

# Degenerative disorders of cervical spine

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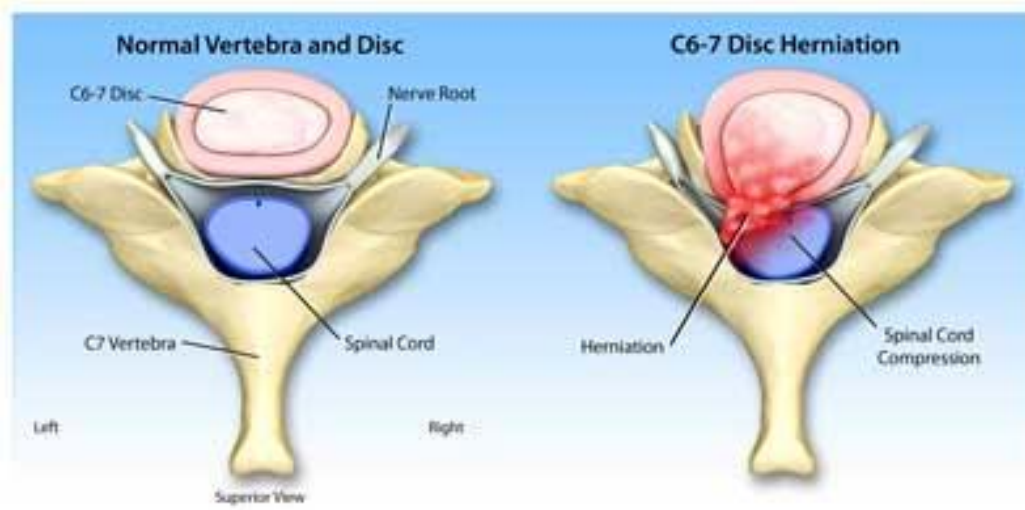
# Degeneration

- physiological
- Begins mostly from 30 yrs
- Could be without difficulties
- Most frequently C5-6 + adjacent segments

**X-ray degenerative changes in  
90% of males older than 50 yrs + 90%  
of females older than 60 yrs (*Schmorl +  
Junghann*) – only minority of them with  
compression of neural structures**

# Degeneration of motion segment

- **Osteochondrosis** – involvement of intervertebral disc - protrusion, hernia
- **Spondylosis** – involvement of vertebral end plates – anterior, posterior, lateral osteophytes
- **Spondylartrosis** – involvement of intervertebral joints – lateral stenosis
- **Uncoartrosa** – involvement of proc. uncinatus – foraminal stenosis



**Healthy Cervical Spine**



**Degeneration of Cervical Spine Due To Arthritis**



# Examination

- **Anamnesis**
- **Clinical**
- **Radiological**
- **Neurological - EMG, mJOA score, Nurick scale**

# Clinical manifestation

- **Pain syndrome without neural deficit**
- **radiculopathy – nerve compression**
- **myelopathy – spinal cord compression**  
(clumsy hands, gait and sensory, sfincter disorders)

# **Radiological examination**

- X-ray, including flexion / extension (functional)**
- MRI**
- (CT, myelo CT, KPMG, ....)**



# X-ray diagnostics



**14 yrs**



**30 yrs**

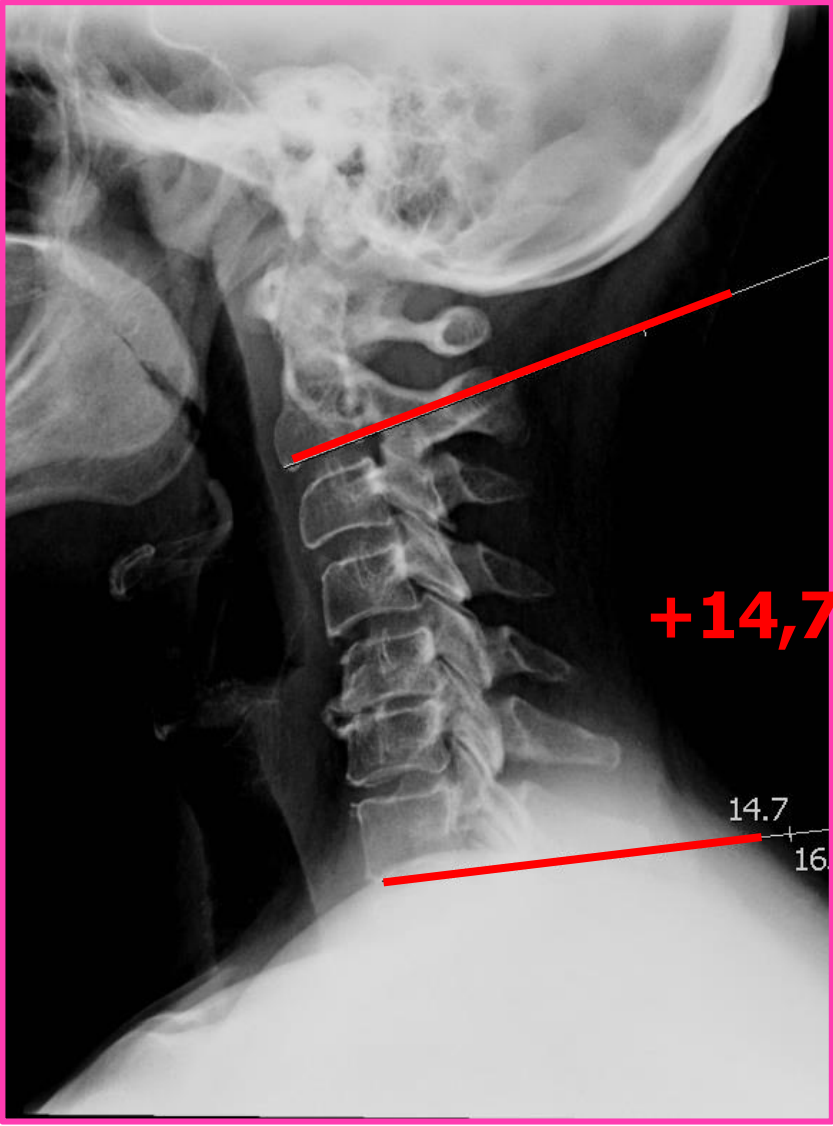
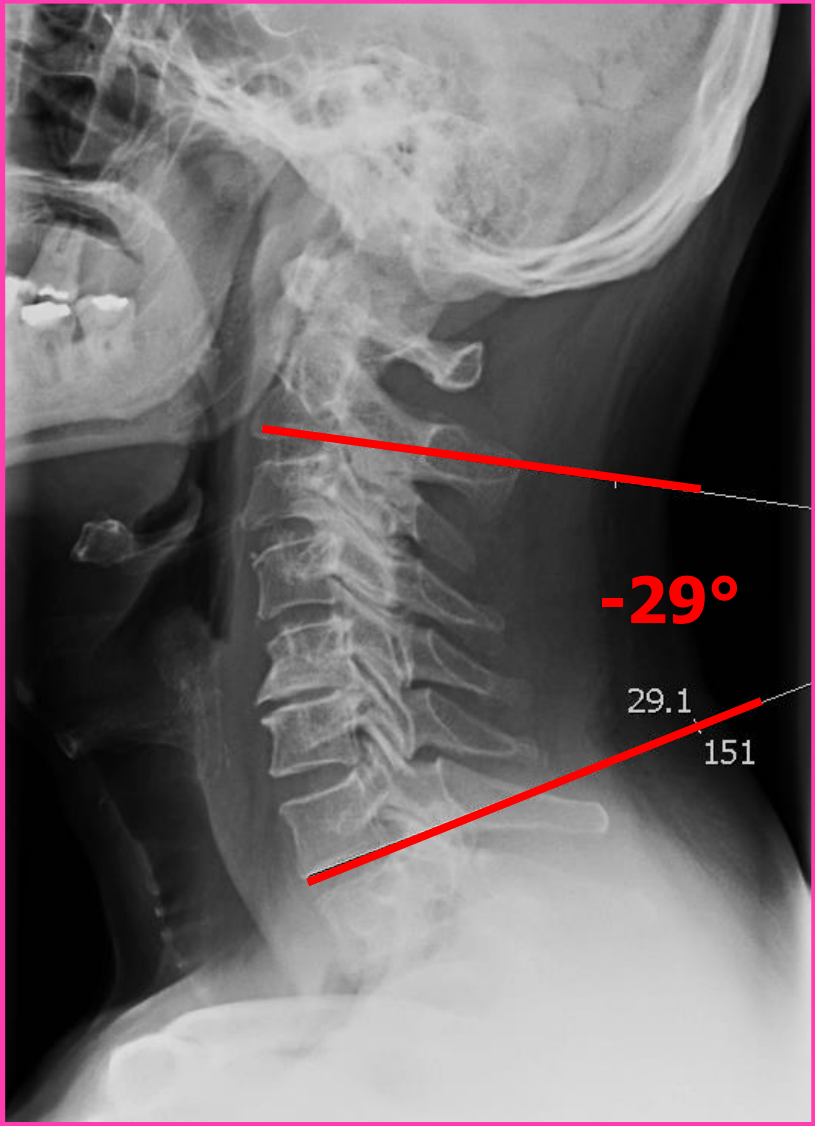


