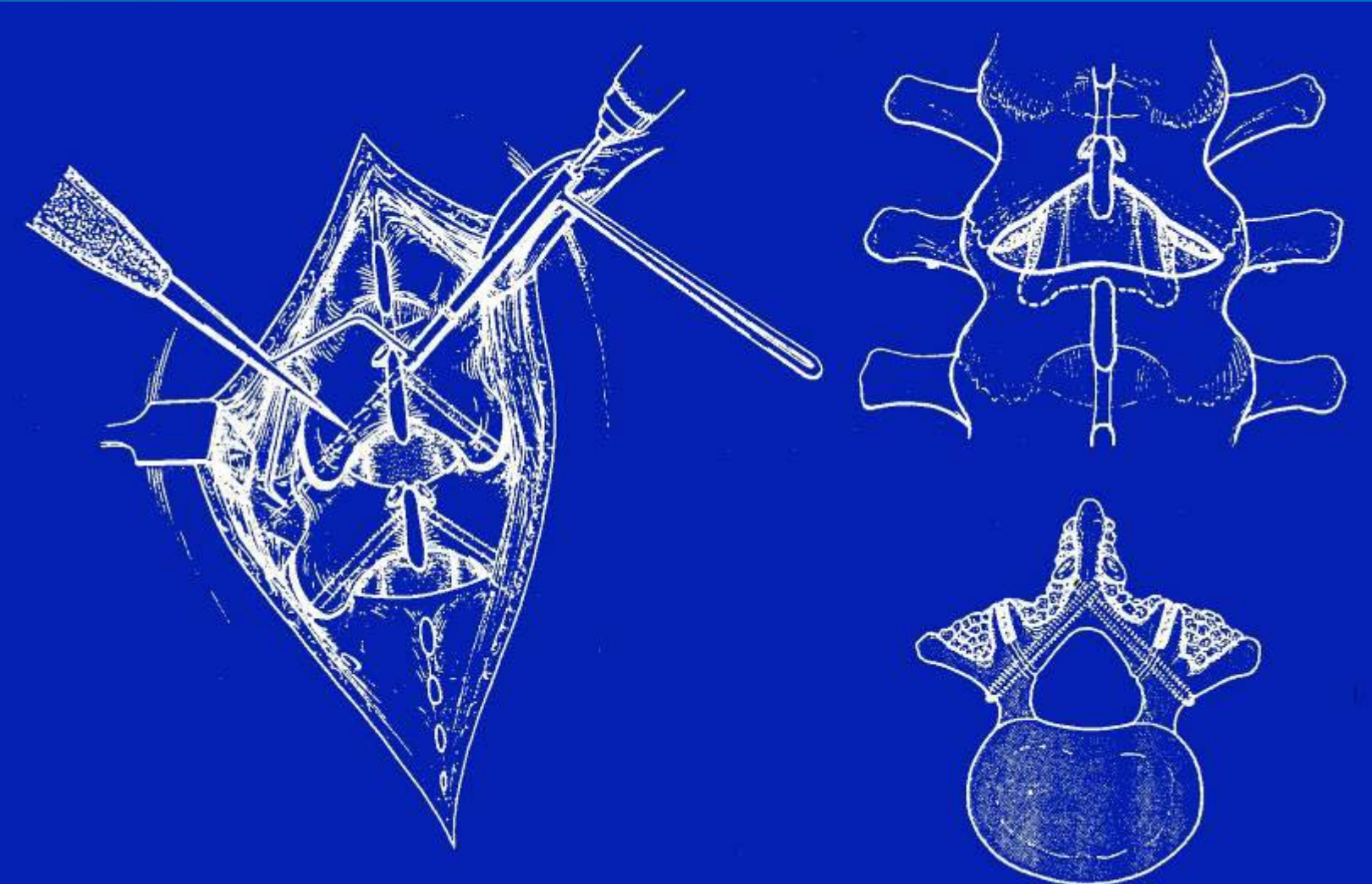








# Decompression, fusion, translam. screws



# Decompr., fusion, transped. screws

Posterolateral fusion

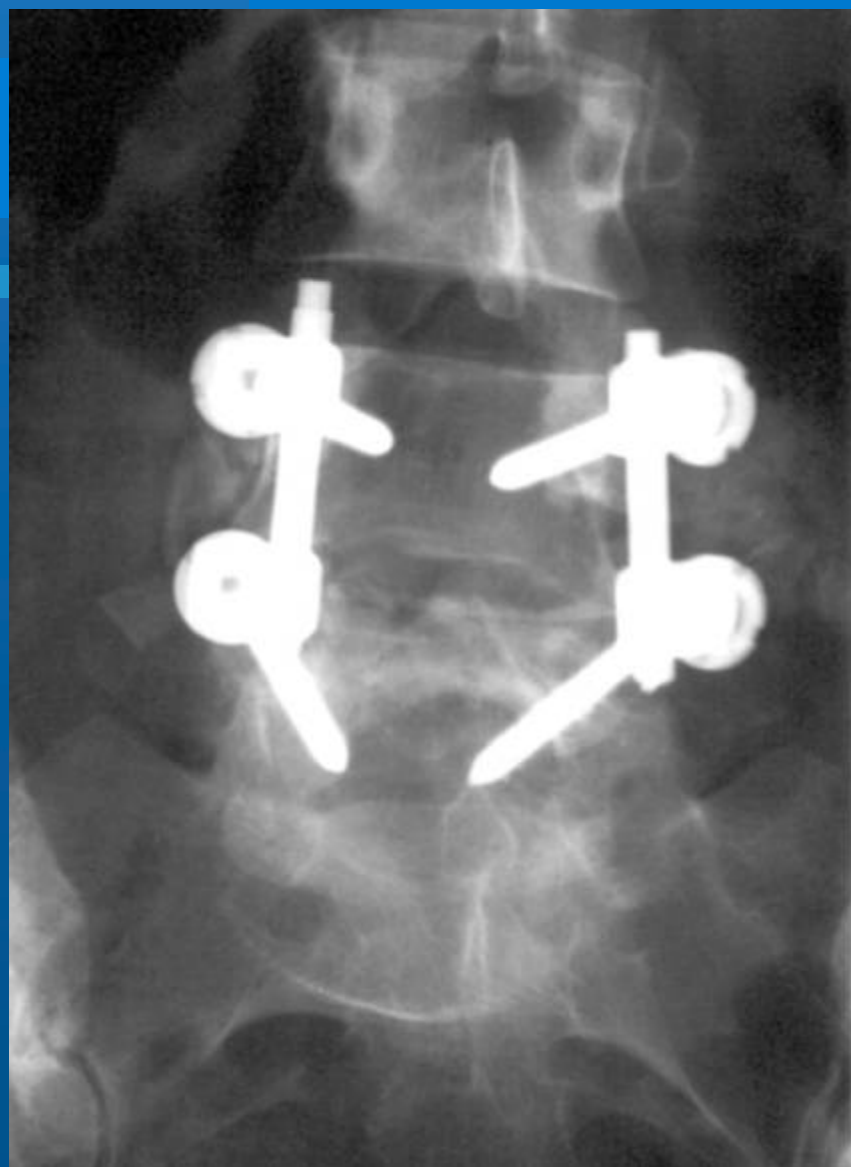
