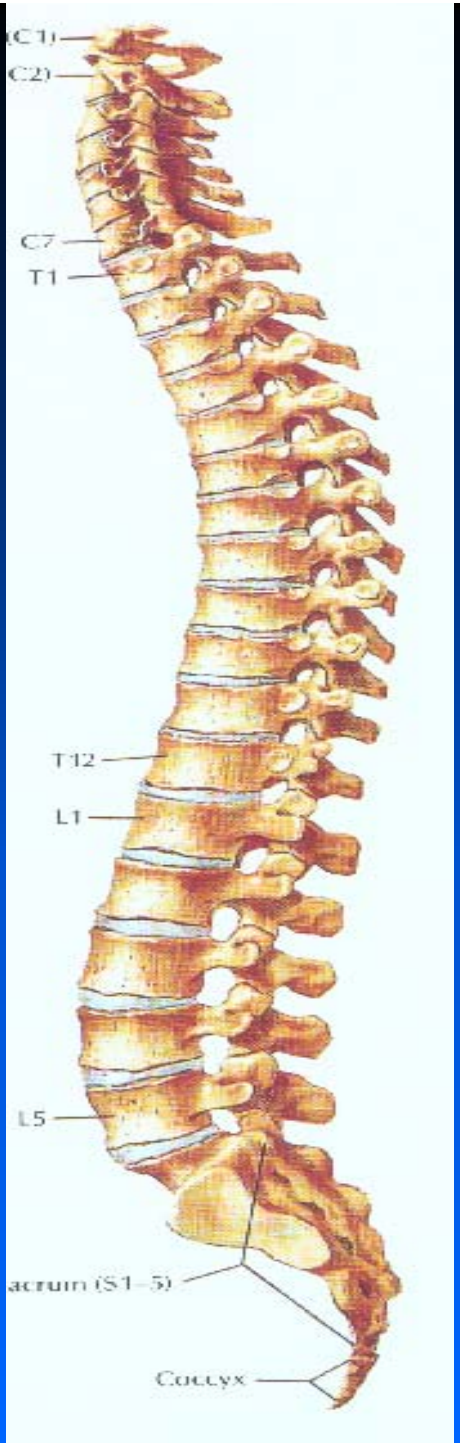
SPINAL CORD SYNDROMES



INCOMPLETE SPINAL CORD INJURY SYNDROMES

- The syndromes are named according to the presumed location of injury in the transverse plane of the spinal cord
- International standard classification is applied.

IMPORTANT TO CATEGORIZE ACCORDING TO LOCATION OF INJURY

- Recognise types of injury
- Information helps to select treatment
- Each has different prognosis for recovery

CERVICO MEDULCARY SYNDROME
(upper cervical cord to medulla)

- Damage to upper cervical cord and medulla
- Upwards – can extend upto pons
- Downwards – upto C4.

CMS: PRESENTATION

1. Respiratory dysfunction
2. Hypotension
3. Tetraplegia
4. Aneasthesia from C1 to C4

   Sensory loss on face – Dejerine pattern or onion skin pattern

CMS: MECHANISM

- Traction injury
- Severe dislocation
- Antero posterior compression
- Protruded disc

Past – usually associated with death

Present – prompt first aid treatment, greater number of survivors reach hospital

CMS: EXAMINATION

- Face trigeminal nucleus – pons
- Trigeminal tract- pons medulla and spinal cord upto C4- descending spinal tract
- Sensory loss around month – lesion in medulla.
- Sensory loss forehead, chin, ear –C3-C4

CMS: LIMB WEAKNESS

- More weakness in arms
- Less weakness in legs

  (Mimics central cord syndrome)
- Mechanism : Pyramidal arm fibers decussate at this level antero medially and susceptible to injury by odontoid and ant. rim of foramen magnum. Selective bilateral arm paralysis is possible – cruciate paralysis of Bell