**58 yrs**

# X-ray - FUNCTIONAL

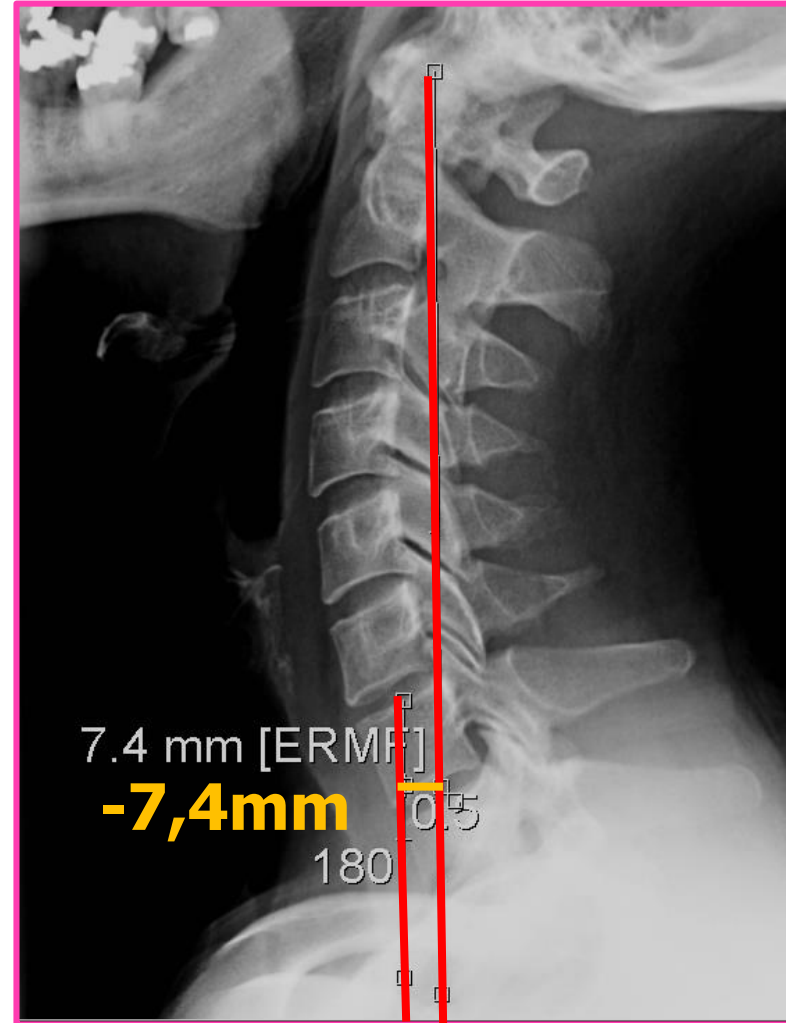
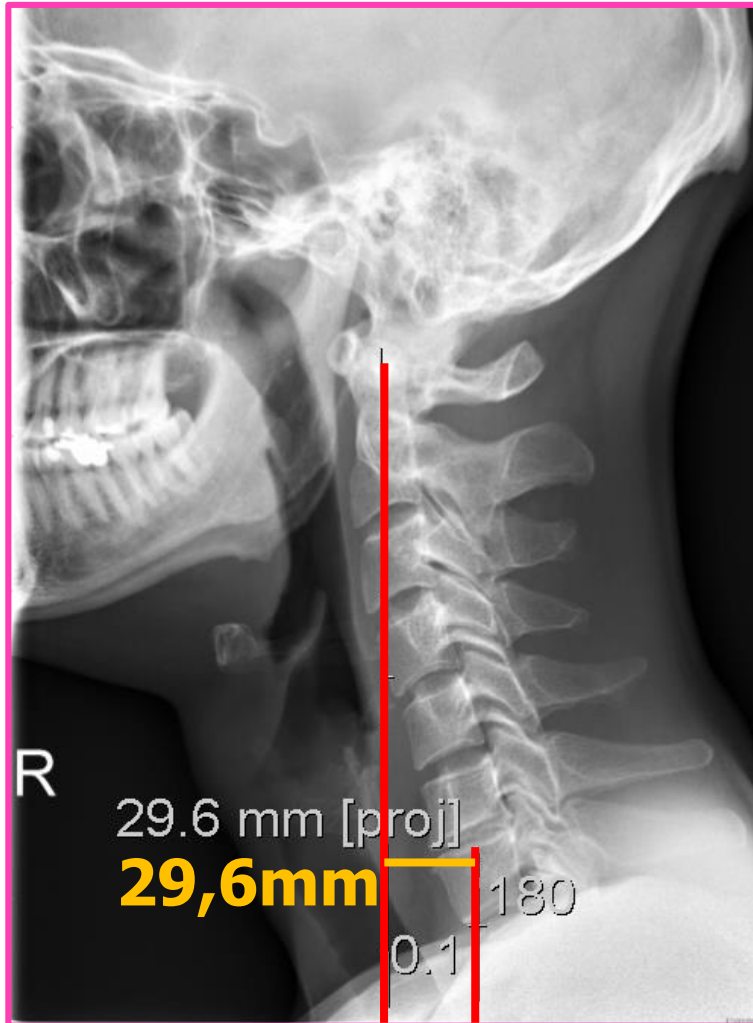


# Cobb angle



# SVA C2-7

Sagittal vertical axis  
Plumb line from C2, C7



# Therapy

- **Conservative – remedies, orthoses, physiotherapy, régime measures**
- **Surgical**

# Surgery indications

- **Spinal instability**
- **Compression of neural structures**
- **pain? (relative)**
- **Other**

# Principles of tx

- **Non fusion systems**
- **Anterior fusion systems**
- **Posterior decompression + fusion techniques**

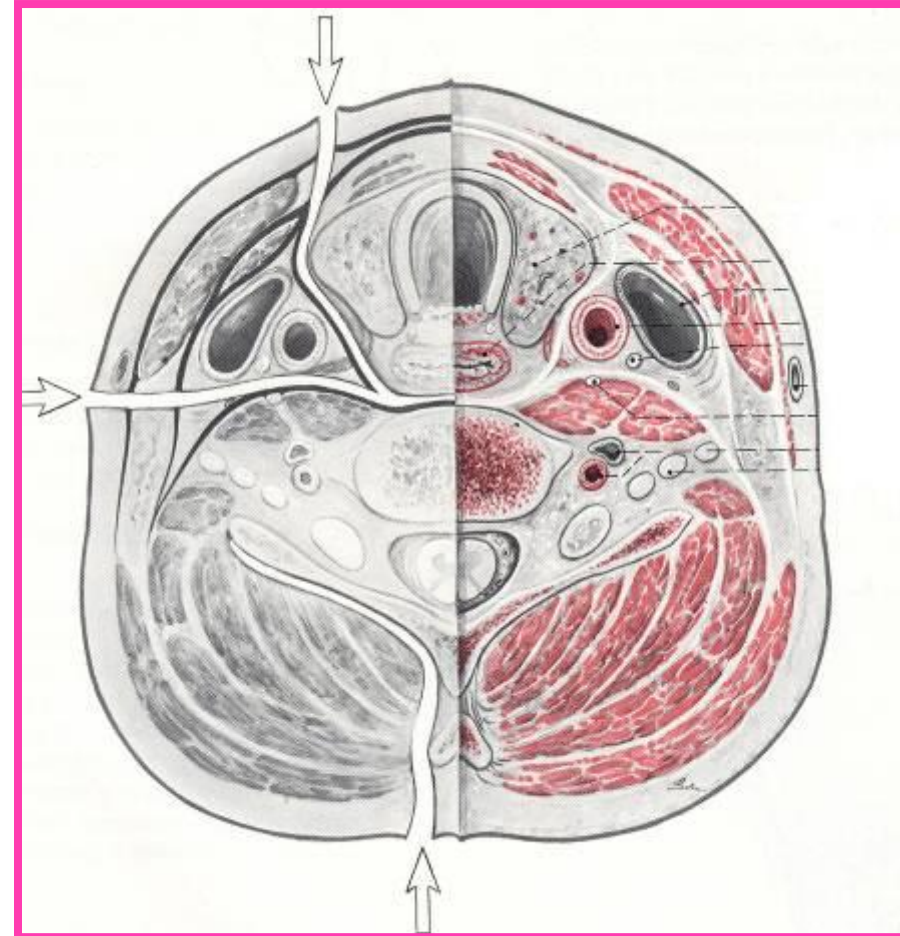
# Surgical approaches

## 1. Anterior

- transoral
- transmandibular
- anterolateral
  - pre SCM
  - retro SCM

(sternocleidomastoid m.)

