# Cervical Myelopathy


- Myelopathy:
- Clinical

- Cord Compression
- Radiographic

# Myelopathy

- Degenerative
- OPLL
- Post-traumatic
- Developmental
- Inflammatory (RA)
- Iatrogenic
- Infectious
- Neoplastic

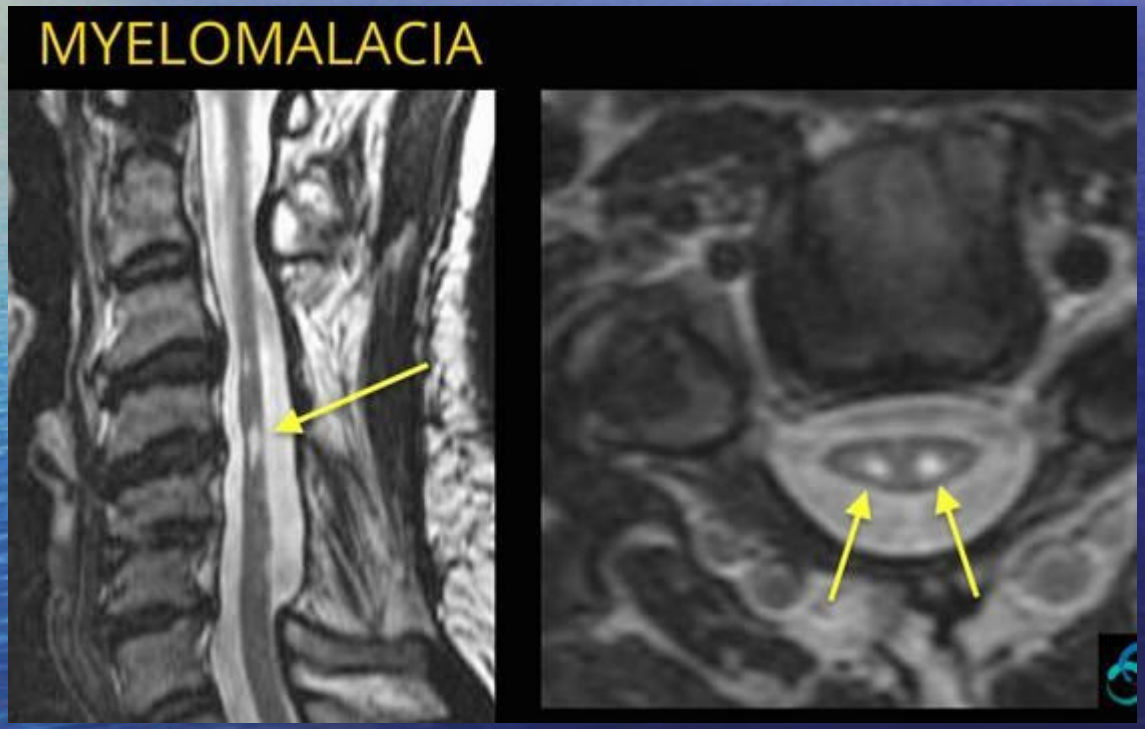
Interpretations in three dimensions of dermatome diagrams from Drake RL, Vogl W, Mitchell AWM (2005), Gray's Anatomy for Students.

