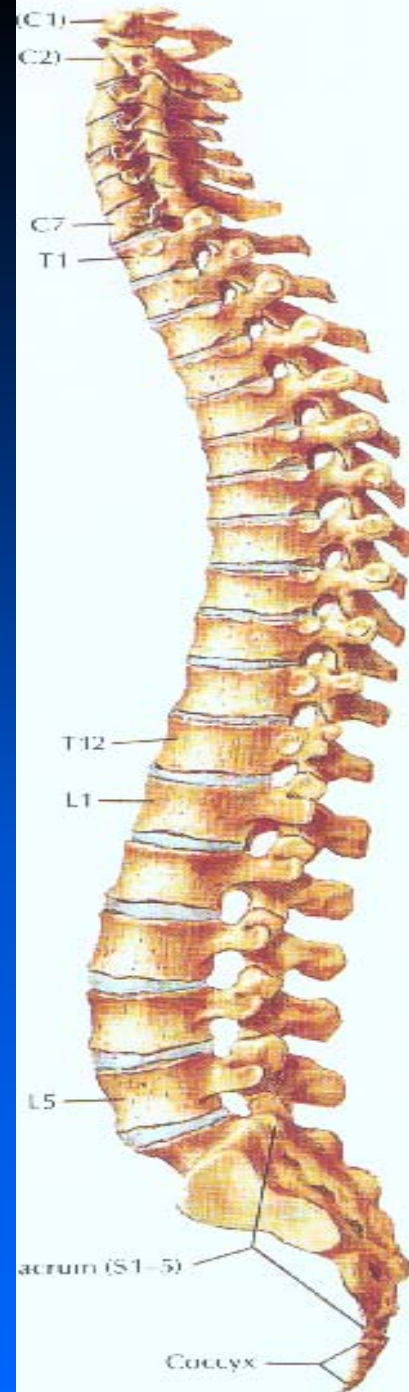


CERVICAL SPONDYLOSIS





CERVICAL SPONDYLOSIS

- ❖ Commonest cause of neckpain
- ❖ Besides neckpain it produces



- Radiculopathy
- Myelopathy
- Decreased ROM
- Central spinal cord injury
elderly



HUMAN SPINE

- Supports the body against gravitational and other extrinsic and intrinsic forces
- Allows wide range of motion.



RANGE OF MOTION

■ Possible movements

- Flexion
- Extension
- Lat burding
- Rotation

Rotation: Mainly at C1/C2 In flexion spine below C2 is blocked so rotation at C1/C2 only

In extension

Vertebrae are opened

Rotation predominantly in mid and lower cervical spine

With age all movements are restricted except rotation in flexion.



RANGE OF MOTION

- ❖ Decreases with advancing spondylotic changes
- ❖ Osteophytes least common at AA joint
- ❖ ROM preserved at AA joint