360° fusion - PLIF (grafts, cages)

TLIF

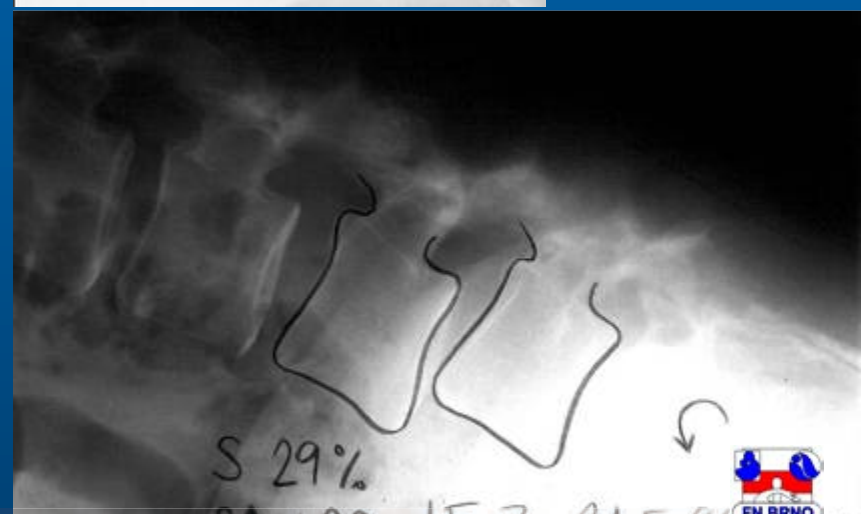
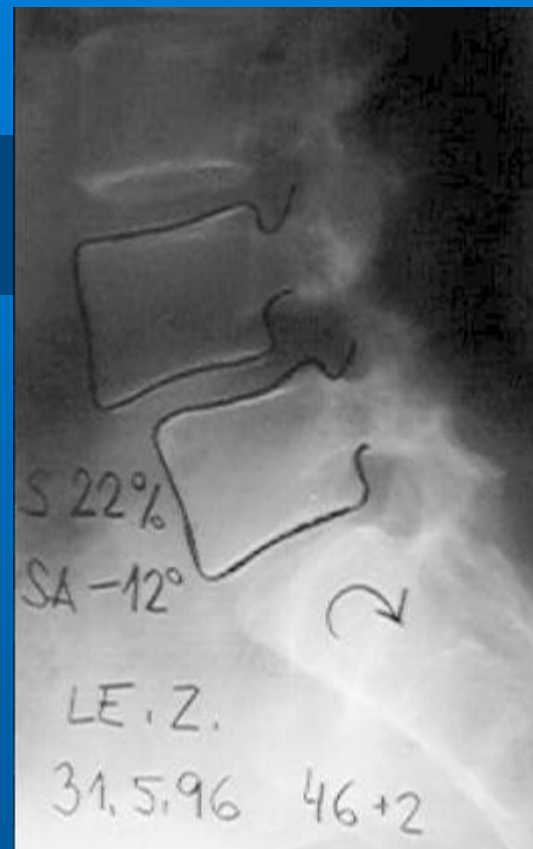
(combined surgery + anterior fusion)