## 2. Posterior





# **Anterior surgeries**

# Removal of spondylophytes



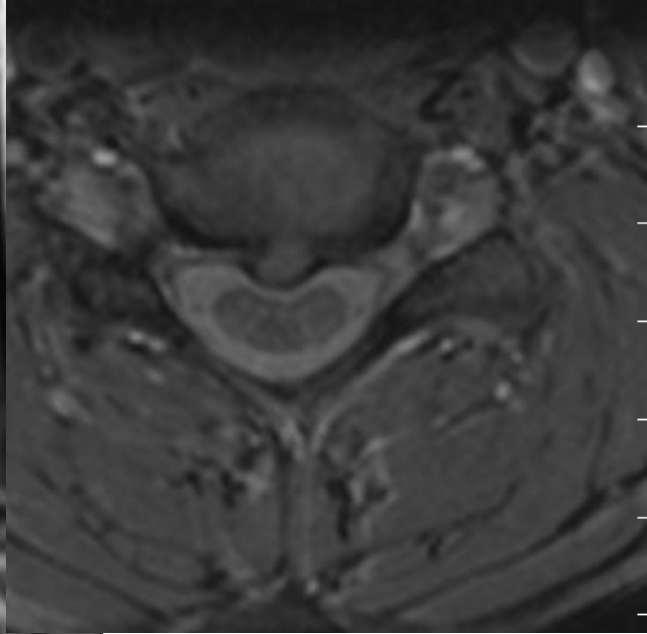
# Swallowing act

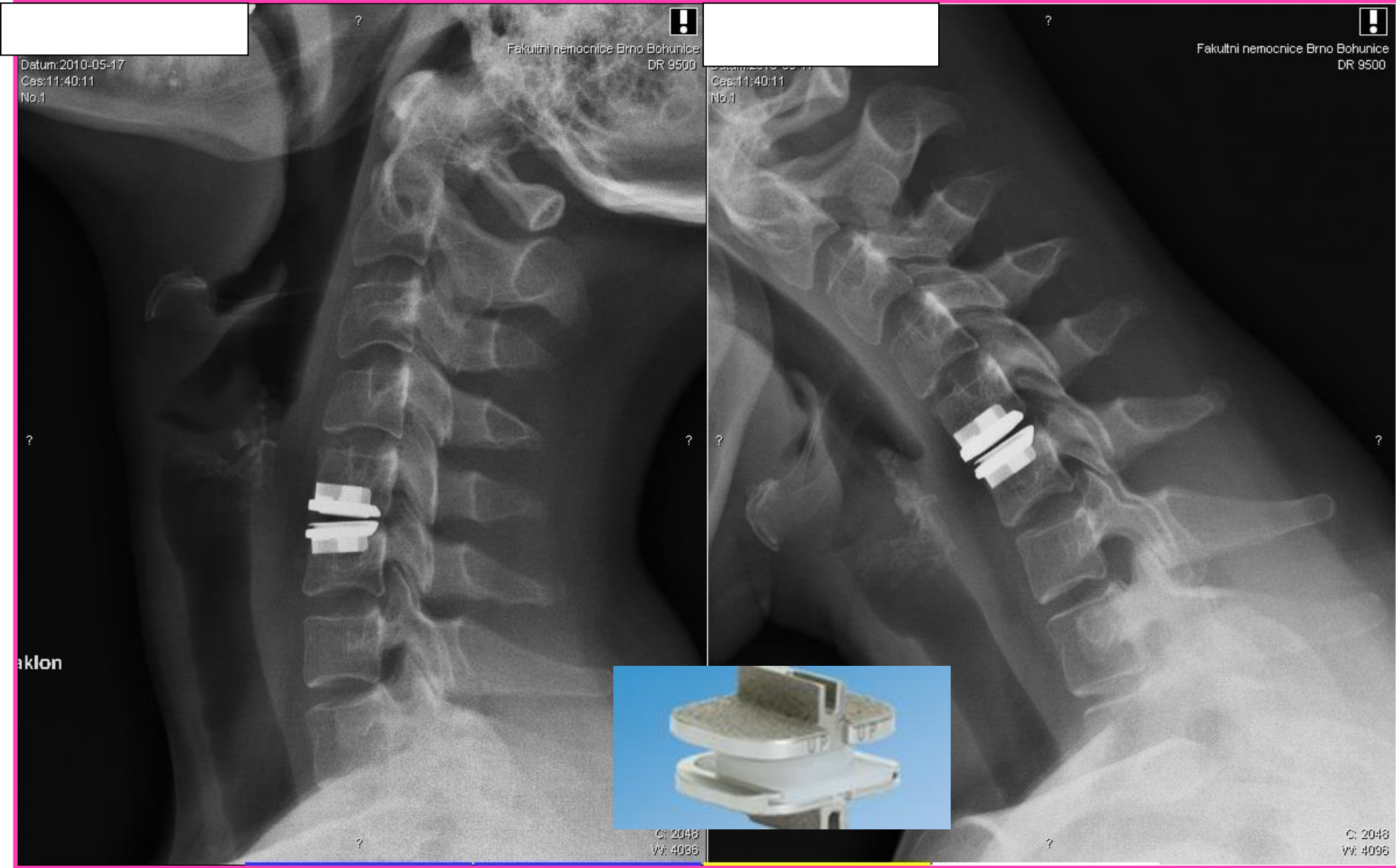


# Anterior surgery – non fusion

- Non fusion technologies – artificial disc – total disc endoprosthesis
- Indication: soft hernia without skeletal degenerative changes







# **Anterior surgeries – fusion techniques**

- Disectomy – replacement by cage or graft**
- Somatectomy 1- several vertebral bodies – replacement by graft, bone cement, cage**
- Fit / recommend to add anterior plate**

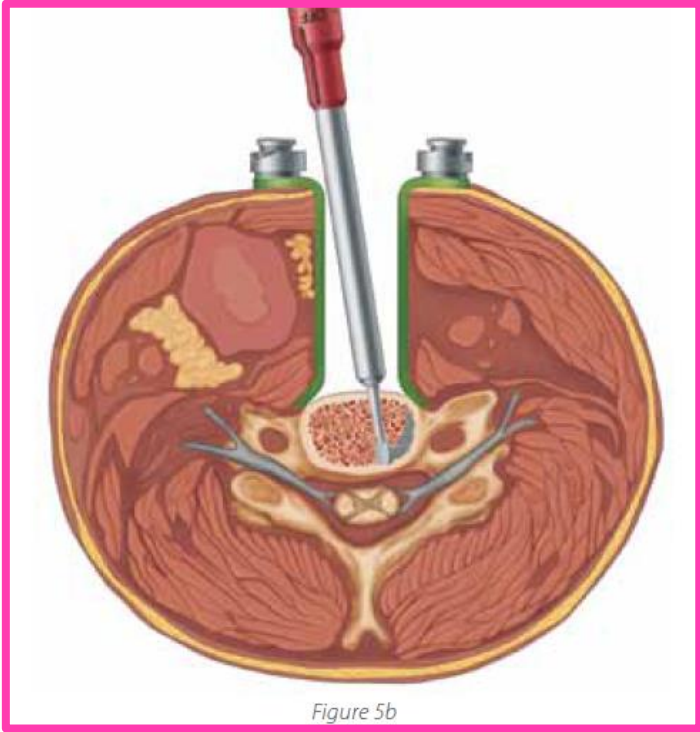
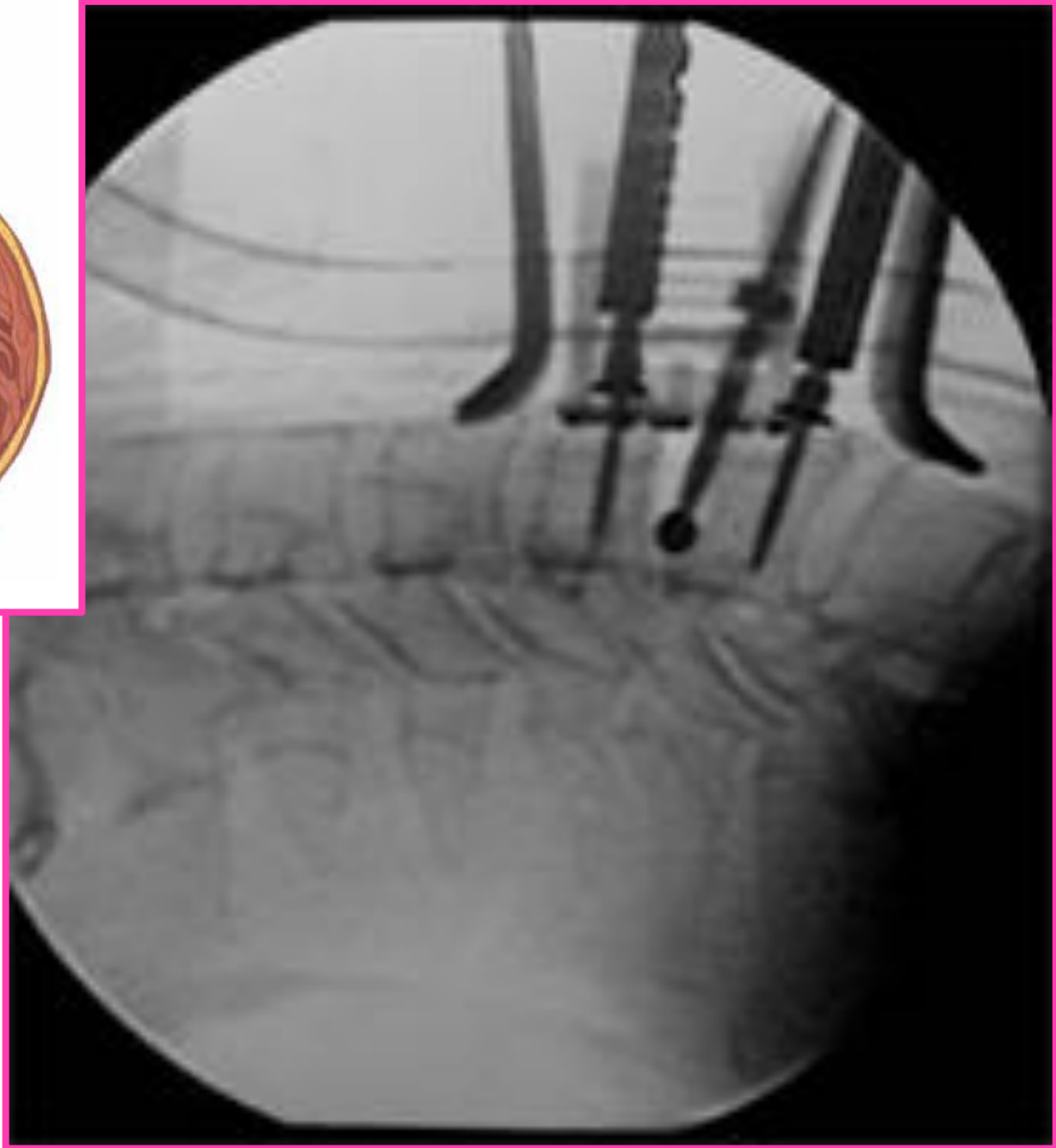