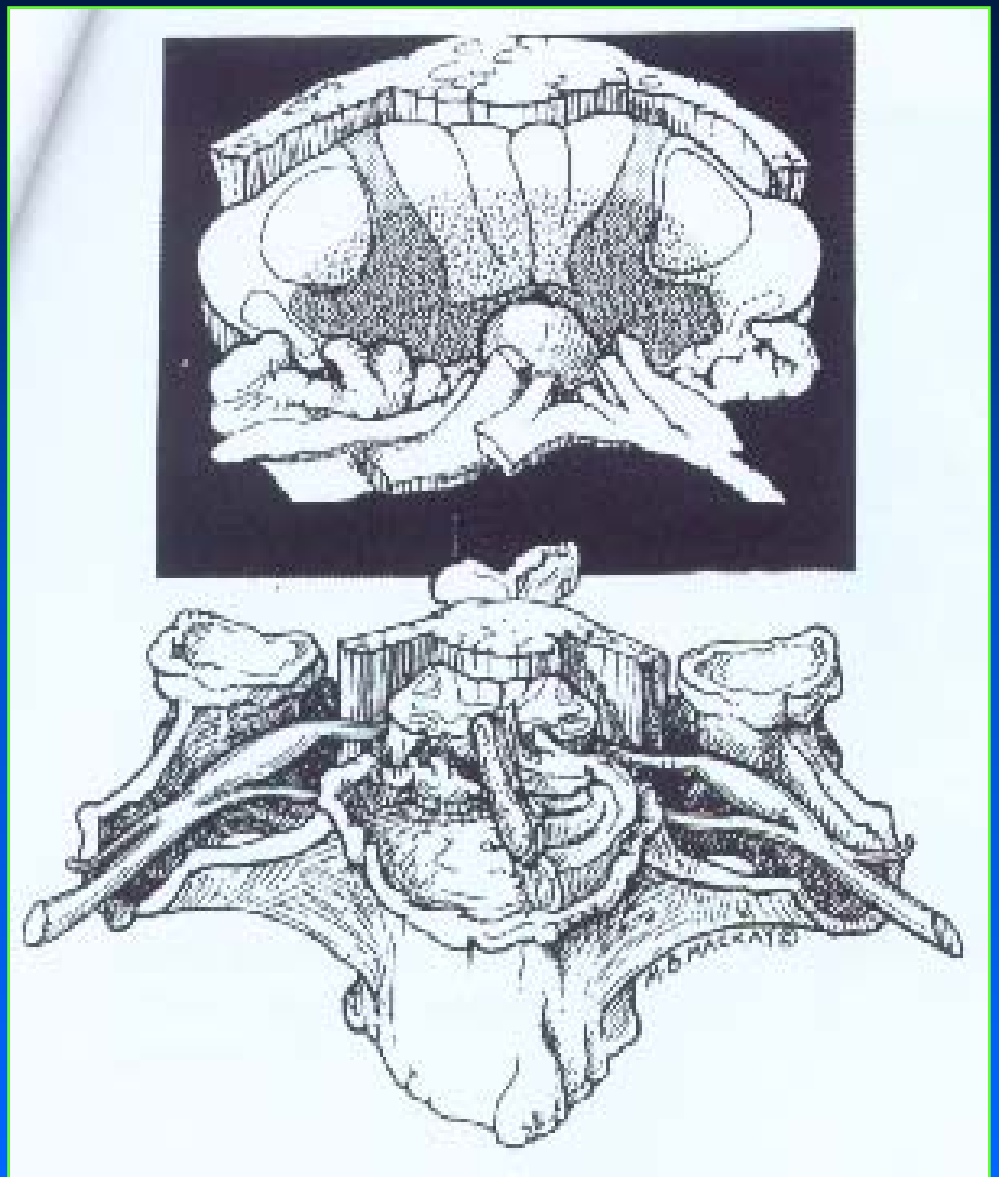
CMS: INJURIES

- Atlanto occipital injury of Bell
- Atlanto axis injury & dislocation
- Odontoid fracture

ACUTE CENTRAL CORD SRNDROME

- Acute compression
- Elderly people
- Hyperextension injury
- Dysproportionate greater motor loss in upper extremities
- Varying sensory loss
- Spontaneous recovery or improvement possible

CENTRAL SPINAL CORD SYNDROME



Cervical spondylosis, ant. and post. osteophytes. Spinal cord is compressed. The central portion is damaged

CSCS: MECHANISM

- A - Hypertension injury
  - Antero posterior compression
  - Elderly people
  - Central haematomyelia
  - Surrounding oedema

Mechanism- compression between bony spurs ant. and ligamentum flavum post., central necrosis, involves ant. horn cells.