# Radiographic Cord Compression

- Grade 1 Myelomalacia - edema

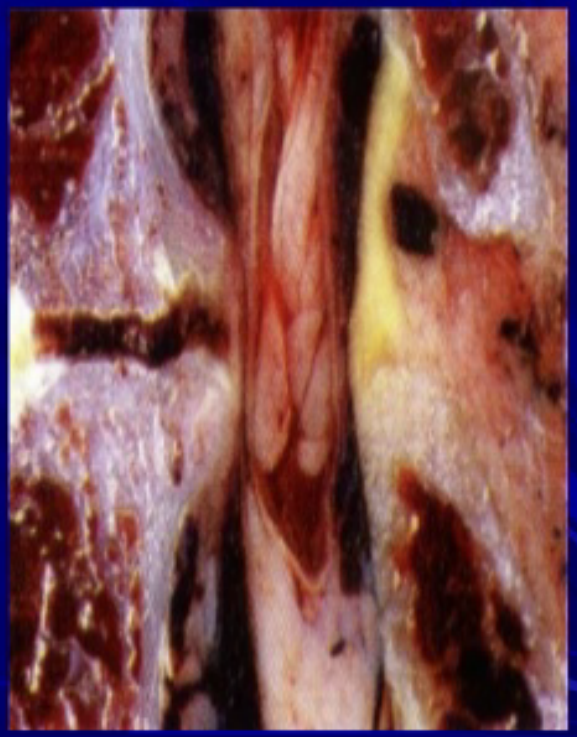
# .Myelomalacia Grade 2 - Gliosis

# Myelomalacia – Grade 3 Snake Eyes



# Myelopathy

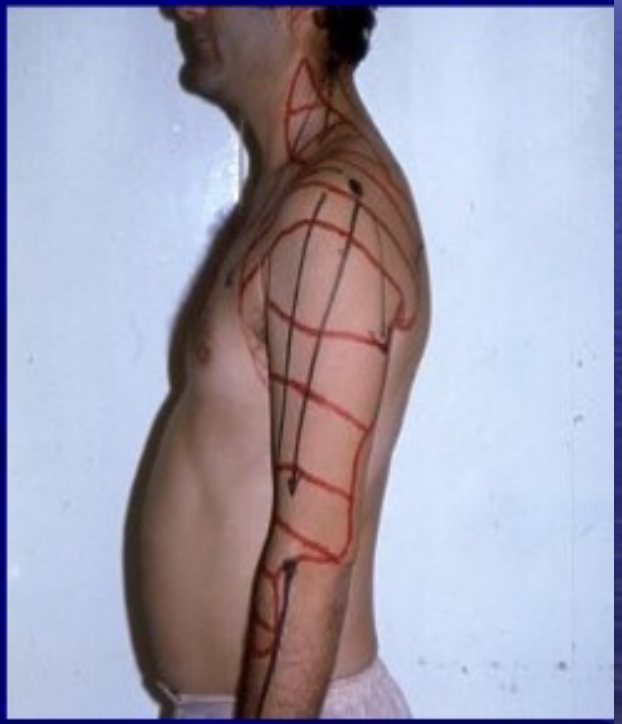
- Canal dimensions
  - 17 mm (13 – 20 mm) midsagital diameter
  - < 13 mm – congenital stenosis
- Cord dimensions
  - 10 mm (8.5 – 11.5), 90 – 100 $mm^2$
  - < 60 $mm^2$ (Penning et al, 1986)
  - Better recovery > 40 $mm^2$, A-P ratio > 0.40
- Vascular factors
  - Brieg et al, 1952 – spondylosis leads to decreased flow in anterior brances
- Dynamic factors
  - Hyperextension
  - Pincer effect
  - Hypermobility above stiff segment
  - Dynamic cord and vascular changes
- Cord degeneration
  - Irreversible cord changes – demyelination, cavitation, gliosis, wallerian degeneration



# Neck pain – Radiculopathy

- 43% complete resolution
- 25% mild residual pain
- 32% moderate or severe pain
- Radicular symptoms – less favourable
- Treatment did not influence outcome

*(Gore et al. Spine 1987)*



# Myelopathy

- Did not follow radiculopathy
- Episodic progression, static disability for years
- Progressive deterioration rare

*(Lees et al, BMJ 1963)*

- Disability established early
- Static periods for many years

*(Nurick, Brain 1972)*

- 67% steady progressive deterioration

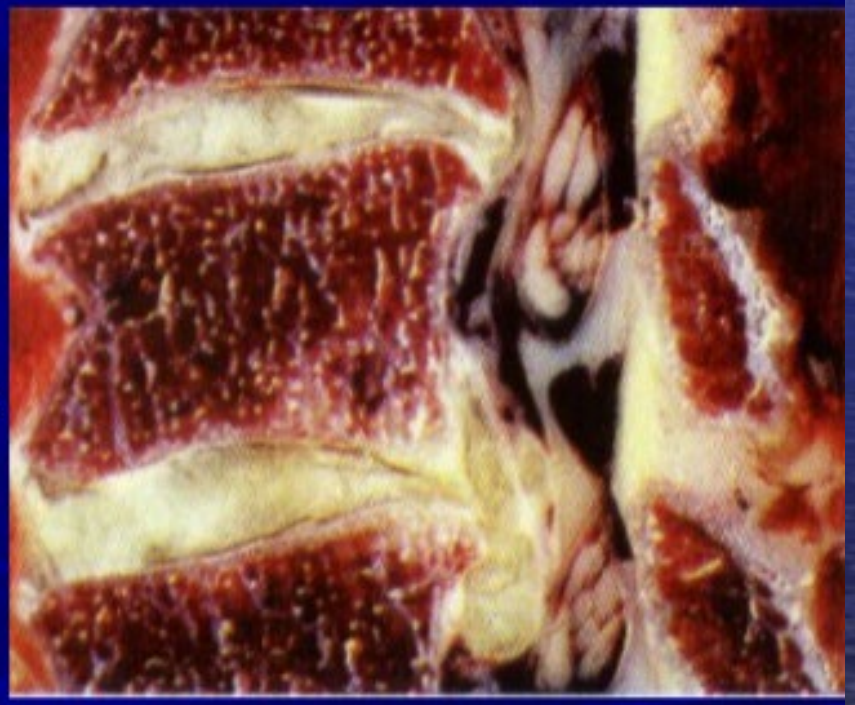
*(Symon et al, Neurology 1967)*

- Poor prognosis
- Non improvement if symptoms > 2 years

*(Phillips, J. Neur. 1973)*

# Myelopathy

- Medial
- Lateral
- Combined
- Vascular
  *(Ferguson & Caplan)*
- Transverse lesion
- Motor system
- Central cord
  *(Grandall & Bartzdorf)*
- Brachial and cord syndrome
  *(Brown & Sequard)*
- Neck pain 50%
- Radicular pain 38%
- Radiating pain 27%
- Bladder – Bowel 44%
  *(Grandall & Bartzdorf 62 pts)*