Figure 5b

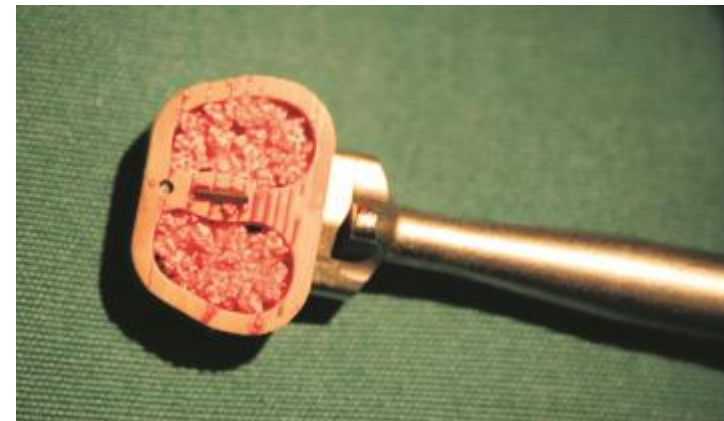




# pelvic autograft



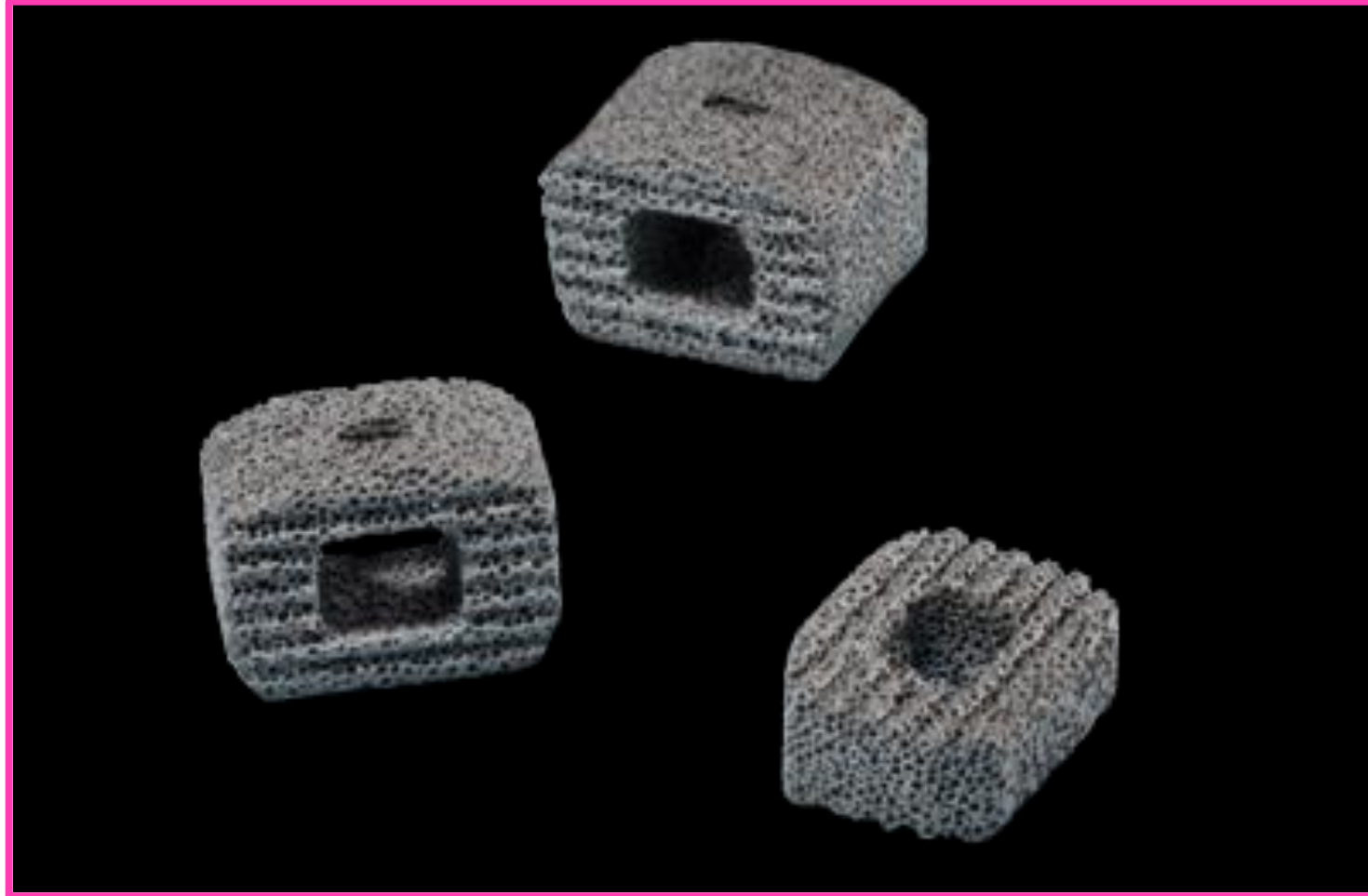
# Polyetheretherketon (PEEK)- polymer



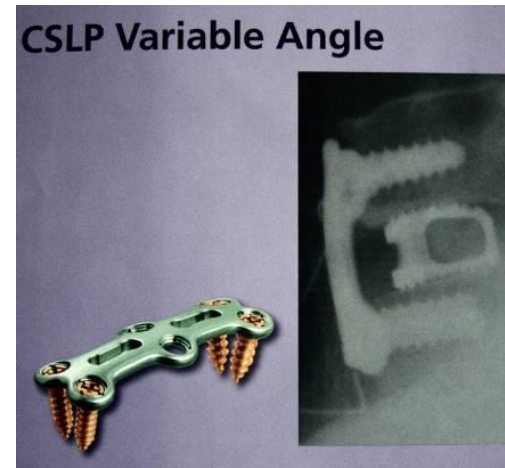
# Titanium implants - cages



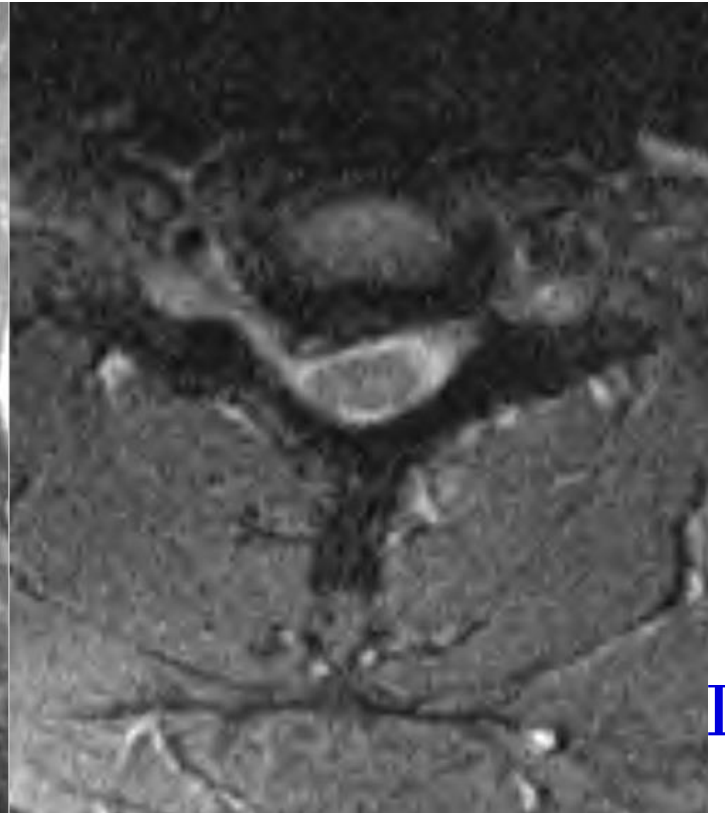
# Trabecular metal

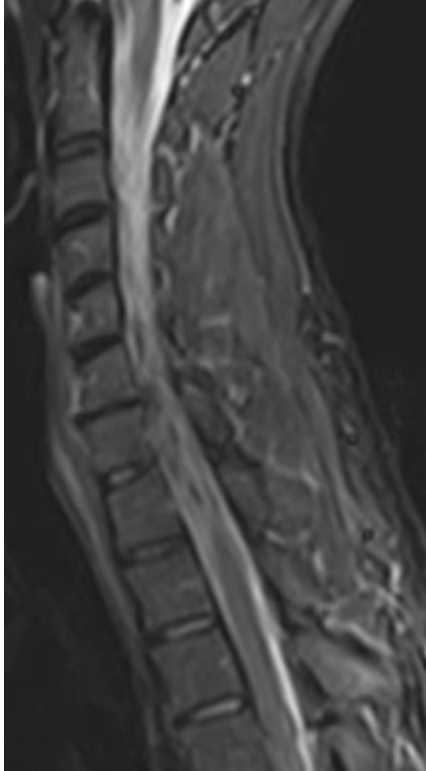
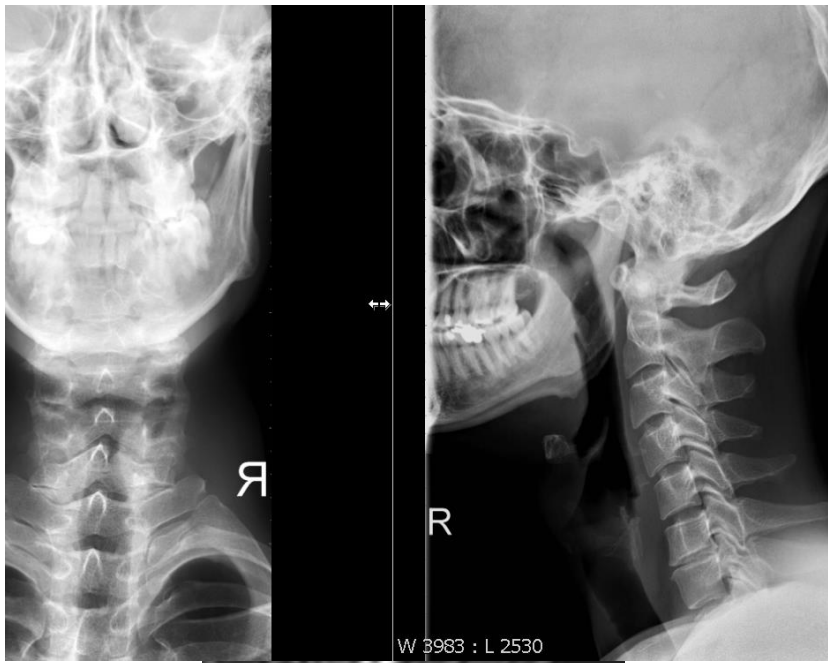