CSCS: MECHANISM

- B – In absence of orteophytes

  Vascular aetiology

  - ✓ Compromise of medullary artery perfusion
  - ✓ Vertebral artery stretching
  - ✓ Ant. spinal artery spasm / occlusion
  - ✓ Venous infarcts

CSCS: MECHANISM

- C - Acute traumatic prolapse of cervical disc
- D - Mechanical compression

CSCS v/s CMS

	Central cord Syndrome	Cruciate Paralysis
Site of lesions	Mid-to lower cervical cord Anterior horn cells Lateral corticospinal tract (medial part)	Lower medulla and upper cervical cord, anterior aspect Corticospinal arm fibers decussation
Clinical manifestations	Arms weaker than legs, flaccid arms acutely, legs normal or variably weak, lower motor neuron deficits in upper limbs persists	Arms weaker than legs, flaccid arms acutely, legs normal or variably weak, upper motor neuron deficits in upper limbs develop ± Trigeminal sensory deficit (onion skin , spinal tract of V) ± Cranial nerve dysfunction (IX, X, or XI)
Prognosis for neurological recovery	Variable	Usually good

RESCENT EVIDENCE for central cord syndrome

- Based on MRI and autopsy study
  - No hemorrhage in cord
  - No necrosis
  - Only oedema
  - Demyelination and myelin breakdown
- Mechanism- Direct mechanical compression of cord