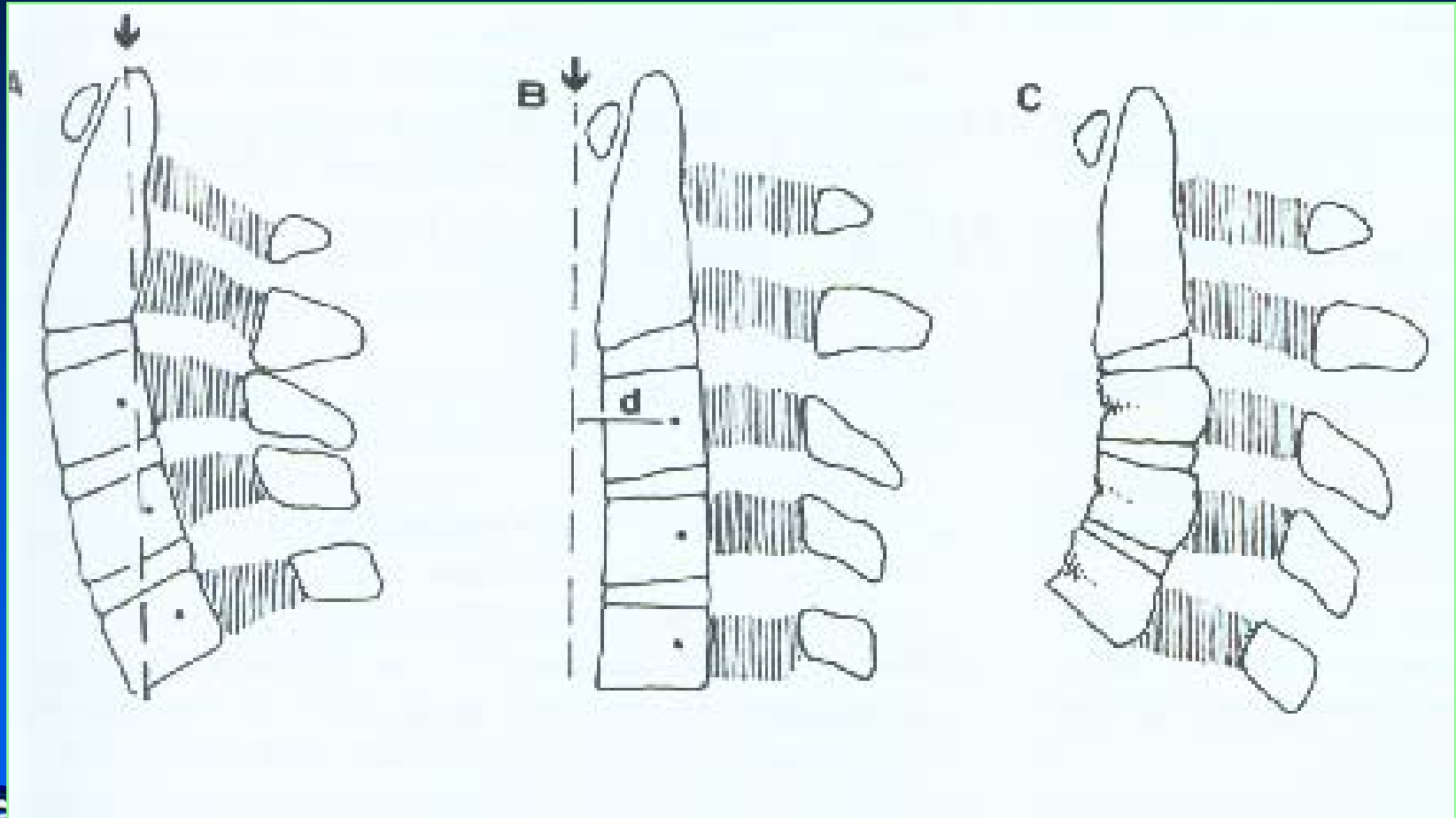


IN FLEXION ROTATION AT C1-C2 IN ADULTS



AGEING PROCESS

change in the arm of moment



FUNCTION OF SPINE

–Combination of stability and mobility due to 2 types of joints.

- Facet Joints
- Intervertebral disc



TYPES OF JOINTS

- Facet joint- Typical (Diarthrodial)
- Lined with synovial membrane
- Minimal resistance to movements
- IVD. Amphiarthrodial (atypical) no synovial lining
- Disc- Bears load associated with erect posture
- Allows movements between bodies



ANATOMY OF DISC

- Height of disc space- it is a cartilaginous disc collag.... & proteoglycan forms 80 of dry wt....
 - Cervical20%
 - Dorsal25%
 - Lumbar30%

IVD cartilaginous end plate

Annulus fibrosis

Nucleus p.....