# Cervical plates



# Cervical plates - dynamic

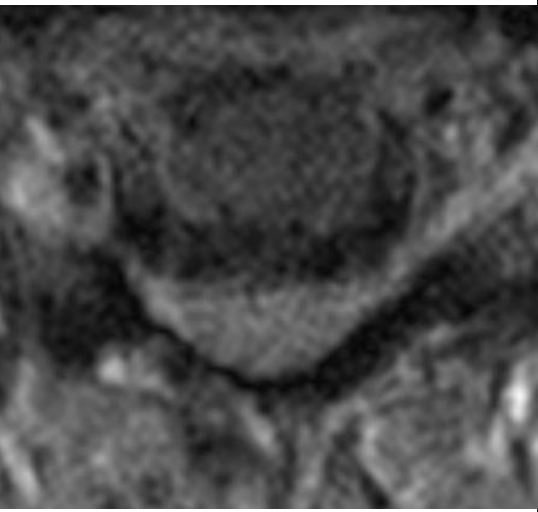




cages







# Posterior approaches - principles

- **Foraminotomy**
- **Laminoplasty**
- **Laminectomy**
- **Stabilisation**

# Posterior approaches

- **Enlargement of spinal canal - decompression**
- **Laminectomy + stabilisation**
- **Laminoplasty in most cases without stabilisation**

# Laminoplasty

- Indication – multilevel, posterior event. combined stenosis, preserved cervical lordosis



# Laminoplasty indication

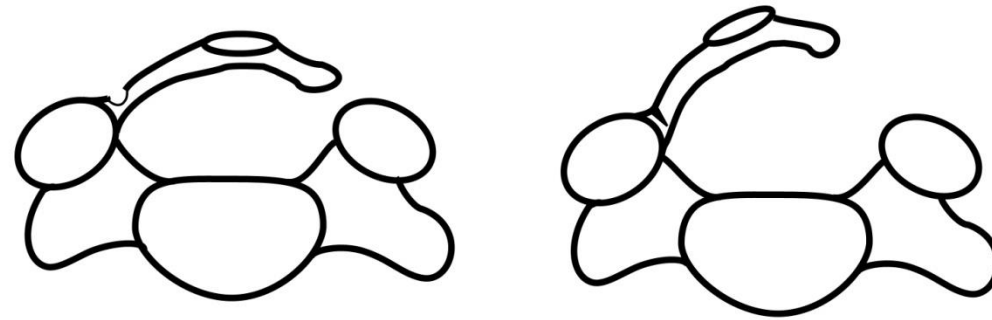
- **CSM – cervical spondylogenic myelopathy**
- **OPPL – ossification of posterior longitudinal ligament**

# Laminoplasty

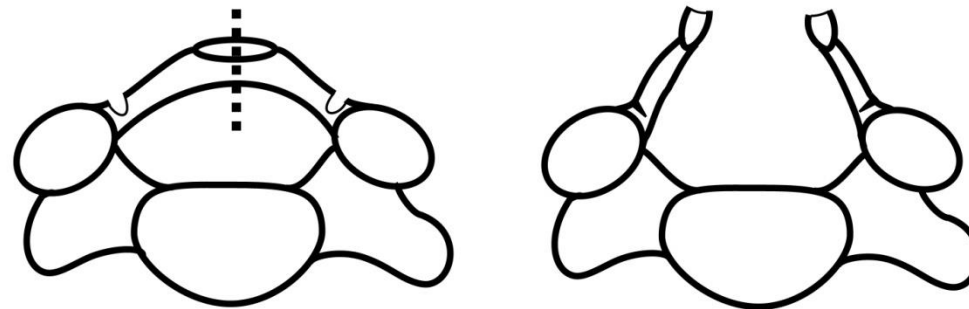
Types – open door x french door

Hirabayshi x Kurokawa

Hirabayshi

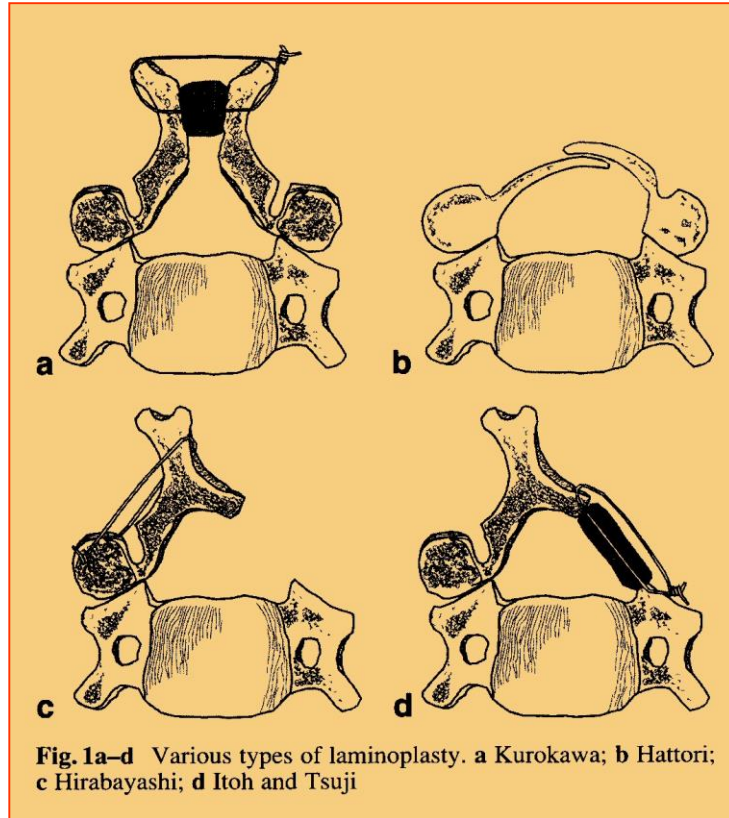


Kurokawa

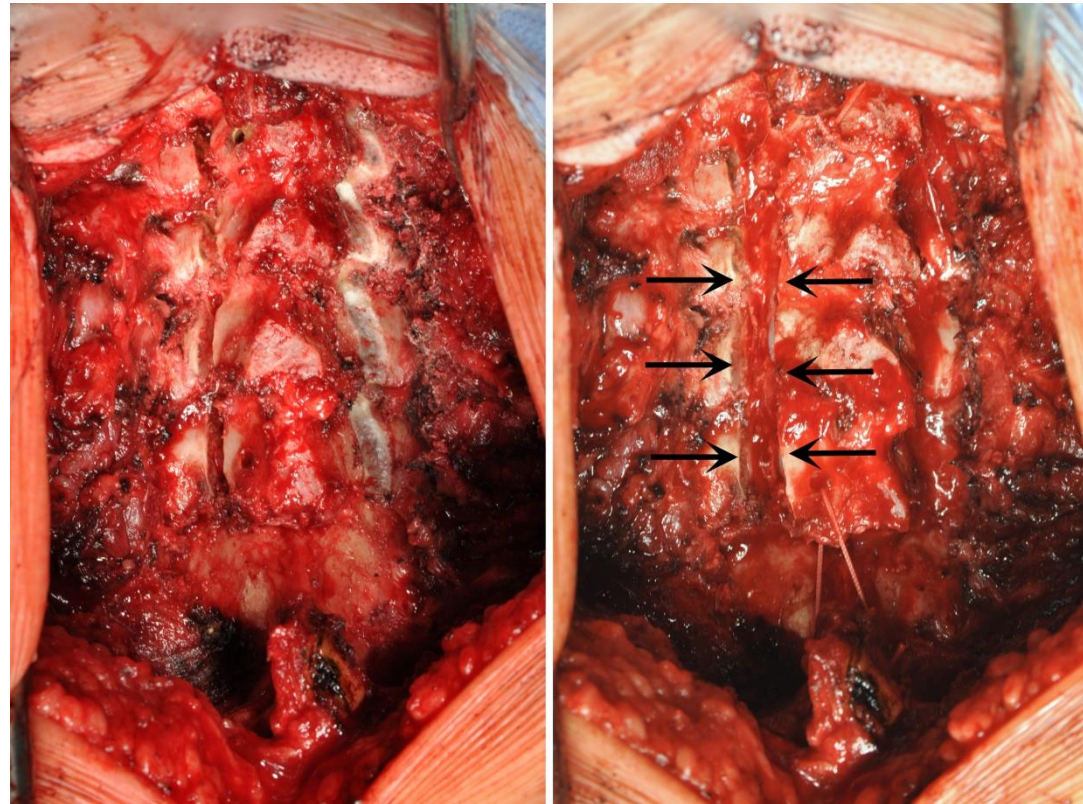
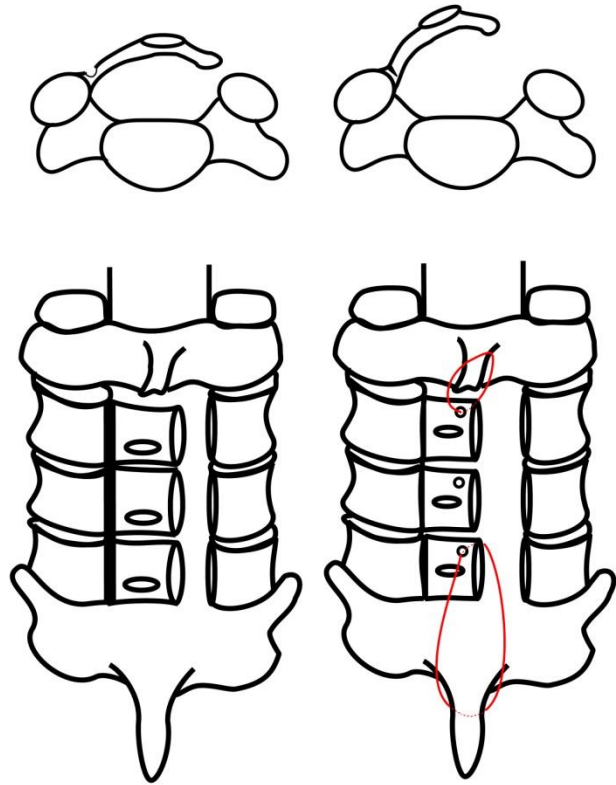