INDICATIONS FOR SURGERY

A. Persistent compression

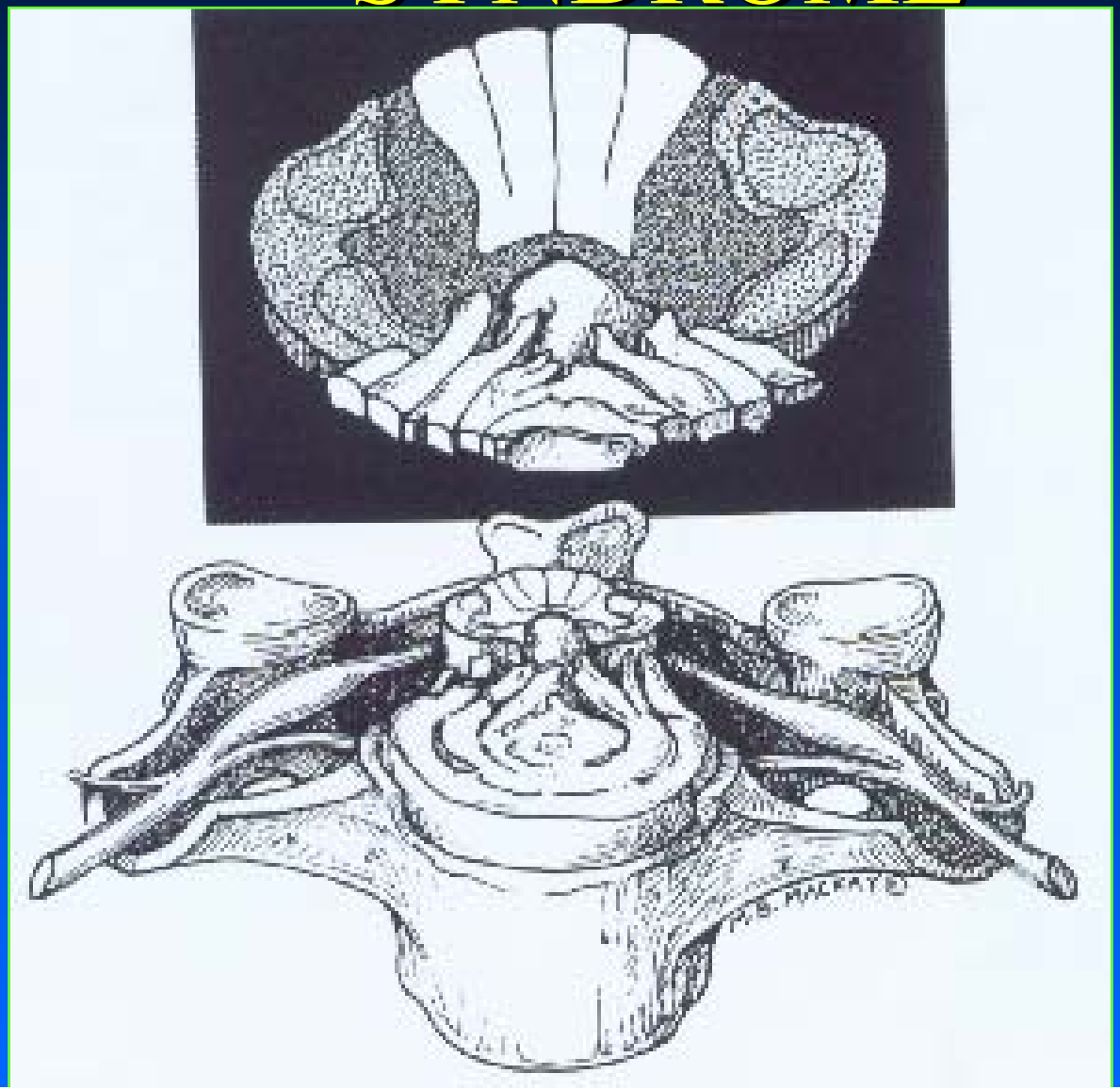
B. Instability

C. Neurological deterioration

ANT CORD SYNDROME

- Immediate complete paralysis in lower limbs
- Sparing of upper limbs
- Sparing of posterior column
- Hyperasthesia at the level of lesion
- Sparing of touch.

ANTERIOR CORD SYNDROME



A large prolapsed disc compresses the ant. spinal cord post. column is intact

ACS: MECHANISM

- Mechanical stress factors
- Cord is pulled between compression and dentate ligament
- Pyramided fibers bear the greatest stress

