Spinal Cord Injury: Chapter 27

**Results of Spinal Cord Injury**

* Tetraplegia: any degree of paralysis of the four limbs and trunk musculature
* Paraplegia: paralysis of LE’s with some involvement of the trunk and hips depending on the level of the lesion
* SCI’s are in the cervical, thoracic, and lumbar regions of the spinal cord and the injury depends on which vertebrae is affected
  + Complete lesions result in the absence of motor or sensory function of spinal cord below level of injury
  + Incomplete lesions may involve several neurological segments, and some spinal cord function may be partially completely intact.

Complete versus incomplete neurological classifications: extent of damage depends on location and severity of the injury

* Complete injury there is total paralysis and loss of sensation resulting from a complete interruption of the ascending and descending nerve tracts below the level of lesion.
* An incomplete injury some of the sensory or motor nerve pathways below the level of the lesion are preserved and intact
* Neurological exam by trained clinicians is essential to determine injury status
* The American Spinal Injury Association impairment scale uses finding from neurological exams to categorize injury types into specific categories.

Clinical Syndromes: central cord syndrome occurs when there is more cellular destruction in the center of the cord than in periphery

* Paralysis and sensory loss are greater in UE’s because nerve tracts are more centrally located than nerve tracts for LE’s
* Usually seen in older people w/a narrow spinal canal or cervical hyperextension

Brown-Séquard Syndrome (Lateral Damage): when only one side of the cord is damaged (stabbing or gunshot)

* Motor paralysis and loss of proprioception below level of injury, ipsilateral side
* Loss of pain, temperature, and touch sensation occurs on contralateral side

Cauda Equina (Peripheral) involve peripheral nerves rather than direct spinal cord

* Fractures below L2 and result in flaccid type paralysis (prognosis for recovery is higher because peripheral nerves can potentially regenerate)

Conus Medullaris Syndrome: injury of sacral and lumbar nerve roots resulting in areflexic bladder, bowel, and lower extremities

Post Traumatic Period: when a person enters a stage of spinal shock that may last from 24 hours to 6 months and this a period of areflexia, reflex activity stops below level of injury

* Bladder and bowel are atonic or flaccid, deep tendon reflexes are decreased and sympathetic functions are disturbed
* Decreased constriction of blood vessels, low BP, slow HR, and no perspiration
* Usually the muscle below the level of injury develop spasticity and deep tendon reflexes become hyperactive because monosynaptic reflex arc is intact but separated from higher inhibitory influences

**Prognosis Recovery:** depends on whether injury is complete or incomplete. If there is no sensation or return of motor function below the level of lesion 24-48 hours after the injury in carefully assessed complete lesions, motor function is less likely to return.

* Partial or full return of function to one spinal nerve root level below fracture can be gained or may occur in first 6 months of injury
* Guidelines to predict recovery process to help therapist include: the severity of injury, incomplete injuries have better chance of recovery, most recovery will occur in first 4 weeks, no amount of hard work can return function, and rehab will not determine the degree of recovery

**Medical and Surgical Management of the Person with Spinal Cord Injury**

* After the initial injury of SCI, trained medical professional should be the people to move and transport person to prevent any additional harm. Careful examination, stabilization, and transportation of patient is vital.
  + Antiinflammatory & steroidal drugs may be administered after injury for swelling
* Examining physician performs careful neurological exams to determine type of injury
  + CT scan & MRI are done, and early medical treatment goals are to restore normal alignment of spine, maintain stabilizations of injured area, and decompress structures that are under pressure
  + Surgery may be necessary to decompress spinal cord and fix any fractures
  + Portable immobilization includes halo vest or cervical collar for cervical injury
  + Thoracic braces or body jacket for thoracic injuries
  + Initiating upright sitting tolerance program shortly after injury is important

Complications of Spinal Cord Injury: Skin breakdowns, pressure sores, and decubitus ulcers

