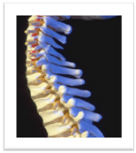
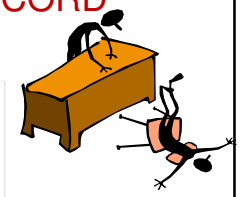
Traumatic injuries SPINAL CORD





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Causes of Traumatic SCI

Spinal Cord trauma can be caused by:

- MVC (most injuries)
- Gunshots
- Falls
- Stabbings
- Assaults
- Industrial accidents
- Sports industries

Men are more at risk

Risk Factors:

- Not wearing protective equipment
- Participating in high risk activity
- Secondary factors

SYMPTOMS

Injuries causes weakness and loss of feeling at and below the level of injury

Symptoms depend on how severe the cord is injured complete or incomplete

Injuries at any level can cause:

- Weakness
- Pain
- Increase muscle tone (spastic movement)
- Loss of normal bladder or bowel function
- Sensory change
- Weakness and paralysis
- numbness

Symptoms by area

CERVICAL (neck)
- Symptoms can affect arms, legs and middle of body
- May occur on one or both sides
- May also affect breathing if high up in the neck to affect muscle

THORACIC (chest)
- Affect the legs
- May also affect the blood pressure
- Trouble maintaining normal body temperature

LUMBAR (sacral)
- Can affect one or both legs
- Affect muscles that control bowel or bladder functions

ASSESSMENT

Key points to identifying spinal injury:

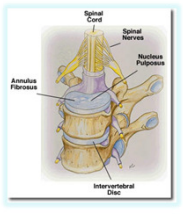
- Initial evaluation of trauma patients with SCI is primary Assessment A, B, C

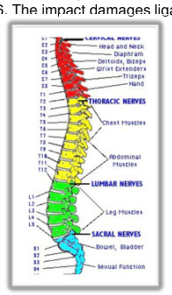
- Perform history taking
- Focus on symptoms related to the vertebral column, such as pain, sensory motor changes
- Mechanism
- Posterior of spine should be examined with logrolling
- Assessing respiratory status

Mechanism of Injury

ROTATIONAL
- When the spine moves past its normal range. Can occur at any Level. Usually involves C5 and C6. The impact damages ligaments and supporting blood vessels

e.g. spinning crashes





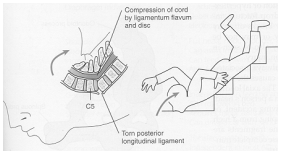
HYPEREXTENSION

- Head is sharply thrust back, and the upper spinal segments

are stretched beyond their normal limits. Ligaments are disrupted,
Rupture of intervertebral discs. Spinal cord becomes compressed

When two joints are drawn away from each other

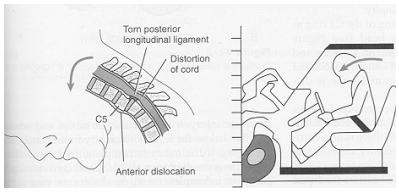
e.g. falling face down on climbing upstairs

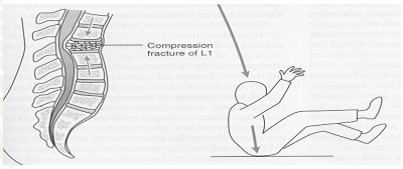


HYPERFLEXION

- Sudden forward of the head is past the normal range of neck movement
- Commonly known as whiplash

e.g. head on crashes

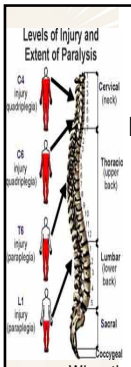




AXIAL LOADING

- Sudden excessive compression which drives the weight of the body toward the head

e.g. a heavy object falling on the fall, or a person jumping and landing on their feet



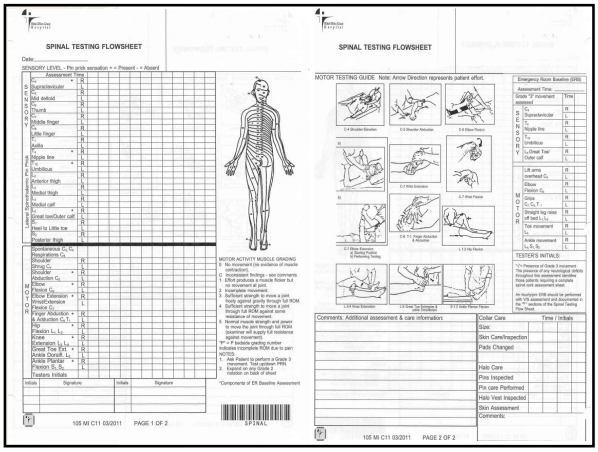
LEVEL OF INJURY

Evaluating the sensory and motor

- SENSORY is done first, this evaluates patients sensation. This is subjective data from the patient. Therefore difficult to do on patient that has dementia, head injury, not cooperative.