ACS: PRESENTATION

- Spasticity
- Disturbance of gait
- Modified sensory changes

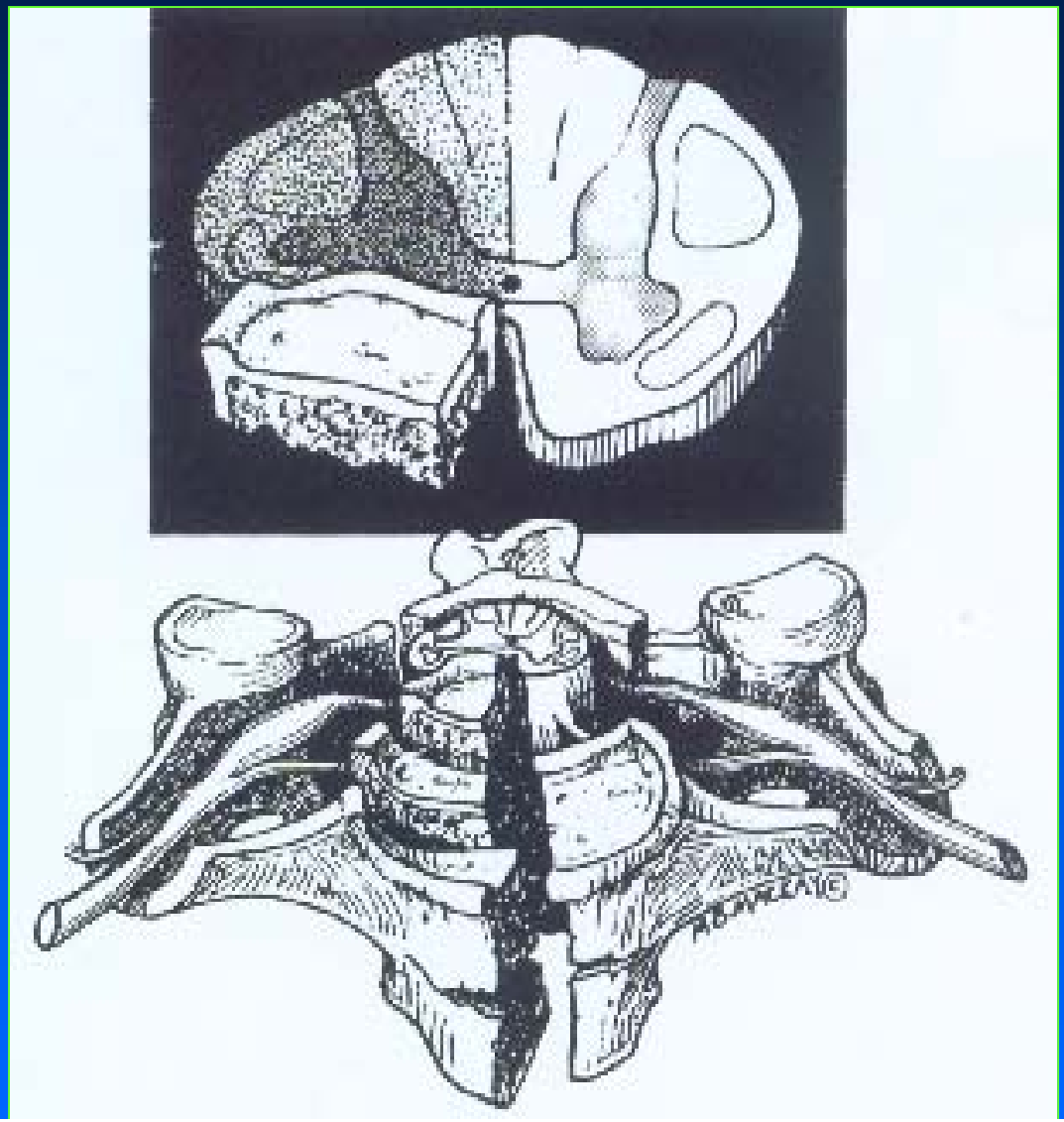
ACS: TREATMENT

- Operative removal of lesion
- Substantial recovery

BROWN SEQUARD SYNDROME

- Not uncommon
- Lesion lat. half of spinal cord
- Ipsilateral motor and proprioceptive loss
- Contralateral – pain and temp loss

BSS: MECHANISM



Burst fracture with posterior displacement causing unilateral compression

BSS: MECHANISM

- Hyperextension injuries
- Flexion injuries
- Facet lock
- Associated with burst fracture