Outer calcified layer of end plate

-lamina cribrosa helps with nutrition

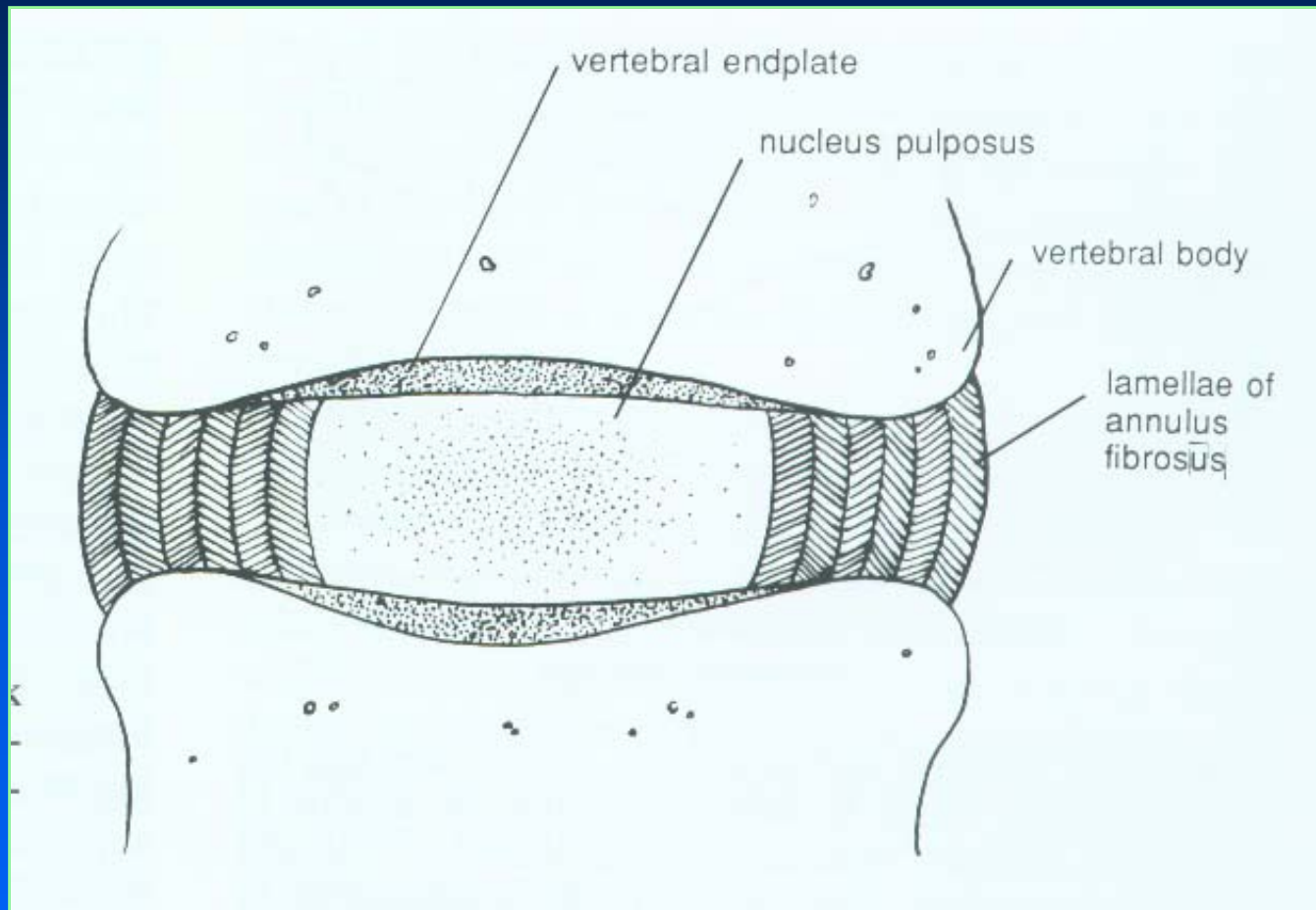


ANATOMY OF INTERVERTEBRAL DISC

- **Annulus**- concentric laminae of collagen fibrils.
 - Outermost – Sharpey fibers attached to bone .
Tough - type I collagen
 - Inner – less tough – type II collagen
 - **Nucleus**- remnant of notochord
only type II collagen



INTERVERTEBRAL DISC



COLLAGEN

- It is a family of proteins with triple helix configuration.
- Individual strands are arranged into fibrils. They have substantial tensile strength.



FUNCTION OF COLLAGEN

- Anchor disc to the bone
- Resist shearing forces
- Does not resist compressive force which is essentially done by
 - Vertebral bodies
 - Osmotic properties of disc



INNERVATION OF DISC

- **Nerve** – Sinovertebral nerve arising from ventral ramus and grey ramus communicans
- **Supplies** – posterior half of disc

