

Spinal Cord Injuries (SCI)

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Spinal Cord Injuries

- Definition
- Aetiology /Demography
- Mechanisms of Injury
- Classifications
- Spinal Anatomy
- Clinical features / Cord syndromes
- Management

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Definition

Damage to the spinal cord causing permanent or temporary changes to its function

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Aetiology

- Direct Trauma/Penetrating trauma
 - Stab wounds
 - Gun shot injuries
- Indirect Trauma
 - RTA
 - Fall from heights
- Sports injuries
 - Diving
 - Motor sports

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Demography

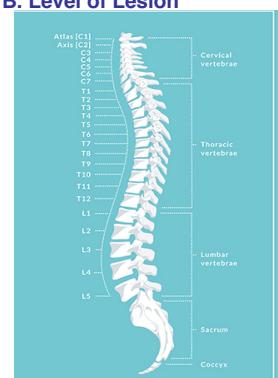
- Age: Young highest 16-30
- Sex M:F 4:1
- Sri Lanka
 - 1500 per year
 - Fall from height and RTA
 - War injuries
 - Has only 3 Rehabilitation Hospitals

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Classifications

- #### A. Severity/Type
- Complete
 - Incomplete

B. Level of Lesion



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Mechanisms of Injury

- Complete transection: causes Total loss of function below the level

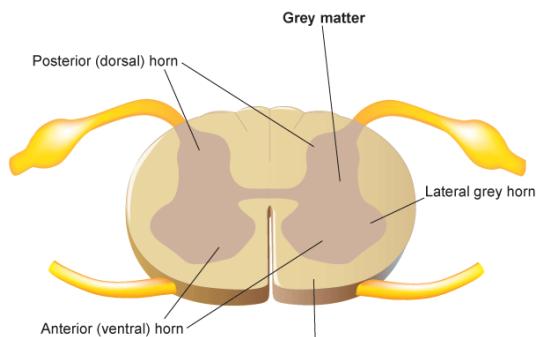
Paralysis: Cervical- Quadriplegia

Lumbar: Paraplegia

- Incomplete injury: Partial loss of function below the level Paresis

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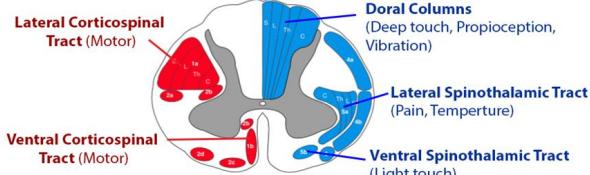
Spinal Anatomy



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Spinal Tracts

Descending Tracts (Motor)



Ascending Tracts (Sensory)



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Spinal Tracts

Ascending tracts/Sensory

Spino-thalamic

- Anterior (Light touch)
- Lateral Pain Temp)

Dorsal columns

- Fine touch, proprioception

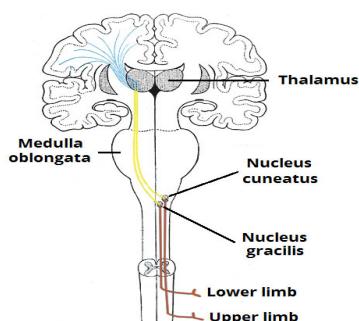
Descending tracts

Corticospinal tracts

- Anterior and Lateral

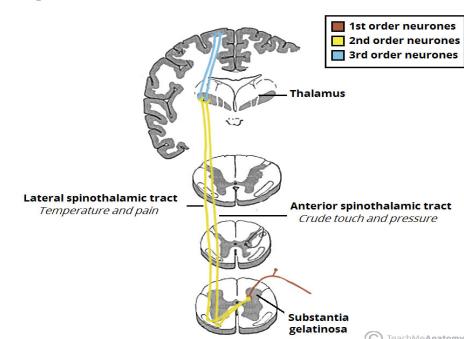
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Dorsal Column



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Spinothalamic tracts



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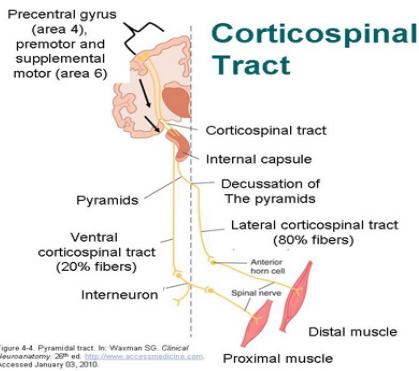


Figure 4-4. Pyramidal tract. In: Waxman SG. Clinical Neuroanatomy, 20th ed. <http://www.accessmedicine.com>. Accessed January 03, 2010.

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Clinical Features

- Depends on Level of lesion
- Severity (Complete or Partial)
- Distribution (Area of damage /tracts involved)
- Time since injury /Phase

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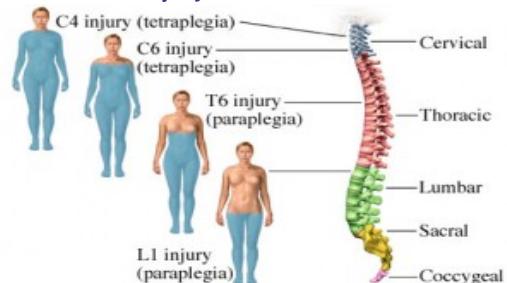
Level of the lesion

- At the level
- Above the level
- Below the level
- Ipsilateral side or contralateral side