CAUSE:- spinal cord compression

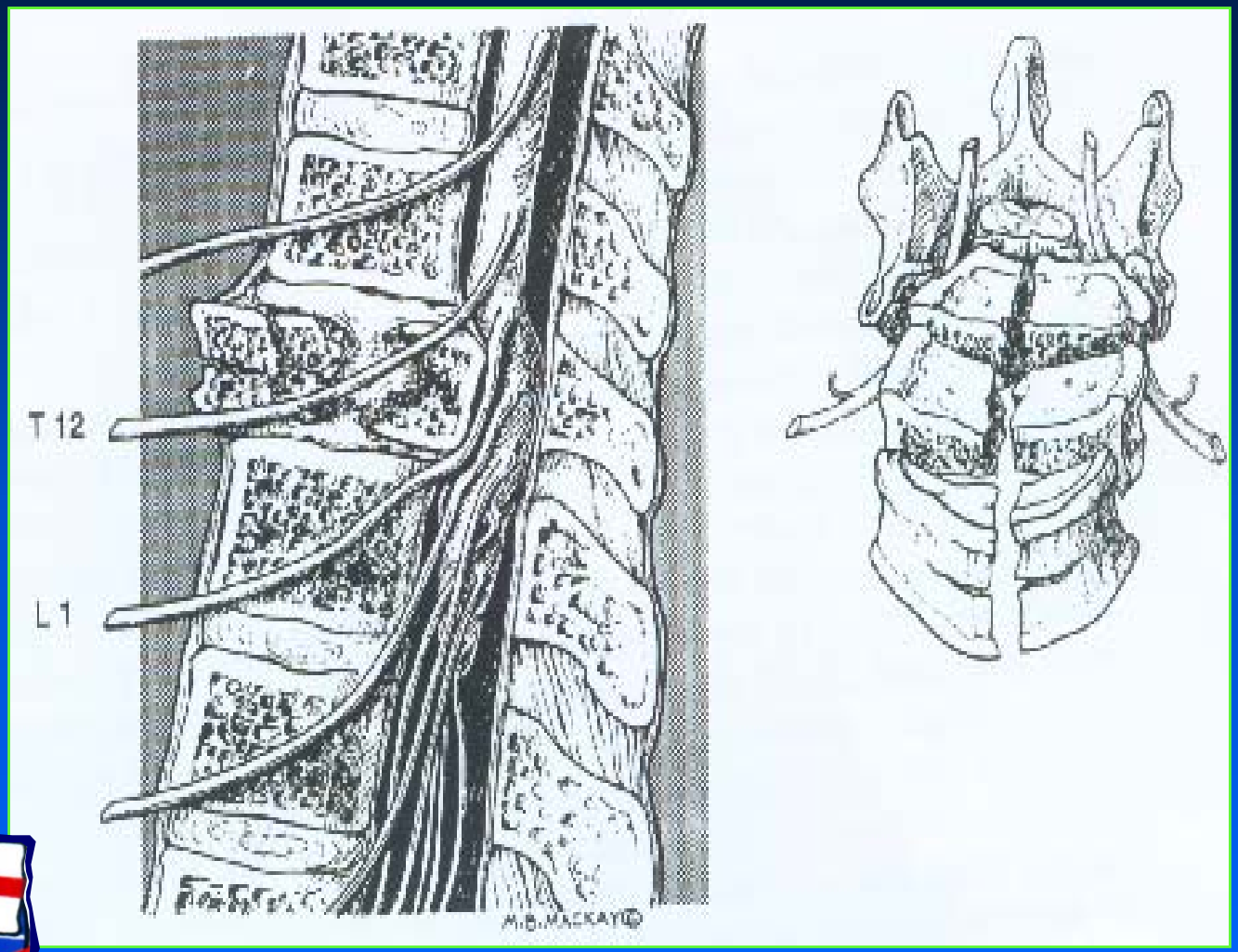
BSS: PRESENTATION

- Present from the beginning
- Gradual evolution within days possible
- Common in cervical spine.
- Sphincter may be spared

CONUS MEDULLARIS SYNDROME

- Anatomically all lumbar segments are opp. T12 vertebral body
- All sacral segments are opp. L1 vertebral body
- Cord ends between L1 L2 disc space

CONUS MEDULLARIS SYNDROME



D12 burst fracture compress the conus. All lumbar and sacral segments can be compressed