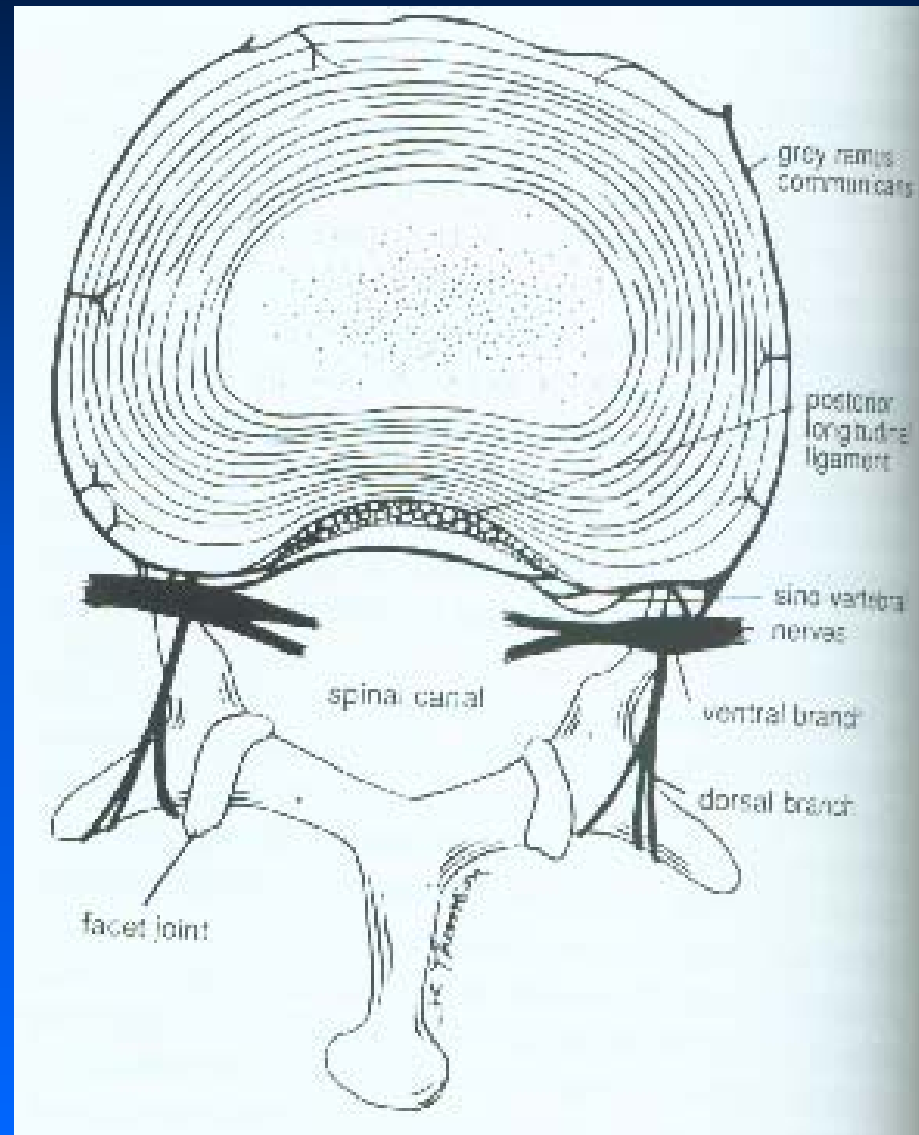
PLL

Dura

Ant. disc and ALL supplied by branch of grey ramus communicans



INNERVATION OF DISC



MECHANISM OF PAIN

- Not well understood –
- Pain - not well understood
- Surgery - relieves pain immediately
- Some pts – do not have pain
- Rest – relieves pain
- Carpal tunnel – produce numbness more than pain

Possibly: Nerve distortion

Rest decreases tension in the disc



CERVICAL SPONDYLOSIS

- Chronic degenerative lesions of single or multiple intervertebral discs and consequent osteophytosis of related vertebral bodies
- Cervical spondylosis is a leading cause of musculo- skeletal disability
- There is no inflammation being an amphiarthrodial joint



DISRUPTION OF FUNCTION

- Function is disrupted by
 - natural process of ageing
 - Degenerative process

Some deg. Changes are point of ageing

Does not produce symptoms

With age all movements are restricted except rotation in thorion dege. Changes produce pain, destruction and disability.