**Cont…**

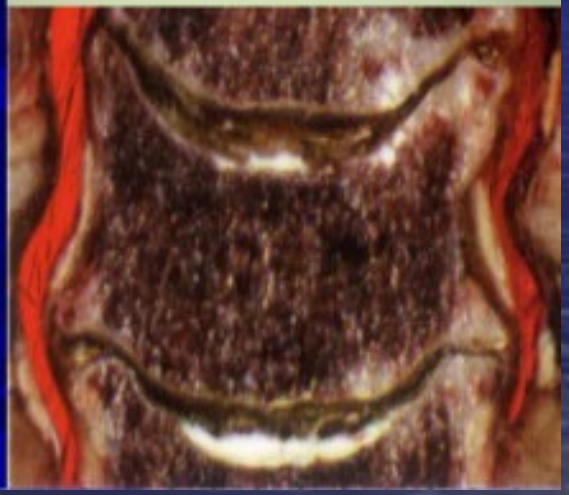
- Unsteady gait
- Ataxic
- Spastic
- Romberg's
- Reflexes
- Hyperflexia
- Clonus
- Absent supf reflexes
- Pathologic reflexes
- Sensory examination
- Light touch
- Sharp touch
- Vibration - proprioception

Cont…

- Myelopathy's hand
  - Clumsiness
  - Intrinsic wasting
  - Finger escape sign
  - Grip and release test
- Watch out for:
  - Multiple sclerosis
  - ALS
  - Subacute combined degeneration
  - Peripheral neuropathy
  - Tumors - infection

# Atypical clinical presentations of cervical spondylosis

- Cervical angina
- Chronic breast pain
- Facial pain
- Spurs – dysphagia, dysphonia, dyspnea
- Vertebral artery thrombosis
- Hemiparesis
- Sympathetic involvement
- Combined with lumbar stenosis – peripheral neuropahy

# Nurick grading of disability based on gait abnormality

| | |
|---|---|
| Grade I | No difficulty in walking |
| Grade II | Mild gait involvement. Does not interfere with employment |
| Grade III | Gait abnormality prevents employment |
| Grade IV | Able to ambulate only with assistance |
| Grade V | Chairbound or bedridden |

**Chart 1.** *JOA Scale.*

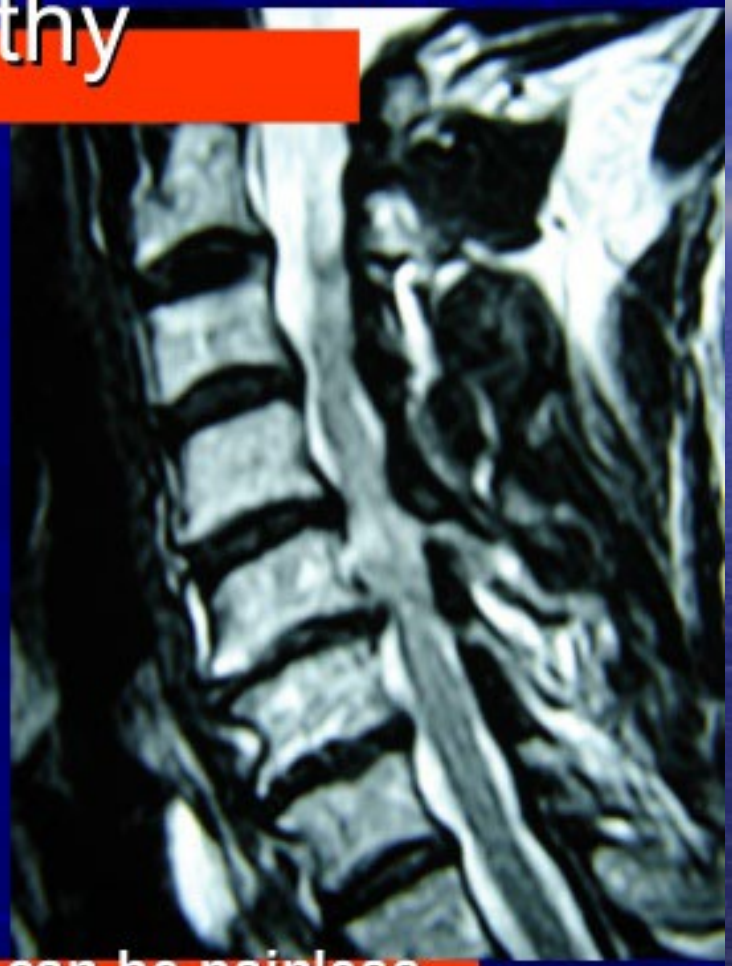
| Scale for clinical evaluation of myelopathy – Japanese Orthopedic Association (JOA): 0 to 17 points | Points |
|---|---|
| **I – Motor function of the upper limb** | |
| -Impossible to eat with cutlery or to button shirt | 0 |
| -Possible to eat with cutlery, impossible to button shirt | 1 |
| -Possible to button shirt, with great difficulty | 2 |
| -Possible to button shirt, with difficulty | 3 |
| -Normal | 4 |
| **II – Motor function of the lower limb** | |
| -Impossible to walk | 0 |
| -Needs cane or assistance on flat surface | 1 |
| -Needs assistance on stairs | 2 |
| -Walks unaided, but slowly | 3 |
| - Normal | 4 |
| **III – Sensory function** | |
| Upper limb | |
| -Apparent sensory disorder | 0 |
| -Minimal sensory disorder | 1 |
| -Normal | 2 |
| Lower limb | |
| -Apparent sensory disorder | 0 |
| -Minimal sensory disorder | 1 |
| -Normal | 2 |
| Trunk | |
| -Apparent sensory disorder | 0 |
| -Minimal sensory disorder | 1 |
| -Normal | 2 |
| **IV – Bladder function** | |
| -Urinary retention or incontinence | 0 |
| -Sensation of retention, loss of slight flow | 1 |
| -Urinary retention and/or increase in urinary frequency | 2 |
| -Normal | 3 |