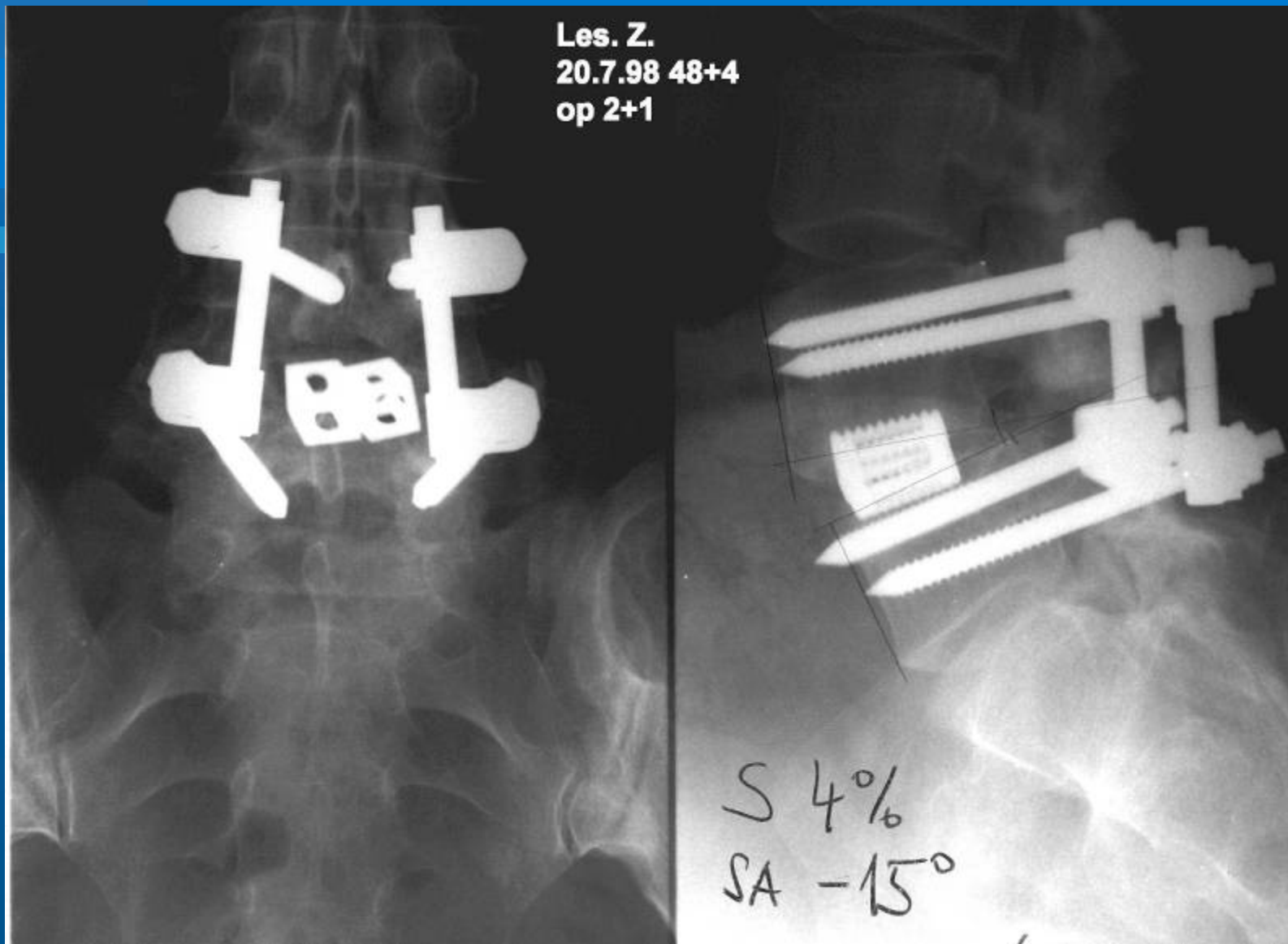


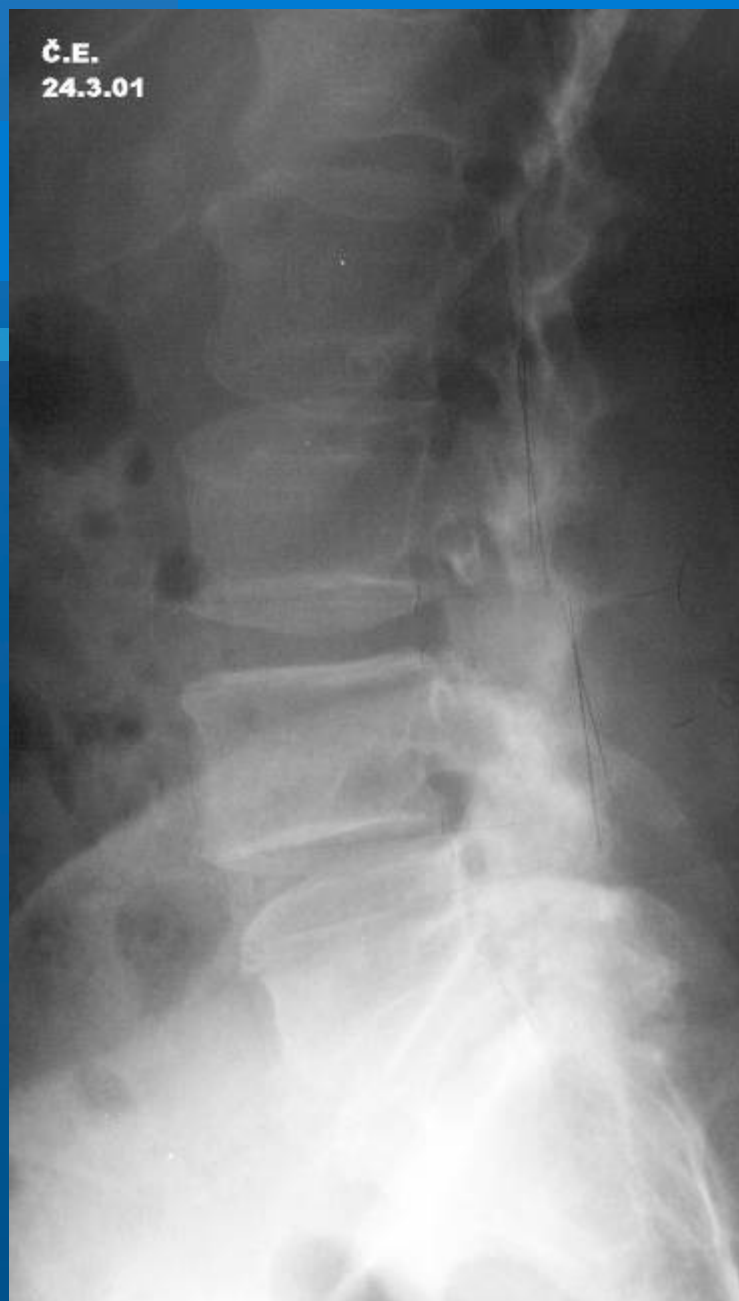


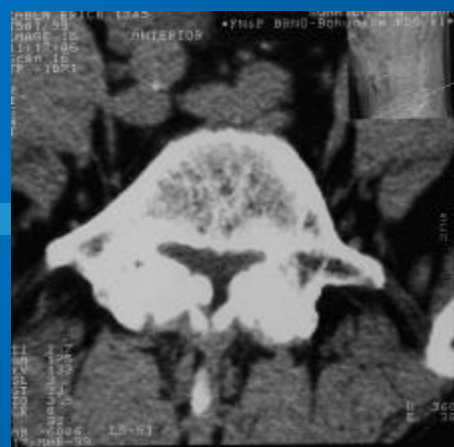




Les. Z.  
20.7.98 48+4  
op 2+1













# Complications

- dural sac tears, root injury
- wound infection
- urinary infection, lung embolism
- ament delirant syndrome
- late - instability above fusion

# Results of surgeries

Katz et al. 1997 improved 85%

Airaksinen et al. 1977  
improved 62%

# Conclusion

- conservative management
- surgery – clear diagnosis