DEGENERATION INCLUDES

- Change in osmotic properties
- Decrease in water content from 90%
- Lose of disc height and loss of ability to expand
- Irregularities of end plate
- Sclerosis in disc interspace
- Formation of osteophytes
- Soft tissue p.....- pannus
- Calcification



DISC BULGE

- Elevates of periosteum and Sharpey's fibers
- Subperiosteal bones formed
- Spondylotic sp... Or ridges formed
- Why posterior?

Nucleus is placed more posteriorly annular fibers are thinner posteriorly and more thinner laterally than medially



CLINICAL PRESENTATION

- The sequence of disc degeneration leads to clinical syndromes of
 - Cervical pain
 - Cervical radiculopathy
 - Cervical myelopathy



AETIOLOGY OF SPONDYLOSIS

- Ageing process
- Mechanical load applied to the spine
- Mechanical instability
- Abnormal movements- athetosis
- Genetic abnormalities of cartilage protein (type IX collagen)
- Hereditary predisposition indentical spurs in twins



PREDISPOSING FACTORS

- ❖ Abnormalities of glucose metabolism
- ❖ Cytokine mediated abnormal bone growth
- ❖ HLA related genotype aberration



PREDISPOSING FACTORS

- Diabetes
- High blood pressure
- Smoking



FORMATION OF OSTEOPHYTE OR SPUR

- Disc bulge and peripheral tear with annulus elevates ALL from bony rim.
- Produces exc..... Tention which stimulates growth
- Prolijention of fibroblasts in outer annulus and metaplasia into chondrocytes lends to ossification cartilage and spur formation



THE DIAMETER OF CERVICAL SPINAL CANAL

■ C1	22.1
■ C2	18.8
■ C3	16.2
■ C4	15.8
■ C5	15.7
■ C6	15.6
■ C7	15.9



THE TRANSVERSE ARE OF SPINAL CORD

■ LEVEL	SPINAL CORD
■	(mm ²)
■ C2-3	79.4
■ C3	80.5
■ C3-4	82.9
■ C4	84.6
■ C4-5	85.8
■ C5	83.2
■ C5- 6	81.2
■ C6	76.1
■ C7	60.9