* Sensory loss increases risk of skin breakdown because with sensory loss patient cannot feel pressure and shearing and pain or heat against body.
  + Pressure causes loss of blood supply which can result in necrosis (death of tissue)
  + Heat can burn quickly, and shearing can destroy underlying tissue
* Decreased vital capacity: a problem in people who have sustained cervical and high thoracic lesions. They have limited chest expansion and decreased ability to cough because of weakness or paralysis of diaphragm and surrounding muscles
* Osteoporosis: evident because of disuse of long bones especially in LE’s
* Orthostatic Hypotension: lack of muscle tone in abdomen and LE’s lead to pooling of blood in areas with a decrease in blood pressure
* Autonomic Dysreflexia: seen in person whose injuries are above T6 level and caused by reflex action of the autonomic nervous system in response to stimulus
  + Symptoms are pounding headache, anxiety, chills, perspiration, flushing, & more
* Spasticity: involuntary muscle contraction below the level of injury from lack of inhibition from the brain
  + Moderate amount of spasticity can be helpful to maintain muscle mass, assist in prevention of sores because blood flow, and assist with ROM
  + Too much spasticity can cause additional medical problems (skin issues & fever)
* Heterotopic Ossification: bone that develops in abnormal anatomic locations-hip & knee
  + Onset of HO usually is 1-4 months after injury
  + Contributes to trunk deformities like scoliosis and kyphosis and skin breakdowns

**Sexual Function:** the drive and need for physical and emotional intimacy are not altered but problems of mobility, functional dependency, and altered body image.

* Lack of sensation over body part effects intimacy
  + Males erection and ejaculation are often affected
  + Women menstruation usually ceases for a period of time after injury then returns
  + Females are still able to conceive and give birth, but complications may arise
  + Sexual education and counseling is vital within patients with an SCI

**Occupational Therapy Intervention:** Evaluation is assessment of the patient is an ongoing process that begins on day of admission and continues after discharge on outpatient follow up

* Depending on where the patient is (acute, rehab, or home) staff should continually assess patient’s functionality and appropriateness of treatment and equipment
* Interdisciplinary team will enhance OT’s ability to predict realistic outcomes
  + Discharge planning begins at initial evaluation

Physical Status: OT obtains specific medical information and performs more of an evaluation

* Passive range of motion is measured to check for pain and potential harm
* Muscle strength is critical and manual muscle testing is performed
* Sensation is evaluated for light touch, superficial pain, and kinesthesia to determine areas of absent or impaired functioning.
* Muscle tone is evaluated to look for hypertonicity and Hypotonicity
* Evaluation of wrist and hand function to determine patient able to manipulate objects
* Clinical observation to assess endurance, oral motor control, head and trunk control, LE functional muscle strength, and total body strength

Functional Status: purpose is to determine present and potential levels of functional ability

**Establish Treatment Objectives** are important to do with patient, family, and rehab team.

* Objectives for OT to follow are…
  + Maintain or increase joint ROM, increase strength in muscles, increase physical activity and purposeful activities, maximize independence in ADL, explore leisure interest, and more

**Treatment Methods**: Acute Phase- is a phase of rehabilitation program the patient may be in traction or wearing a stabilization device for cervical or thoracic spine.

* Correct body positioning and appropriate splinting is necessary depending on injury
* AROM of all joints, muscle reeducation techniques for wrists and elbows, progressive resistive exercises, and encouragement to engage in self-care activities.

Active Phase: Part in rehab that patient can sit in a wheelchair and should begin upright tolerance

* High priority is preventing pressure sores on bony prominences
* AROM, PROM, splinting, casting, muscle innervations, assistive devices, and equipment are all important for this phase
  + Assistive devices like: eating cuff, wrist cock-up splint, plate guard, and more
  + ADL’s to improve feedings, hygiene, dressing, transfers, & communication skills
  + When patient is discharged a home evaluation is performed to ensure safety
  + OT can help with adaptive driving, home management, leisure activities, or one hand manipulation to evaluate for increase UE strength, coordination, trunk balance, and more.

**Aging with Spinal Cord Injury:** with age comes naturally and no preventable symptoms. 20 years after an SCI injury is typical point of aging problems increasing

Functional outcomes /impairments for people with SCI include: respiratory, bowel, and bladder function, bed mobility, transfers, positioning, standing, ambulation, all ADL’s, communication, transportation, homemaking, adaptive equipment/devices required, home modifications, & more

* FIM is used for a disability measurement in rehab capturing basic disability areas

Research on SCI’s is continually improving to someday improve functioning completely