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Clinical Features

- Level of injury



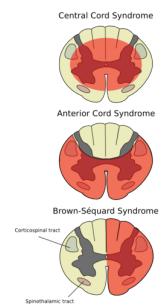
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Spinal cord syndromes

Spinal cord syndromes

Incomplete lesions of the spinal cord

- Anterior cord syndromes
- Posterior cord syndrome
- Central cord syndrome
- Brown Sequard syndrome
- Cauda equina syndrome
- Conus medullaris syndrome



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Anterior cord syndrome

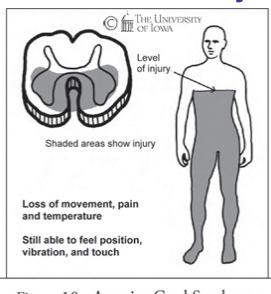
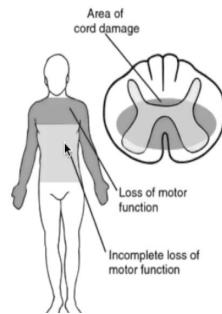


Figure 10. Anterior Cord Syndrome

- Damage to Corticospinal (motor) and spinothalamic (Pain temp) tracts
- Dorsal column intact (Vibration, Joint position)

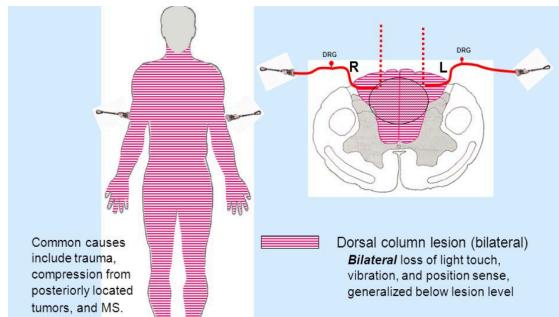
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Central cord syndrome



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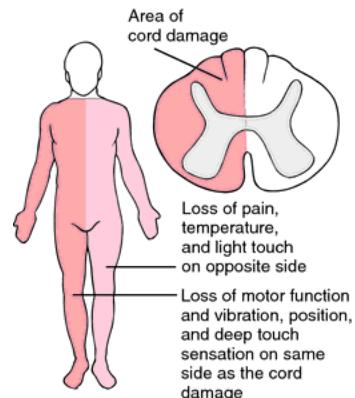
Posterior cord syndrome



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Brown Sequard syndrome

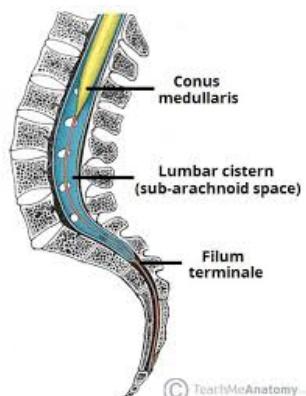
Hemisection of the spinal cord



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Cauda equina syndrome

- Below L 2
- 1. Leg pain/weakness
- 2. Saddle anaesthesia
- 3. Loss of bladder function
- 4. Loss of sphincter tone
- 5. Loss of ankle reflex
- 6. Foot drop



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Clinical features based on timing

Spinal shock:

- Temporary areflexic state with loss of autonomic control, and muscle tone below the level of the injury which lasts up to six weeks after injury. It usually occurs in spinal cord injury to cervical & upper thoracic spinal cord. Functional recovery may improve after spinal shock resolves.

Neurogenic shock:

- : hypotension as a result of bradycardia and vasodilation due to loss of thoracic sympathetic innervation following SCI. Profound effects are noted if injury is at level of T6 or above. Most dramatic effects noted in the first few weeks with most patients stabilizing in 7-10 days

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Diagnosis and evaluation

Diagnosis and evaluation

- Clinical Examination
- Imaging
 - X Rays
 - CT scans
 - MRI
- Functional assessment
 - NCS

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Management

Management

- Initial management
 - ABC (Primary Survey)
 - Spinal Immobilization
 - Log rolling
 - Imaging
 - Secondary survey
- Definitive management
- Rehabilitation

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Principle of initial management is to stabilize the spine and prevent further injury

How can We achieve this ?

Spinal immobilization: Cervical spine

- Rigid cervical collar
- Spinal blocks and tapes



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Spinal immobilization: Thoracolumbar

Spinal Board



Spinal board
immobilization



Spinal immobilization: Thoracolumbar

- Logrolling



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Diagnosis and evaluation

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Diagnostic Goals

- Level of injury
- Extent of injury
- Complete or incomplete
- Time since injury
- What phase it is (Acute /shock , Recovery, Rehabilitative)
- Progressive or static

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Principles of Treatment

- Protection and prevent further damage
- Medical / supportive therapy:
 - Analgesia
 - Steroids
 - Mild sedation
 - Nutrition
 - BP management

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Principles of Treatment

- Role of surgery
 - Decompression SOL
 - Fixation of spinal fractures
 - Stabilization procedures
 - Wound management

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Rehabilitation of spinal cord injuries

Rehabilitation of spinal cord injuries

- Team effort
 - Rehabilitation Physician
 - Physiotherapist
 - Psychologist
 - Neurologist
 - Orthopaedics
 - Occupations and social workers

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Rehabilitation principles

- Maintain muscle tone
- Encourage active passive movement
- Prevent bedsores
- Bowel bladder care
- Medications
- Nutritional support
- Psychological support
- Social support
- Mobility support

Rehabilitative phase can last for days, weeks, months, years or even a life time

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**Warwick
Medical School**



Thank You



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of Coventry and
Warwickshire**

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