

MANAGING SPINAL CORD INJURY PATIENTS IN THE ICU

Presented by:

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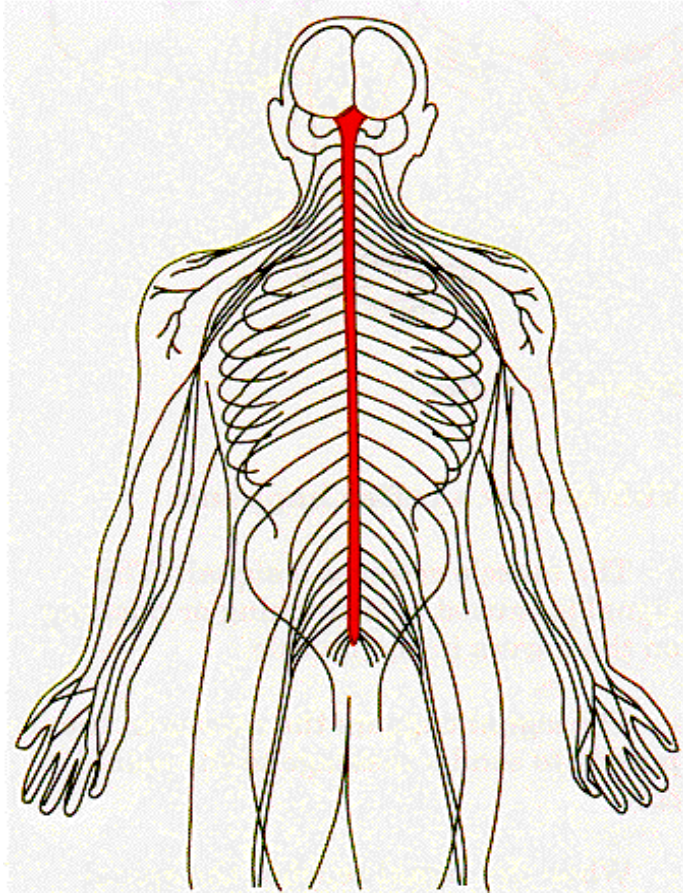
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OBJECTIVES

- Describe Levels of injury related to SCI
- Explain common medical changes related to SCI



SPINAL CORD INJURY



Any damage to the spinal cord that blocks communication between the brain and body.



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SPINAL CORD

- Types of Messages
 - Sensory
 - Touch, pressure, pain, temperature and proprioception
 - Motor
 - Reflexes