- MOTOR is done next, this evaluates patients muscle tone. This is based on objective data from the examiner

When there is injury at C5 this means that they have no sensory or motor from C6 donwn.



INJURY CLASSIFICATION

COMPLETE: means has no voluntary motor movement or conscious sensory movement below injury site. The completeness of injury is not always determined until 6-8 weeks after injury

INCOMPLETE: when partial damage happens to the spinal cord. A person tends to still have some motor and sensory function The effects of the damage is different depending on the area of the cord

TYPES OF INCOMPLETE

Anterior Cord: damage to the front of the cord. This results in impaired movement, touch, pain, and temperature sensations below the point of Injury. Often motor function is not affected

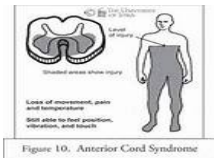


Figure 10. Anterior Cord Syndrome

CENTRAL CORD: Result to the center of the spinal cord. Results in loss of function in the arms, but some leg movement is preserved. Usually from a compression or from flexion-rotation

POSTERIOR CORD: Includes loss of vibration, fine touch and and fine pressure below the level of injury. Walking is difficult Rare condition, present as brown-Sequard

Brown – Sequard syndrome: is a loss of motor function, proprioception and vibration below the level of injury on the same side. It also is loss of pain and temperature sensation on the opposite side also below the level of injury

To sum it up ONE SIDE can feel but not move and THE OTHER SIDE Can move but not feel

Some traumas include stabbings or shot guns

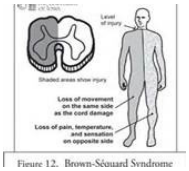


Figure 12. Brown-Séquard Syndrome

SPINAL SHOCK

- When spinal cord is damaged much like a concussion
- Leads to total sensory and motor loss
- Also loss of all reflexes
- These all last for period of time
- Then recovery of reflexes
- Begins within a few minutes of the injury, may take several hours before full symptoms are displayed
- During the shock period the brain is unable to send messages through spinal cord to the end organs

Usually recovers in 24 hours but may last longer

- not circulatory in nature

Neurogenic Shock

- Caused by the loss of sympathetic nervous system
- Results in bradycardia, peripheral vasodilation and hypotension
- Most common area affected is the cervical area
- Patients are generally hypotensive with warm, dry skin
- Loss of sympathetic tone impairs ability to redirect blood from peripherally to core leads to hypothermia and excessive heat loss
- Treated with fluids, dopamine and atropine

Spinal vs Neurogenic Shock

Spinal Shock

- *Due to acute spinal cord injury
- *Absence all voluntary and reflex neurologic activity below level of injury
  - Decreased reflexes
  - Loss of sensation
  - Flaccid paralysis below injury
- Lasts days to months (Transient)
- *Spinal shock & neurogenic shock can in same patient-BUT not same disorder (some sources may group both together)

Neurogenic Shock

- *Critical features-
  - **Hypotension** (due to massive vasodilation
  - **Bradycardia**- due to unopposed parasympathetic stimulation
  - **Poikilothermia;** *Unable to regulate temperature-
- Occurs
  - Within 30 min cord injury level T 5 or above; last up to 6 weeks; also due to effect some drugs that effect vasomotor center of medulla as opioids, benzodiazedines
- Management (*Determine underlying cause)
  - **Airway support**
  - **Fluids as needed-** Typically 0.9 NS , rate depends upon need
  - **Atropine for bradycardia**
  - **Vasopressors as phenylelphrin**e (Neo-synephrine) for BP support

VERTEBRAL FRACTURES

Compression fracture
common in those patients that have pre existing problem like Osteo or disease like cancer. Sudden force of to much pressure leads to fracture

Wedge fracture
is a type of compression in the anterior fossa that compresses in the shape of a wedge

Burst fracture
happen in severe trauma in which the vertebrae are crushed by extreme force. The vertebrae fractures in multiple areas. Bony fragments can damage spinal cord

Hangman's fracture
fracture through pedicles of axis of C2 with or without Involvement of C2 or C3 vertebrae