# Laminoplasties

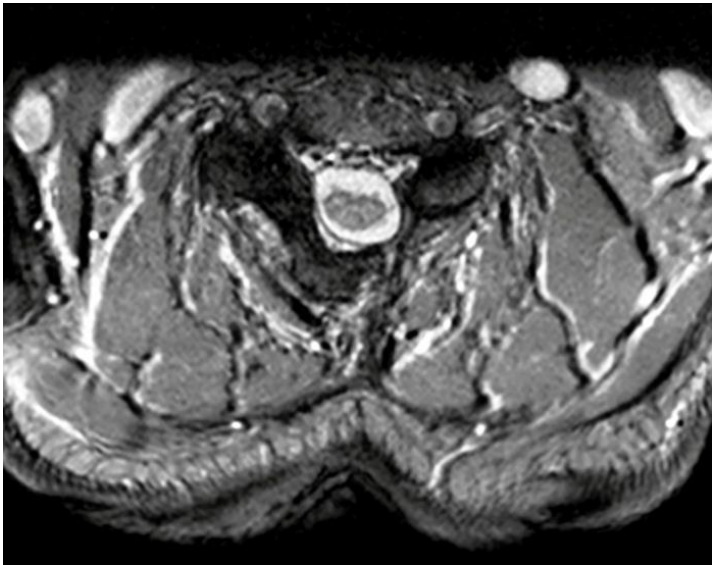
with plates



# Open door laminoplasty



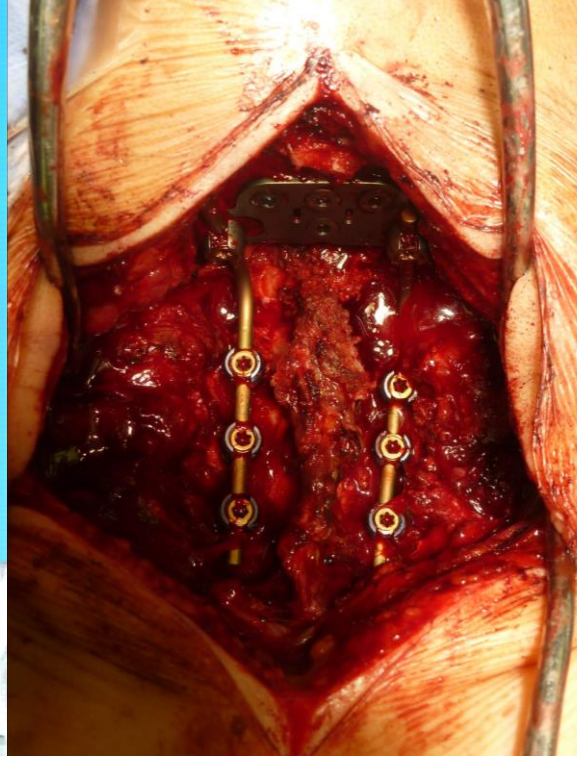


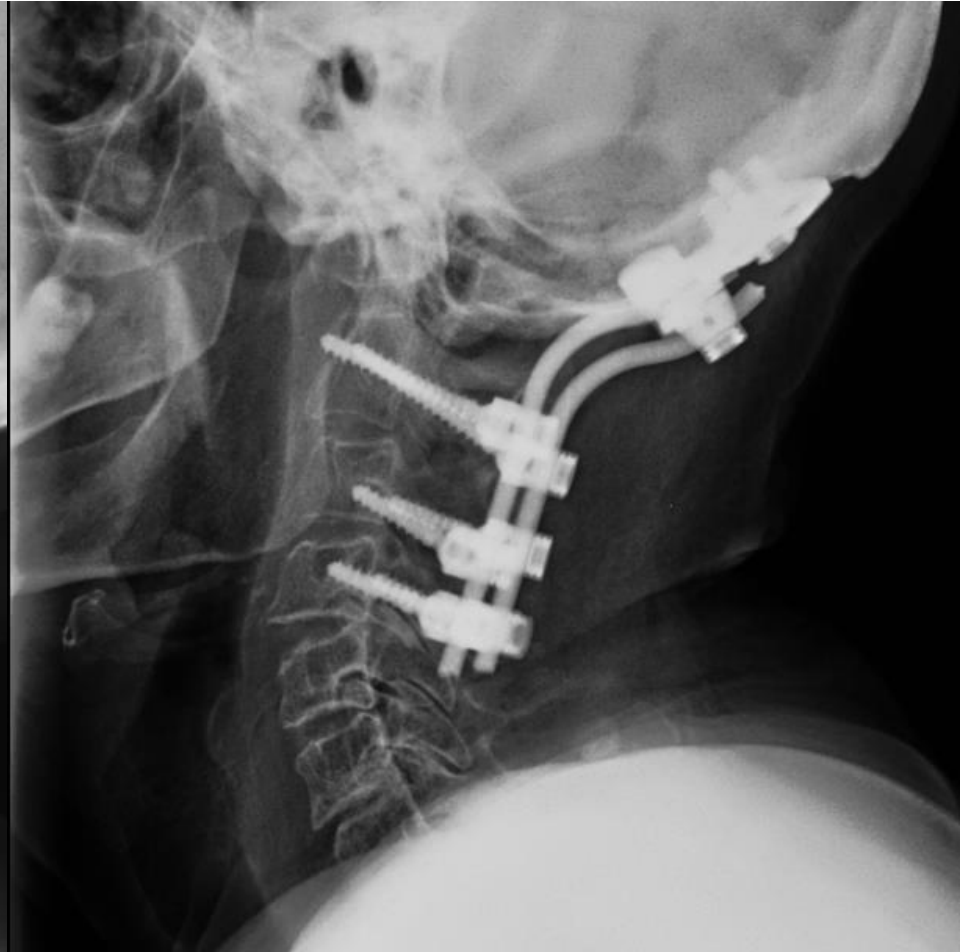


# Principles of stabilisation

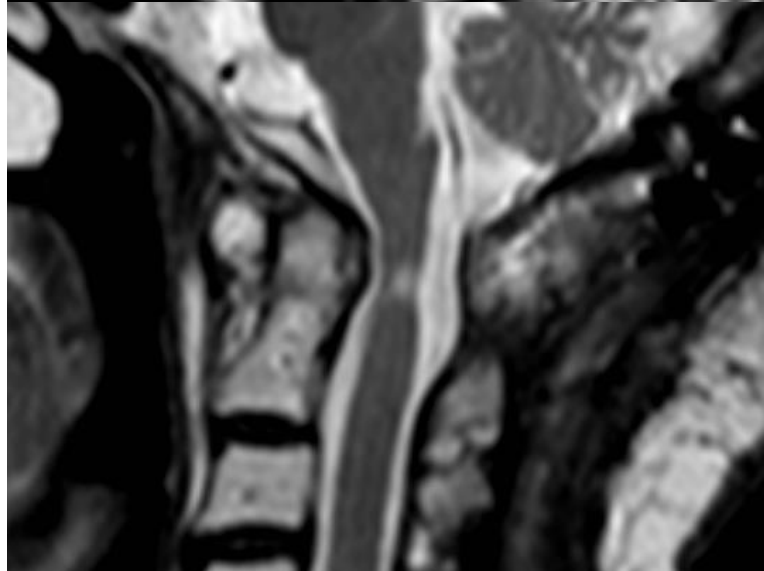
- Occipitocervical fusion
- Sublaminar fixation by loop + graft + event. plate
- Transarticular fixation C1/2
- Fixation by screws and plate / rod

# Occipitocervical fusion





9



DoB:1963-05-12  
2009-08-31  
07:21:14  
No.1

"Thunder Platform"



C: 8192

DoB:1963-05-12  
2009-08-31  
07:25:26  
No.3

"Thunder Platform"