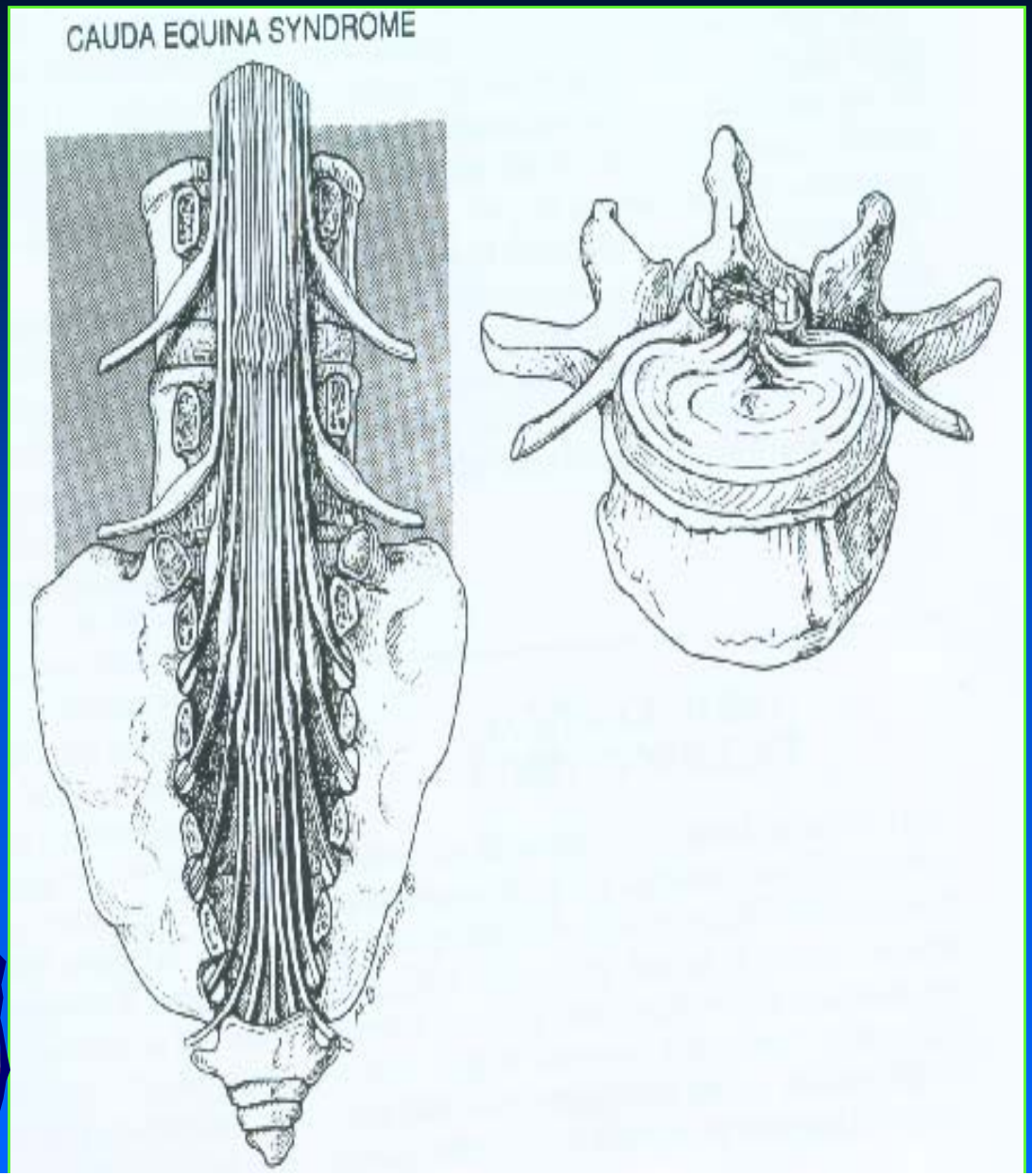
CMS: PRESENTATION

- DL injuries common
- Lower motor neuron flaccid paralysis
- Flaccid sphincters
- Chronic spasticity
- Atrophy of muscles
- Perianal sensation may be preserved (sacral sparing)
- Low pressure high capacity neurogenic bladder

CAUDA EQUINA SYNDROME

- Injury to lumbar spine
- Roots of cauda equina involved
- Injury can be complete (Grade A)
- Or in varying degree of severity
- Motor fibers are always more susceptible than sensory.
- Some sensations are preserved

CAUDA EQUINA SYNDROME



Acute central disc prolapse L4/5. Medially placed sacral roots sustain maximum compression

CES: OUTCOME

- Prognosis for neurological recovery is much better
- Lower motor nerves have more resilience to trauma
- Fever secondary injury mechanisms
- Greater regeneration capability

SERIOUS CAUDA EQUINA SYNDROME

- Acute C4/C5 and L5/S1 disc prolapse
- Major damage to sacral roots
- Sparing of lumbar and S1 roots
- Complete bladder and bowel paralysis
- Perianal anaesthesia
- Sacral roots delicate

  - do not recover

ACUTE SPINAL CORD SYNDROME-SCIWORA

Without radiological evidence of trauma (SCIWORA)

- Paediatric SCI
- Generally injury is less severe. Complete injury possible.
- Investigations do not include MRI. Only plain x-ray tomography and CT.
- In children there is laxity of ligaments
- Para spinal muscles weak.

ACUTE SPINAL CORD SYNDROME-SCIWORA

MRI & SCIWORA

- MRI detects ligamentous injury and haematoma in soft tissues
- Thus revealing damage to spine

ANT SPINAL ARTERY SYNDROME

- Ant. spinal artery supplies ant. 2/3 of cord when occluded:
- Motor, pain and temperature sensations are lost
- Proprioception is preserved
- Rare in trauma
- Occurs in aortic disease, aortic surgery, hypotension, spinal angioma

Pathology:- occlusion of ant. spinal artery

CHRONIC POST TRAUMATIC SPINAL CORD SYNDROMES

- Develop late after trauma
- Months or years to develop
- Causes further sensory or motor loss and involvement of sphincters
- Post traumatic syringomyelia
- Microcystic myelomalacia (Marshy cord syndrome)
- Arachnoiditis
- Pain syndromes

CHRONIC POST TRAUMATIC SPINAL CORD SYNDROMES

Pain syndromes :

- Neurogenic : Peripherial nerves.
- Mylogenic : Spinal cord .
- Cephalogenic: Brain.

REVERSIBLE OR TRANSIENT SYNDROME

Spinal cord concussion:

- transient loss of motor and sensory functions with recovery within minutes. Clinical examination is normal.
- Cause : Minor trauma.
- Mechanism: Unknown , intracellular potassium leak due to injury or vascular mechanism

BURNING HANDS SYNDROME:

- Common in athlets and footballers.
- Transient paraesthesiae in both hands and upper limbs
- All such patients have radiological abnormalities like
  - ✓ Ligamentous instability
  - ✓ Disc disease
  - ✓ Spinal stenosis

BURNING HANDS SYNDROME:

- MRI shows posterior horn damage in intramedullary injury
- Always bilateral
- It unilateral then it is peripheral nerve root injury.

THANK YOU