Stable vs Unstable Fractures

Stable- do not cause spinal deformity or nerve problems. Spine is still able to function as if not there was no fracture

Unstable – make it difficult for spine to carry and distribute weight. They have the possibility of progressing and causing further damage. May also cause spinal deformity

EXAMS AND TESTS

- PEFORM PHYSICAL EXAM WHICH INLCUDES NEUROLOGICAL TEST
- SOME OF THE REFLEXES MAY BE ABNORMAL OR MISSING
- CT OF THE SPINE
- MRI OF THE SPINE
- XRAYS OF AREA INVOLVED

TREATMENT

- IMMEDIATE TREATMENT IS NEEDED FOR THAT OF A SPINAL INJURED PATIENT
- STEROIDS TO REDUCE SWELLING
- SURGERY TO REDUCE FLUID PRESSURE, REMOVE BONE FRAGMENTS, FUSE SPINAL BONES
- BEDREST
- SPINAL TRACTION
- HEALTH CARE PROVIDER NEEDS TO PROVIDE INFO REGARDING MUSCLE SPASMS, PRESSURE SORES, BOWEL BLADDER ISSUES, SKIN BREAKDOWN
- PHYSICAL AND OCCUPATIONAL THERAPY AFTER INJURY HAS IMPROVED
- MUSCLE RELAXORS AND PAIN MEDICATIONS FOR MUSCLE SPASMS
- SUPPORT GROUPS

PREVENTION

- PROPER SAFETY TECHNIQUES DURING WORK AND RECREATION CAN PREVENT SPINAL CORD INJURIES
- USING PROPER PROTECTIVE EQUIPMENTFOR ANY ACTIVITY IN WHICH INJURY IS POSSIBLE
- DON'T DIVE INTO SHALLOW WATERS AND LOOKS FOR ROCKS OR OTHER OBJECTS
- SLEDDING CAN CAUSE ABNORMAL TWISTING, LOOK FOR OBSTACLES
- WHEN PLAYING FOOTBALL, USE PROTECTIVE EQUIPMENT AND TECHNIQUES OR ANY CONTACT SPORT
- CAREFUL DRIVING AND WEARING SEATBLETS
- EDUCATION REGARDING FALLS

Neurogenic bladder

Problems with a neurogenic bladder…
- Lack of bladder control
- Recurrent infections
- Skin breakdown
- Sexual dysfunction
- Stone formation

Nursing needs to…
- Take a full history of voiding patterns, including night and day
- Amount of urine voided
- Amount of urinary emptyings per day
- Description of sensation during bladder filling and emptying

Neurogenic Bowel

Spinal injury may interrupt nerve pathways from brain to GI tract, thus when brain can't control bowel functions known as neurogenic

May not be able to feel when bowel is full, or know when autonomic muscles will relieve the bowel

spastic bowel
- Don't feel the need to have the BM
- Body's reflex can empty it automatically
- When bowel becomes full it empties, and in between sphincter stays tight

Flaccid bowel
- Happens when injury is sacral or lumbar
- Decreases peristalsis and ability to control sphincter
- Can not feel need to have a BM and don't have ability to hold it
- Sphincter is loose and BM leaks out

Care of the SCI patient

Spinal Cord Immobilization
- Maintain C- Collar (use proper technique when applying
- Log rolling patient with SCI or suspected SCI (use proper technique)
- HALO
  - Check proper weight is applied
  - Clean the pins each shift
  - Be alert to occipital pressure areas
  - May need medications for anxiety

- Baseline neuro vitals every shift
- Know signs and symptoms of spinal and neurogenic shock
- Always inform patients of all procedures
- Ensure anti-emetics are given if needed
- Ensure proper alignment of body at all times
- Nutritional needs are met
- Stockings to the limbs

Summary of Nursing Role

- ❑ Care starts on arrival in the ED, working as a team for the best outcome Of the patient
- ❑ Keeping patient stabilized to prevent further injury
- ❑ Assess Breathing as the patient may need assistance, depending on the level injury
- ❑ Keep patient as still as possible, provide sedatives
- ❑ Monitor vital signs
- ❑ Administering steroids as ordered
- ❑ Monitoring for blood clots
- ❑ Range of motion exercises
- ❑ Watch for skin breakdown
- ❑ Monitor input and output
- ❑ Emotional needs need to be addressed for patient and family
- ❑ Ongoing comfort needs of medications, environment temperature as well as psychological needs