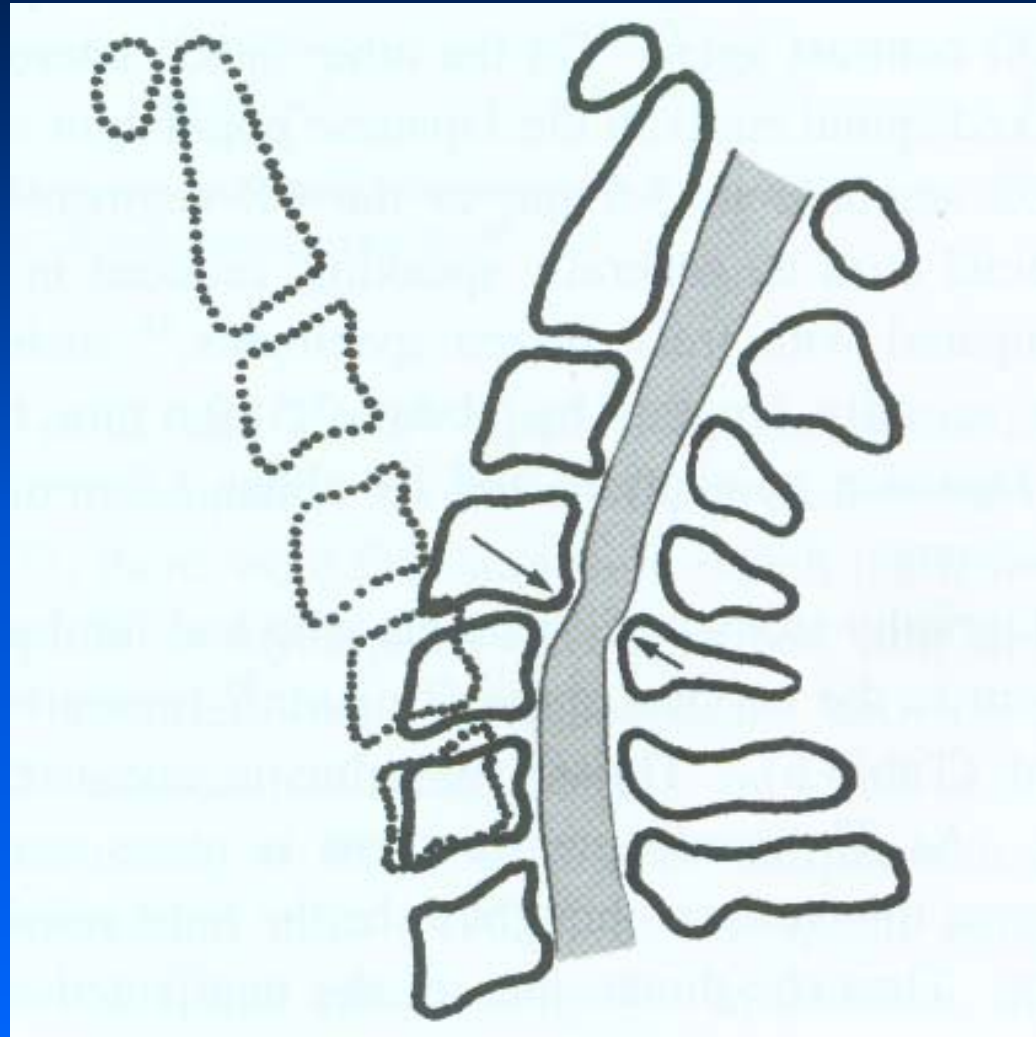


PATHOPHYSIOLOGY OF CHRONIC COMPRESSIVE MYELOPATHY

- Normal spine has physiological reserve space which accomodates changes in flexion and extension
- Spondylosis obstructs the space (PIVD, ostaphytes, redu..... Lig.
- With extension the cord is pinched



Pincer mechanism in next extension



PINCER MECHANISM

Pinching forces concentrate in the central area
of the cord

Compromise micro circulation

Ischaemia is watershed area

Damages large motor neurones and grey matter
in ant. Hor. Oedema 2 neurosis cavitation



SYMPTOMS

A: Pain in the neck- Dull boring, difficult to localise

- Morning stiffness
- Headaches in some – from neck to back of head to eyes from the temporal area.
- Cervical angina- angina pectoris- mimics coronary

B: Radicular pain- C5- Deltoid

- C6 - Thumb & index finger

C: Instability – difficulty in walking, difficulty in climbing stairs

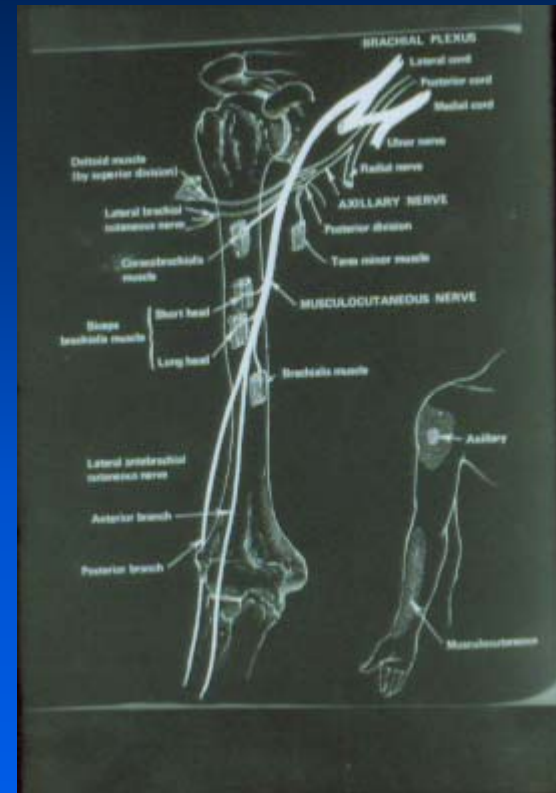
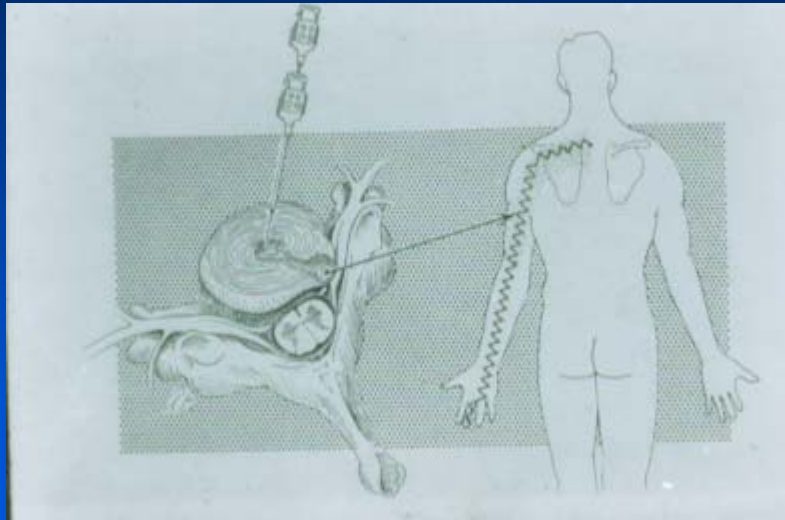
D: Bladder and Bowel dysfunction