# Myelopathy

- Conservative care of spondylotic myelopathy limited
- Observation of myelopathy caused by soft disc herniation is acceptable with close attention to progression of signs or symptoms

– Options include:

- Immobilization of the neck with an orthosis and rest to reduce neural irritation
- Traction or epidural steroids not recommended



**Cervical Myelopathy can be painless and have an insidious onset.**

Cont…

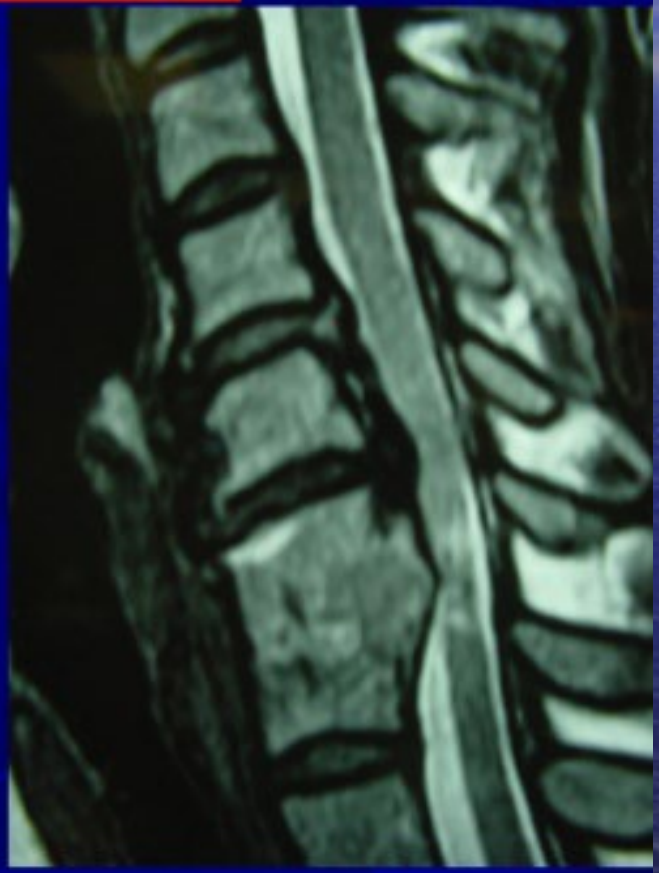
# Surgical indications

Three basic goals

- Decompression of neural elements
- Stabilization of unstable segments
- Ablation of painful articulations

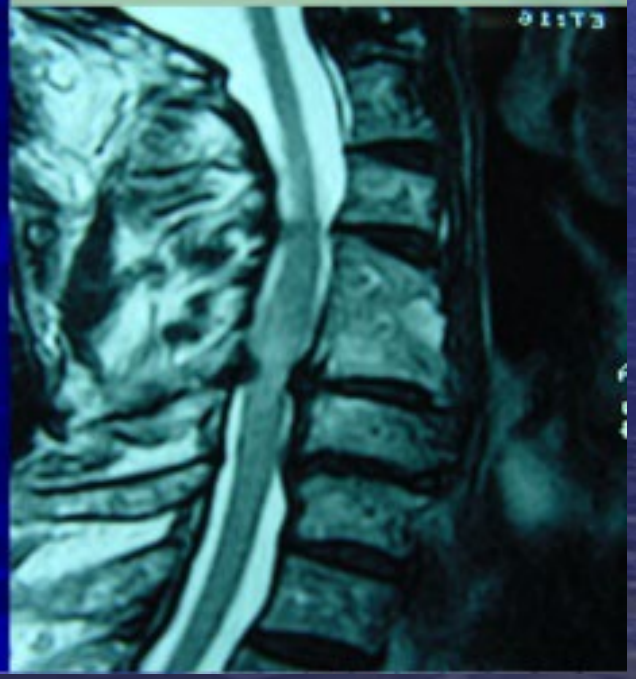
# Myelopathy

- Operative treatment
  - Options
    - Anterior procedure
      - √ Discectomy(ies) and stabilization
      - √ Corpectomy(ies) and stabilization
    - Posterior procedures
      - √ Laminectomies
      - √ Laminectomies and stabilization
      - √ Laminoplasty



# Indications

- Better for central soft disc herniation or bilateral radiculopathy on the same level
- Unilateral soft disc or foraminal stenosis
- **1 or 2 level spondylotic myelopathy**