C: 8192

# **Combined surgeries**





20080320  
08:25:30  
No.3

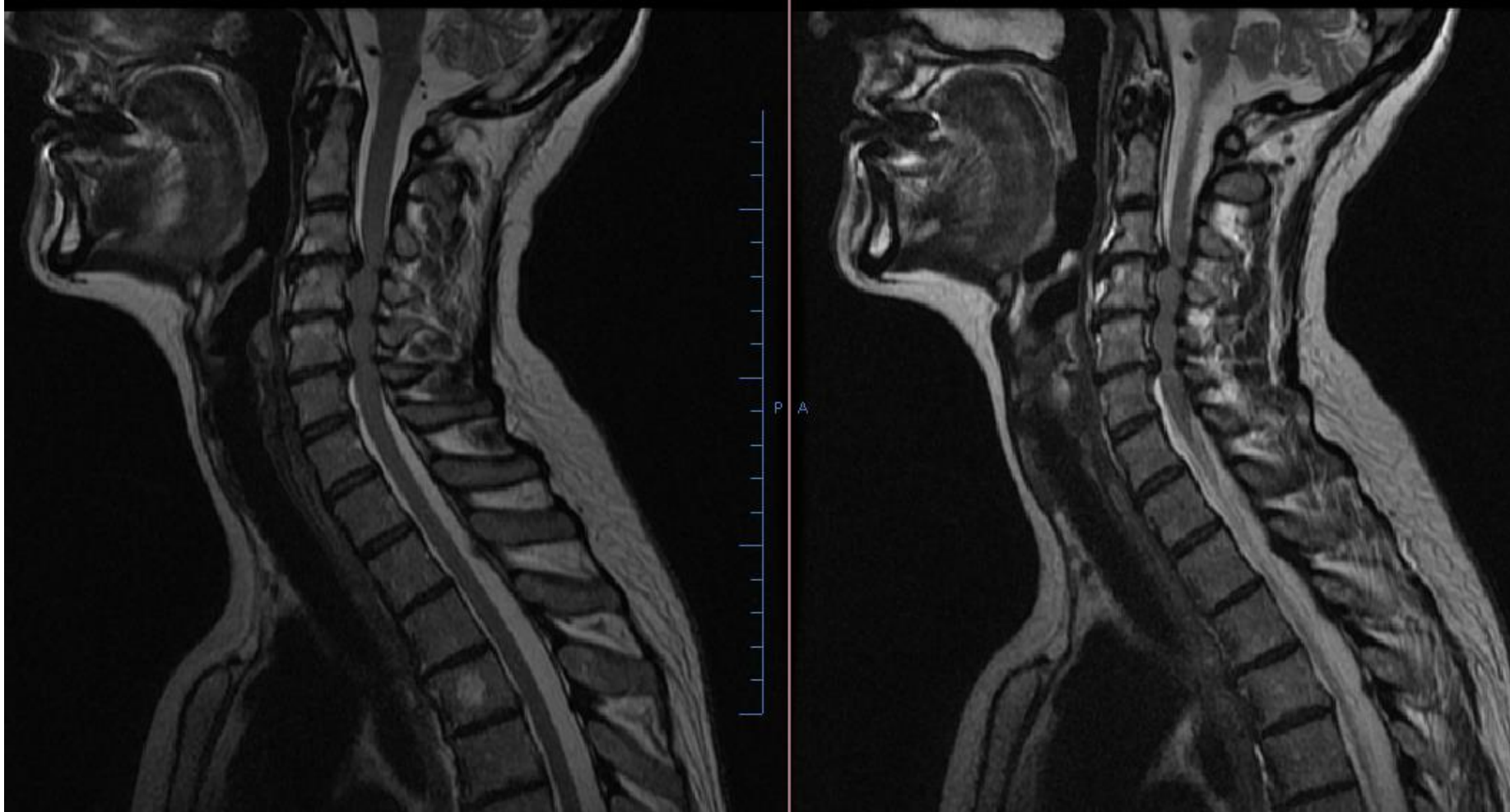


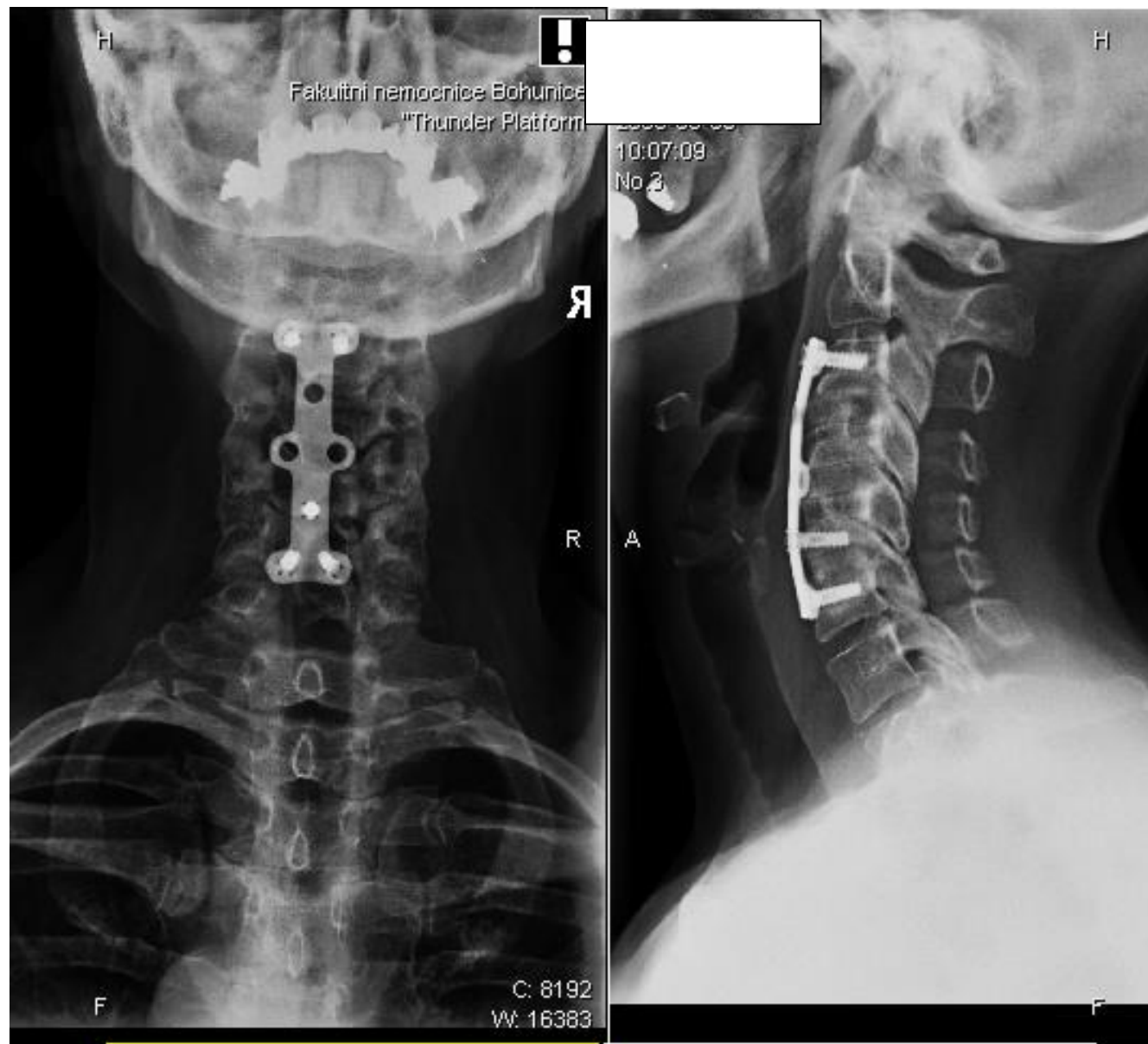
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W: 16369

20080320  
08:26:06  
No.4



C: 8192  
W: 16383

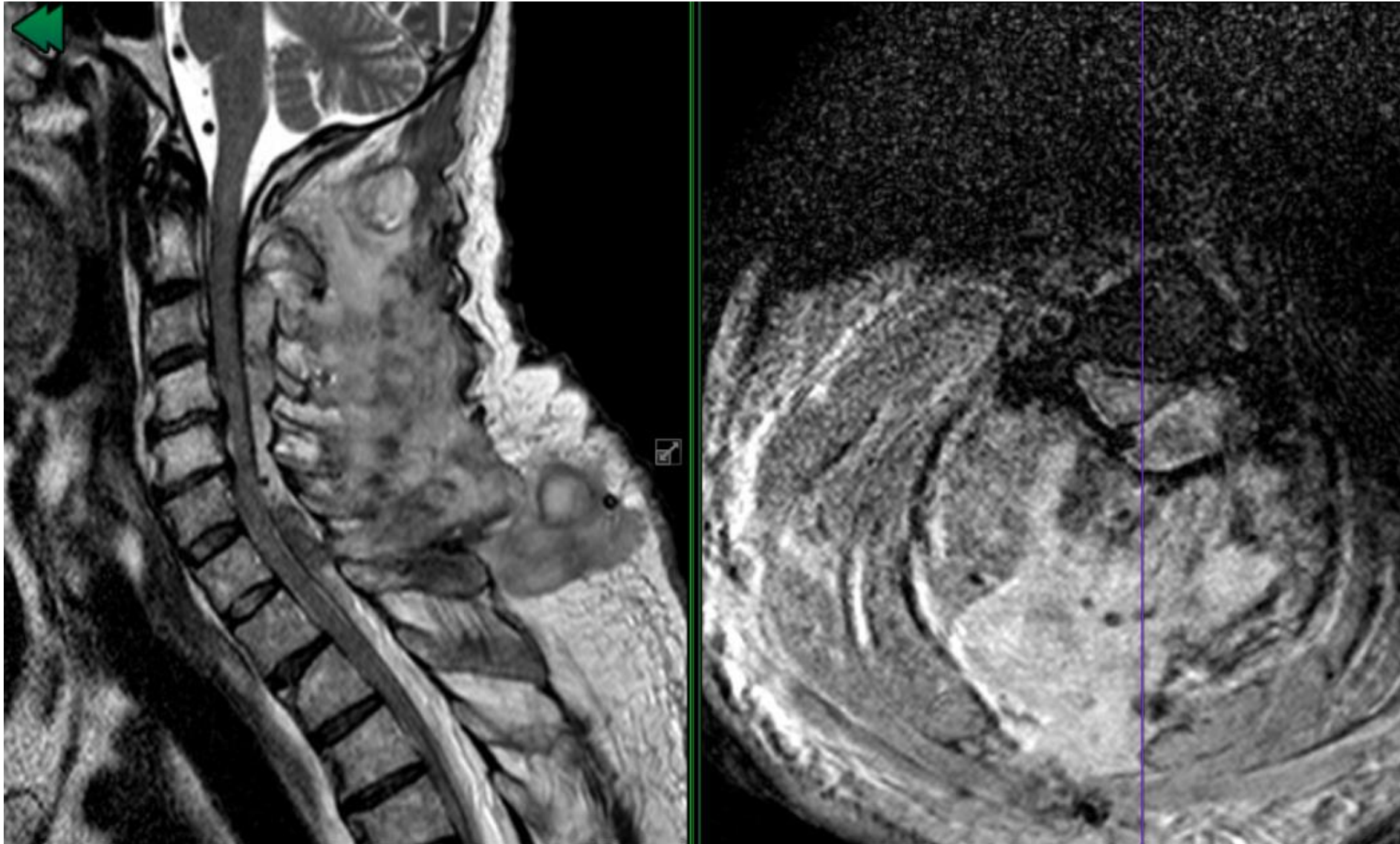




# Complications

- **Early - late**
- **Worsening of neural finding - hematoma, oedema with myelopathy, prominence of soft and bone structures, prominence of implants**
- **MRI - CT**