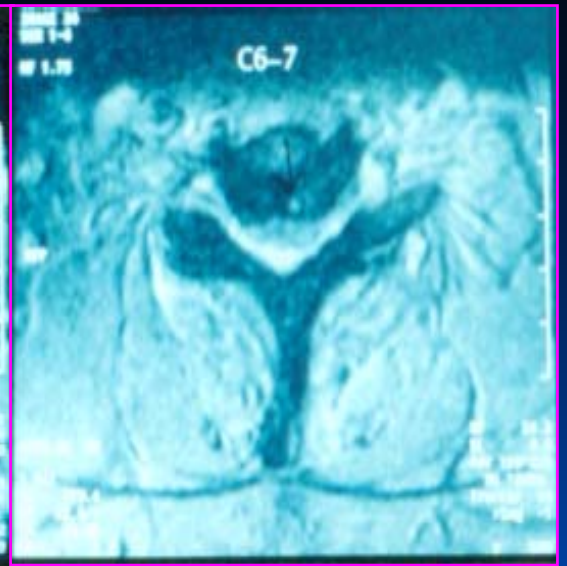
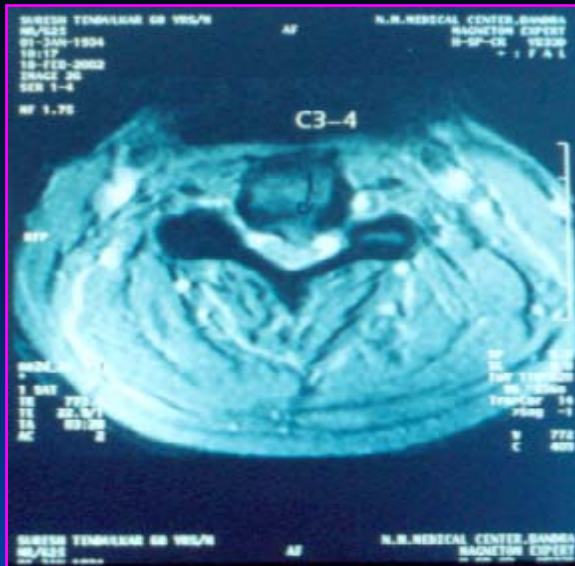
SIGNS

- Neck - tender areas
- - restricted & painful neck movements
- Radiculopathy – Reflex changes
- wasting of small & big muscles
- Myelopathy - Brisk jerks in lower ext.
Tendency for clonus
Spasticity.



RADICULOPATHY





CAUSES OF MYELOPATHY

❖ Hypothesis:-

VASCULAR

MECHANICAL

- ❖ Sometimes clinical signs do not improve after decompression
- ❖ Sometimes myelopathy progress in spite of degeneration
- ❖ Neurological findings do not always correlate with radiological level of compression



MYELOPATHY IN ELDERLY

- ❖ Wasting of small muscles in hands
- ❖ Weakness of deltoid is characteristic
- ❖ Extension contractures of finger MP joints
- ❖ Numbness & paraesthesiae in hands
- ❖ Difficult to use spoon, button shirt





OPLL

- ❖ It is a misnomer
- ❖ Ossification is an entity by itself of ossific process
- ❖ Commonly involves cervical spine in middle & elderly age
- ❖ Cytokine related abnormal bone growth, HLA related genotype aberration, diabetes Vit-D def. genetic recessive transmission