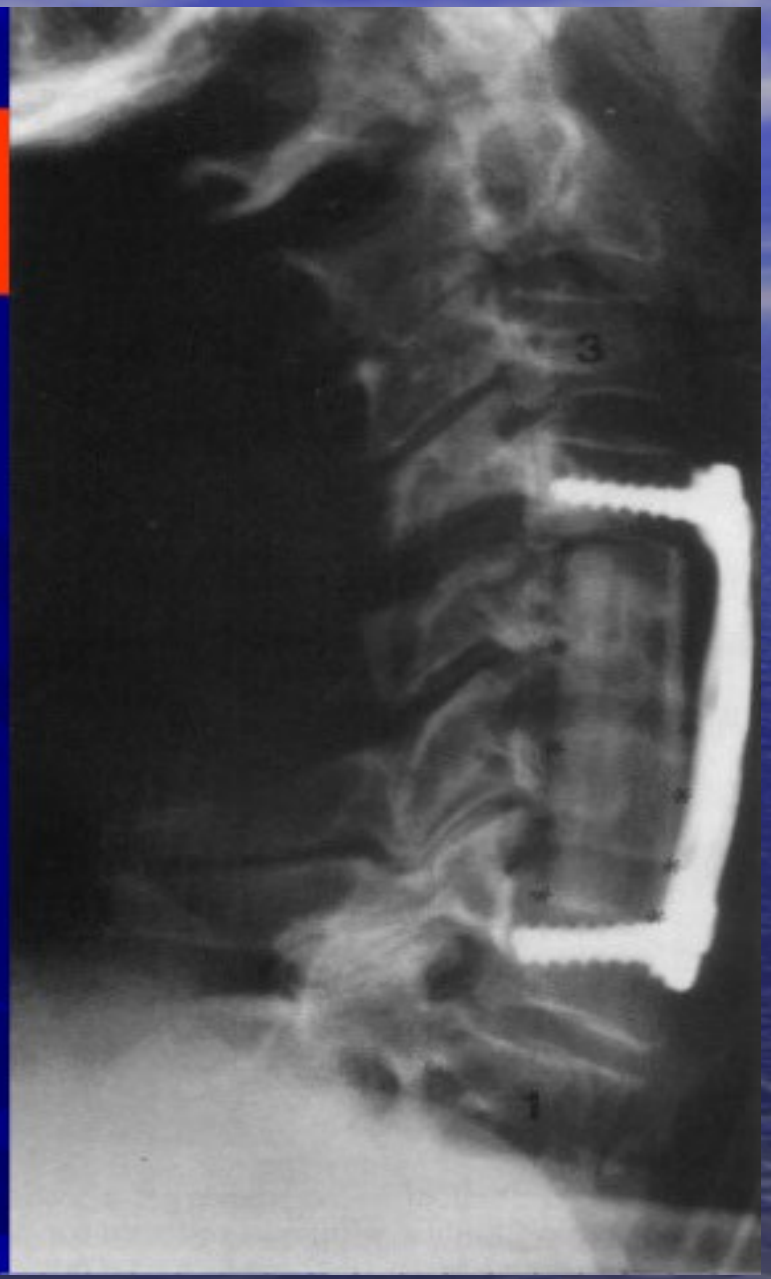
# Contra-Indication

- Cervical stenosis due to pathology of the posterior elements

## Anterior Cervical Corpectomy(ies) fusion and stabilization

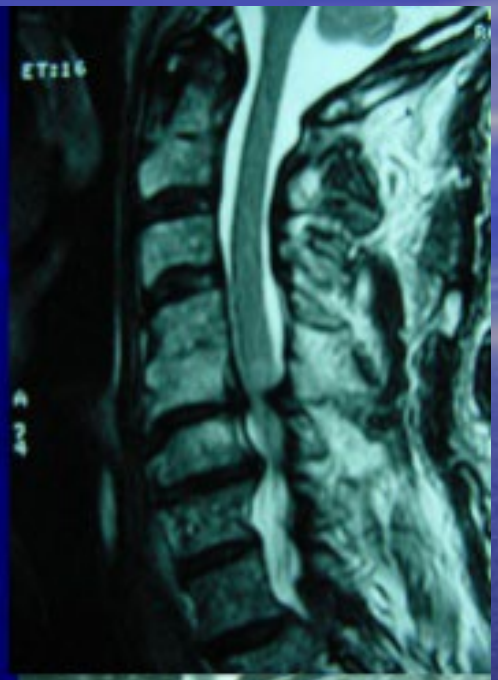
### Advantages

- allows for more complete cord decompression
- may be safer
  - better visualization
  - less distraction
- higher fusion rate
- less levels to fuse