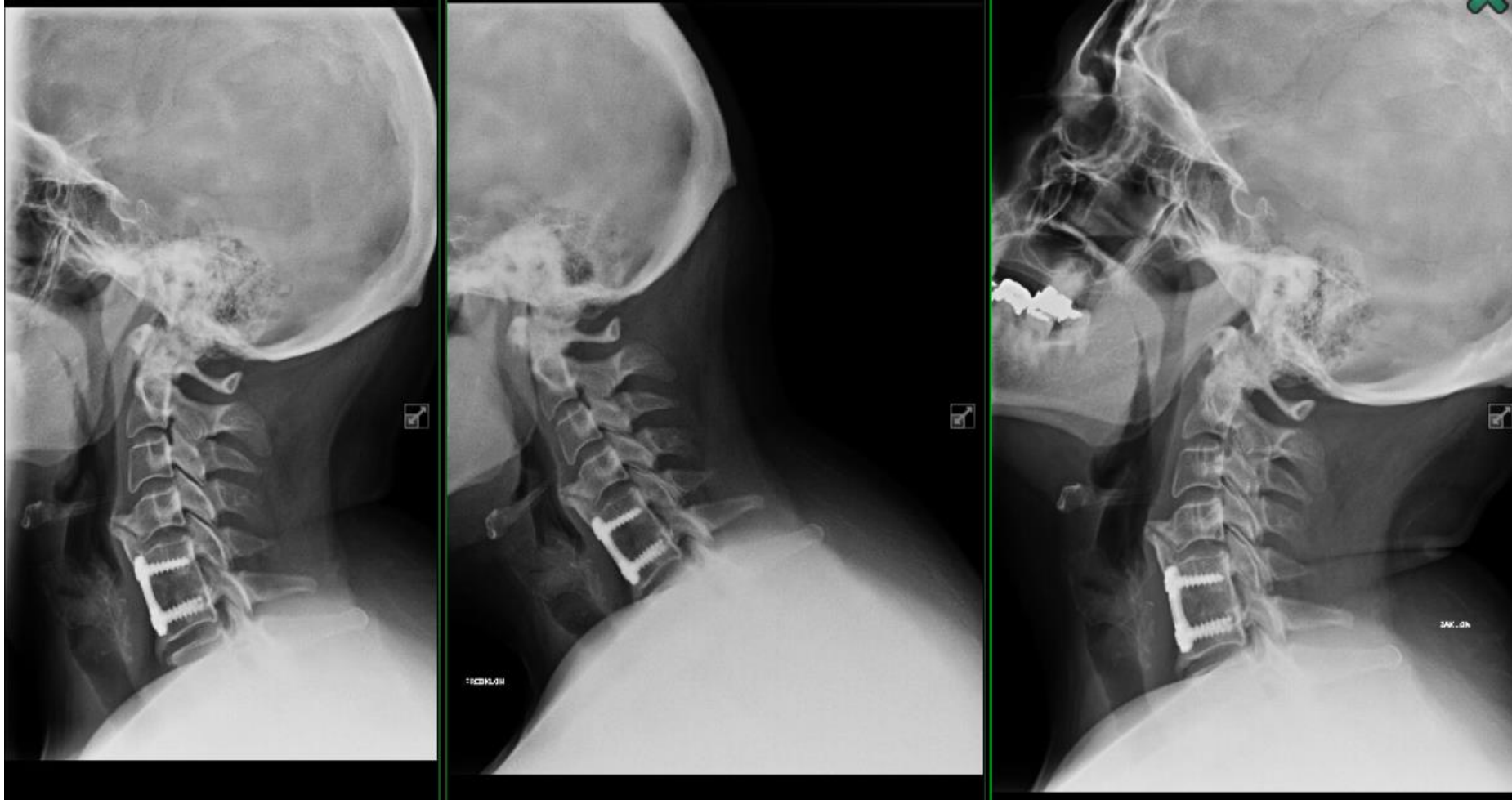
# Complication – worsening of neural deficit

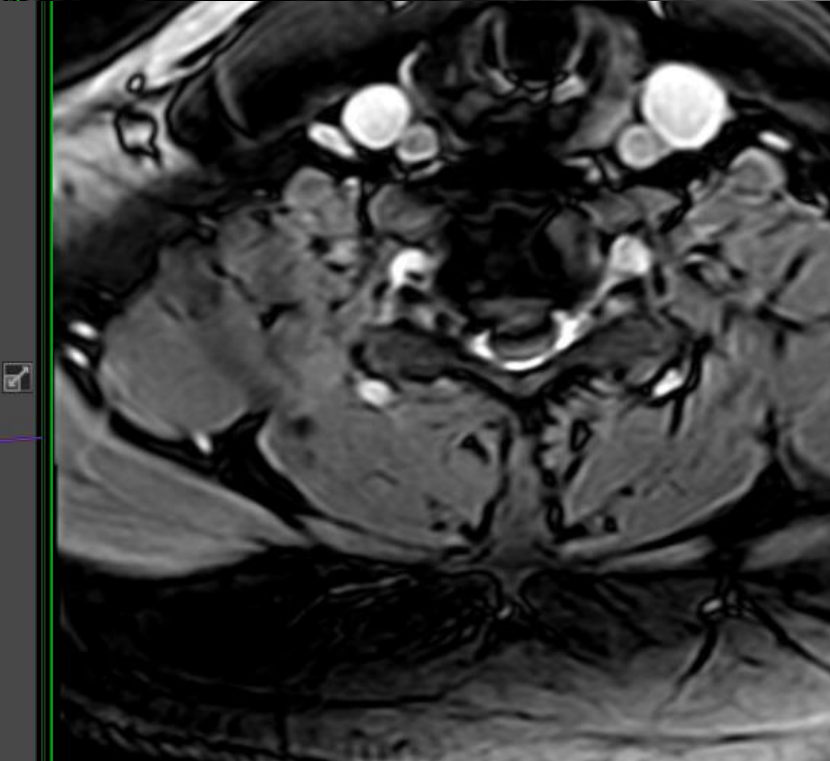
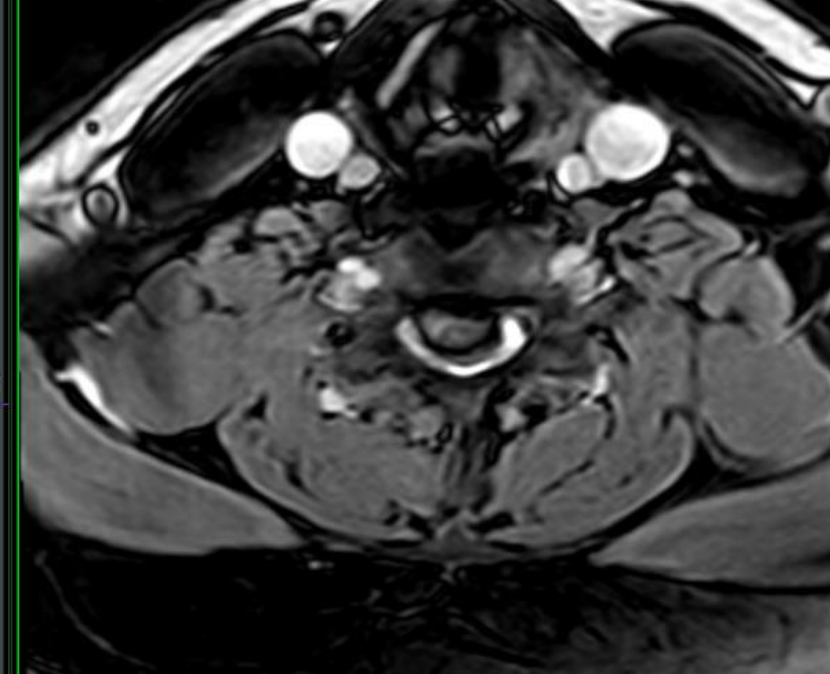
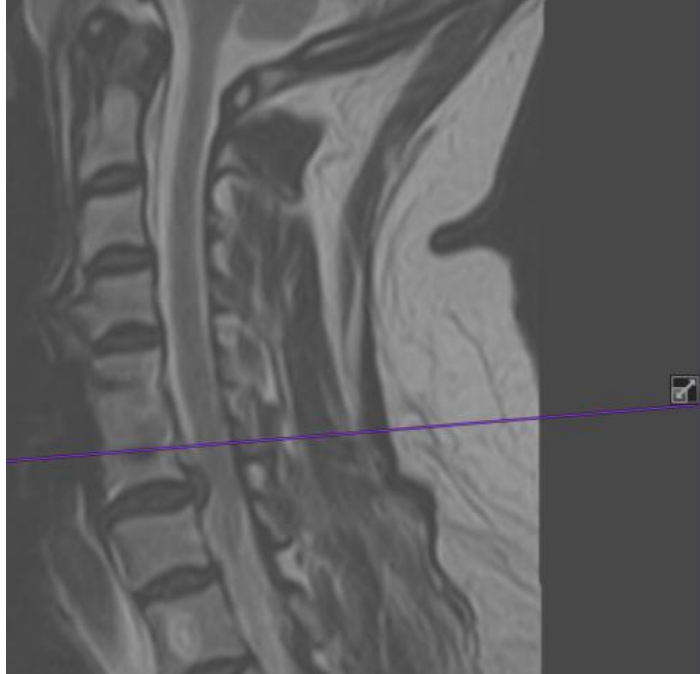




# Late complication

- adjacent segment disease









# Conclusion

- Anamnesis, Clinical, Neurological examination
- X-ray of the whole C spine
- Functional X-ray
- MRI
- CT
- Recommendation



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