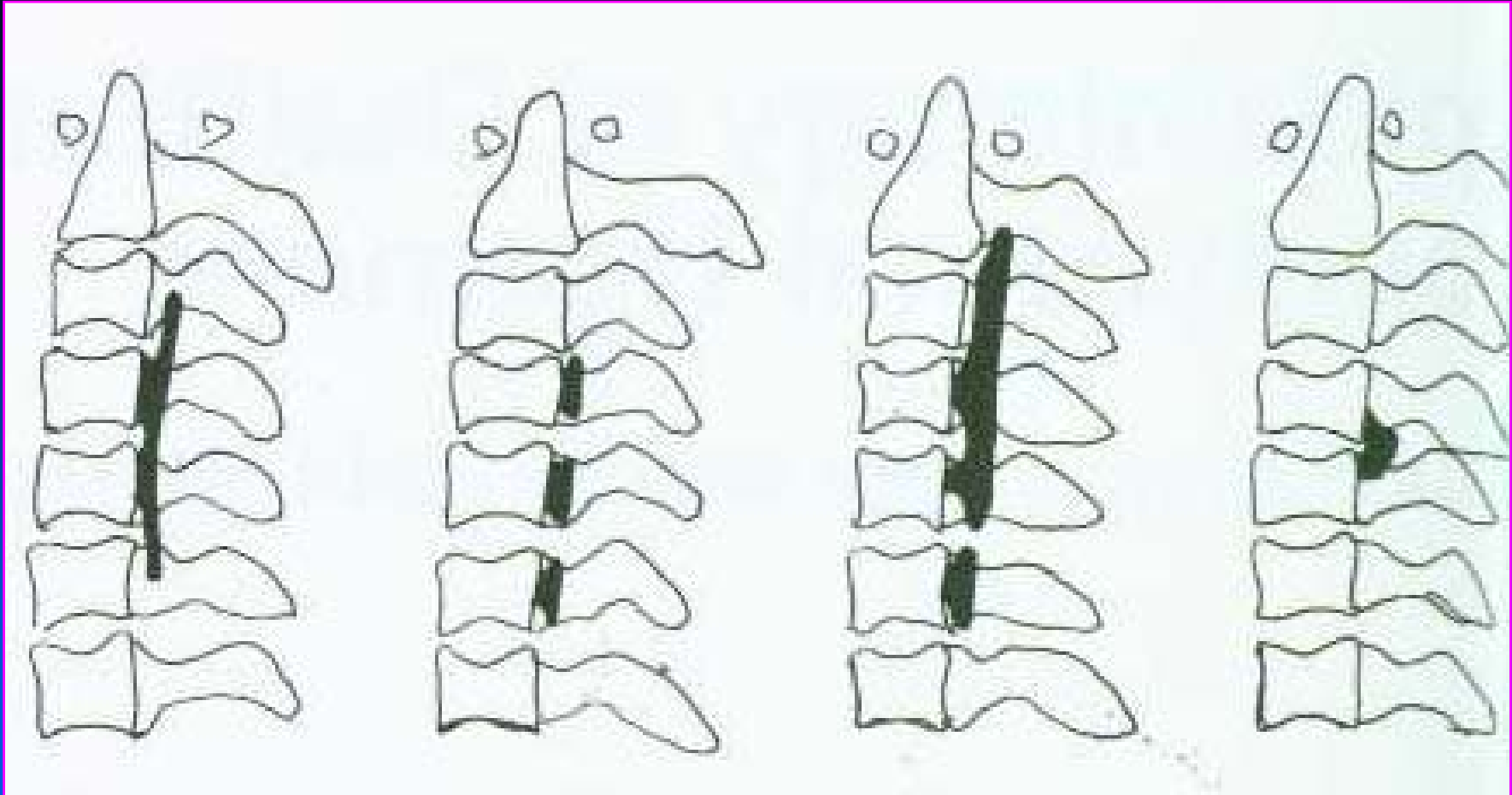




OPLL

- ❖ Most common in Japan
(burning candle variety)
- ❖ Not rare in India
(intermittent ossific tissue)
- ❖ Overall incidence is 5%.





Continuous type

Segmental type

Mixed type

Other type





THANK YOU