# Indications

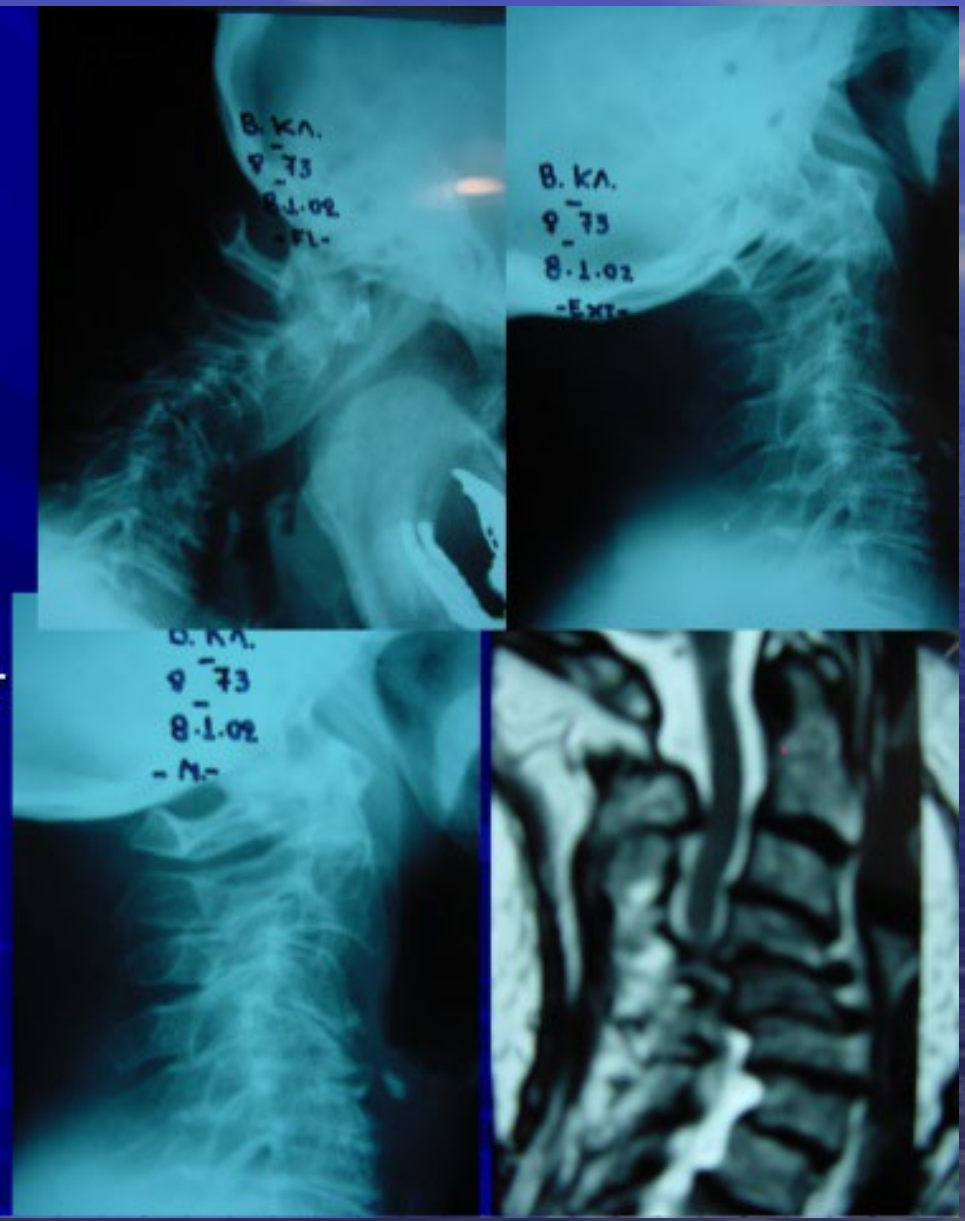
- Unilateral disc herniation or foraminal stenosis
- Cervical spondylotic myelopathy due to > 3 level pathology
  - Congenital stenosis
  - Ossification of posterior longitudinal ligament (OPLL)
- Cervical stenosis due to degeneration – hypertrophy of posterior cervical elements
- Prior anterior cervical procedures (±)

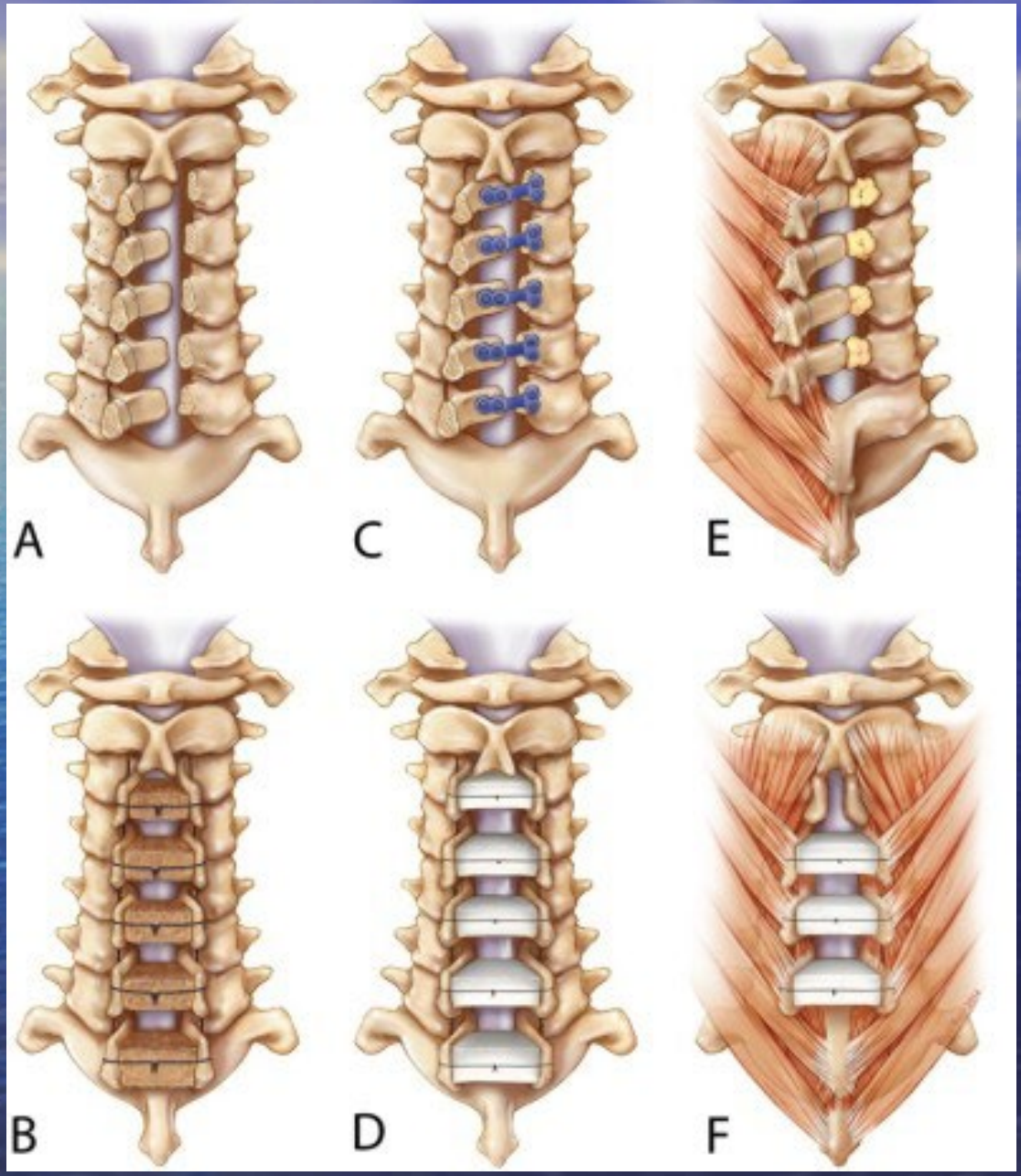


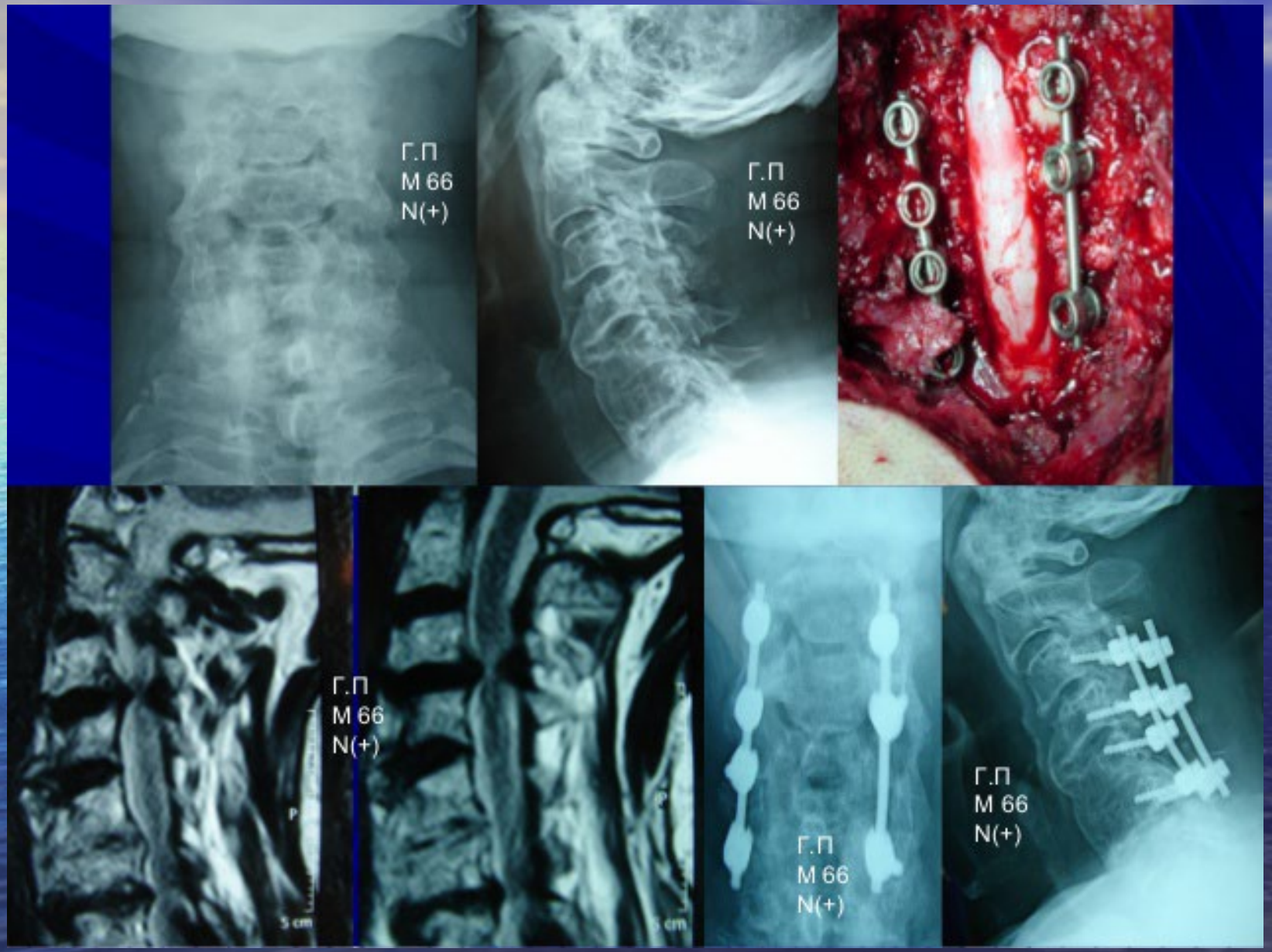
**The cervical spine must be in lordosis**

# Contra-indications

- Pre-existed cervical kyphosis
- Pathology of the anterior vertebral elements (±)




A
C
E
B
D
F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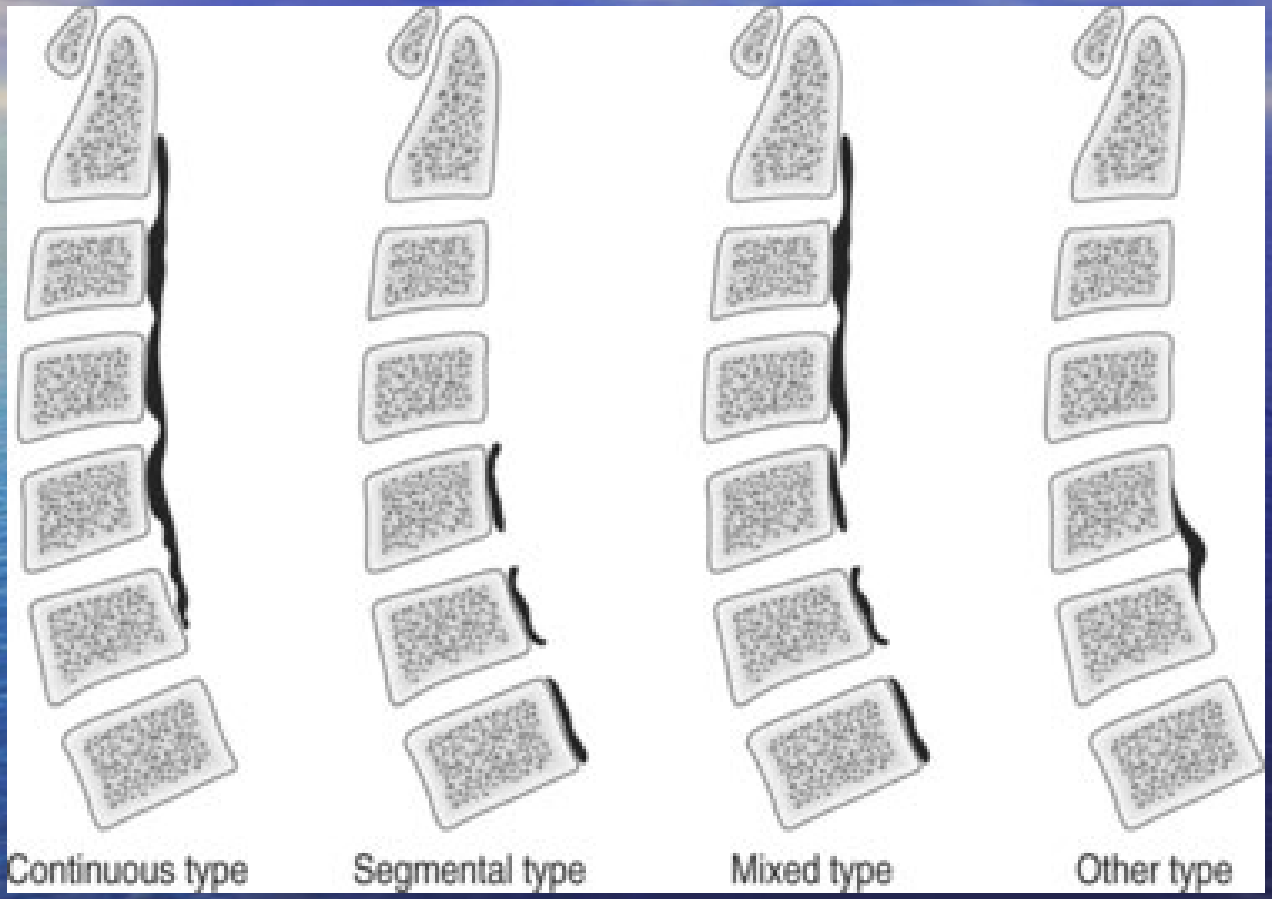
# OPLL


Continuous type
Segmental type
Mixed type
Other type