FACTS & STATISTICS

Model SCI Care System Data, 2014

PREVALENCE

- 12,500 annually

AGE

- Average age is 42 yrs

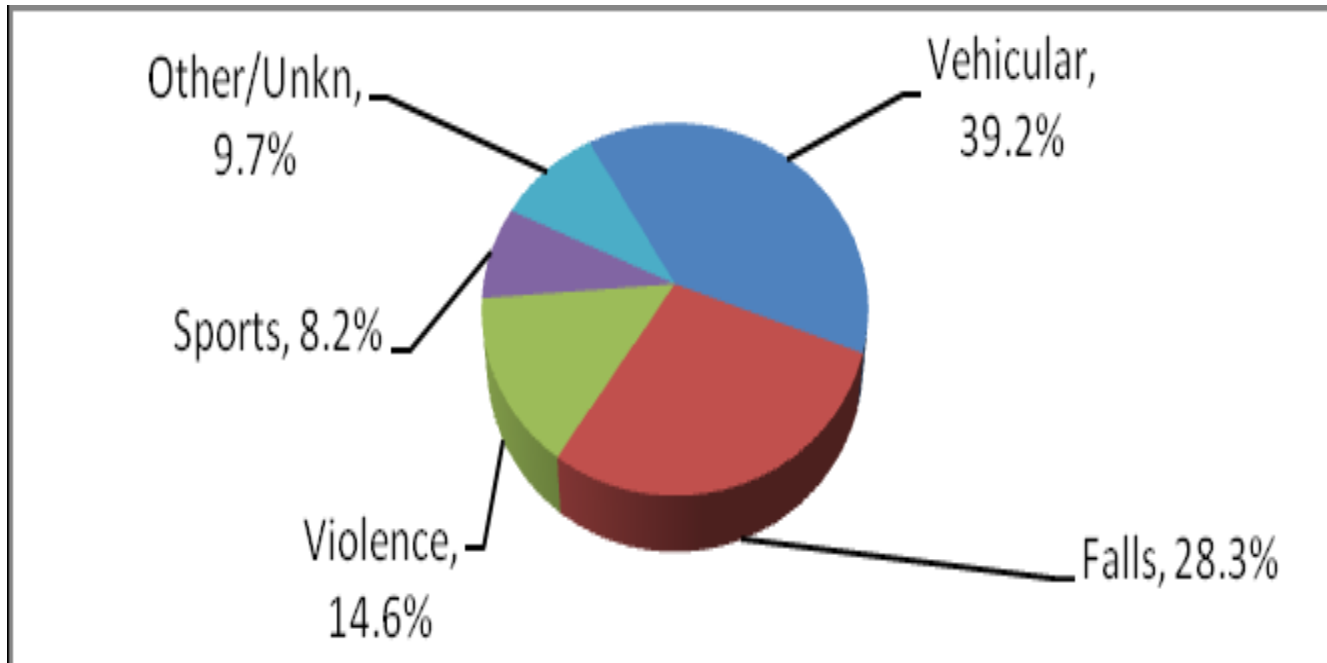
GENDER

- 79% are males

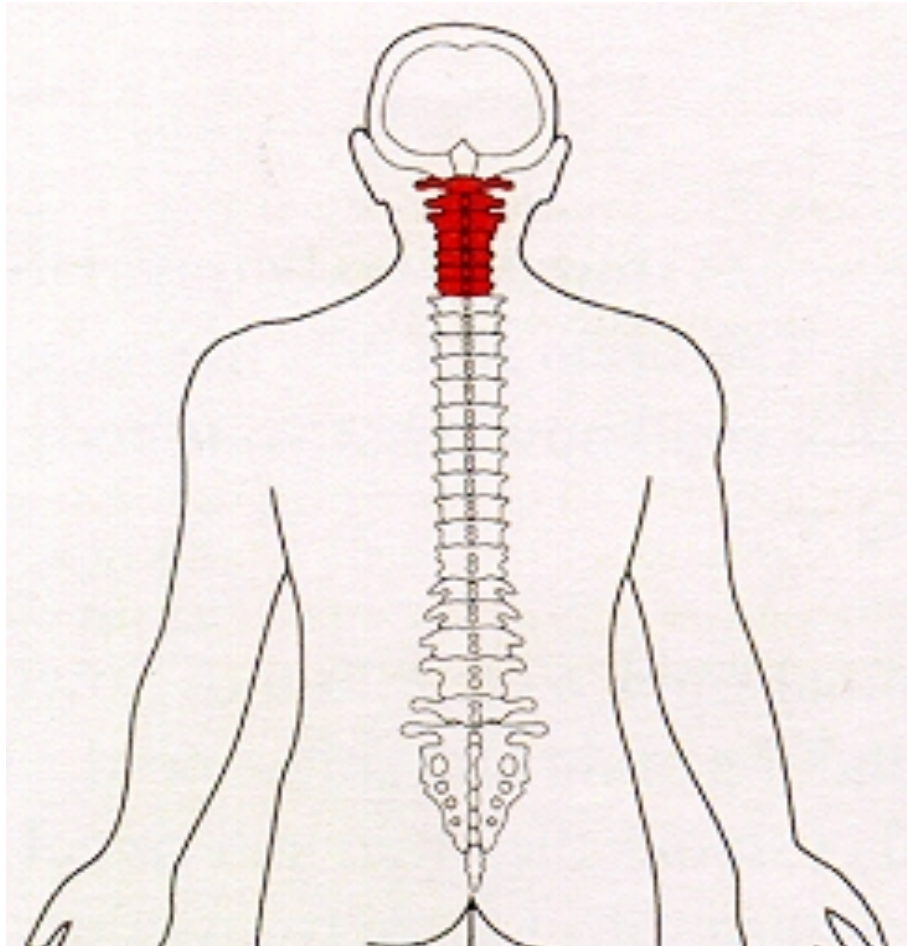


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ETIOLOGY

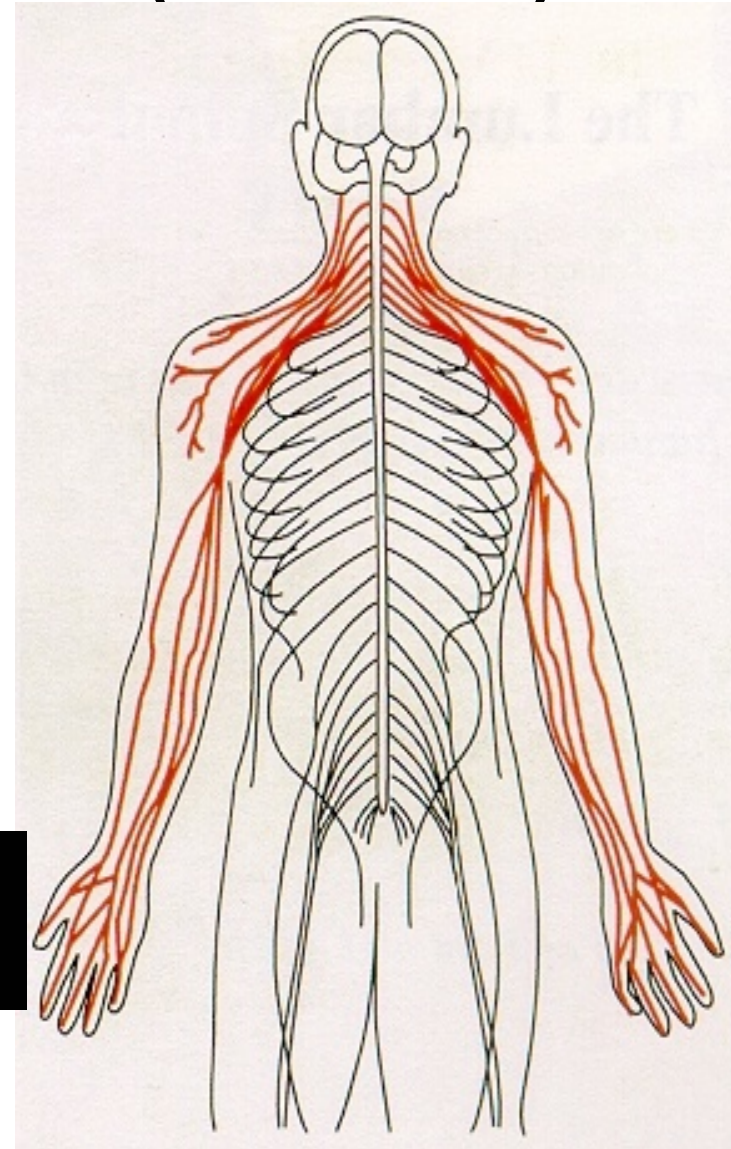
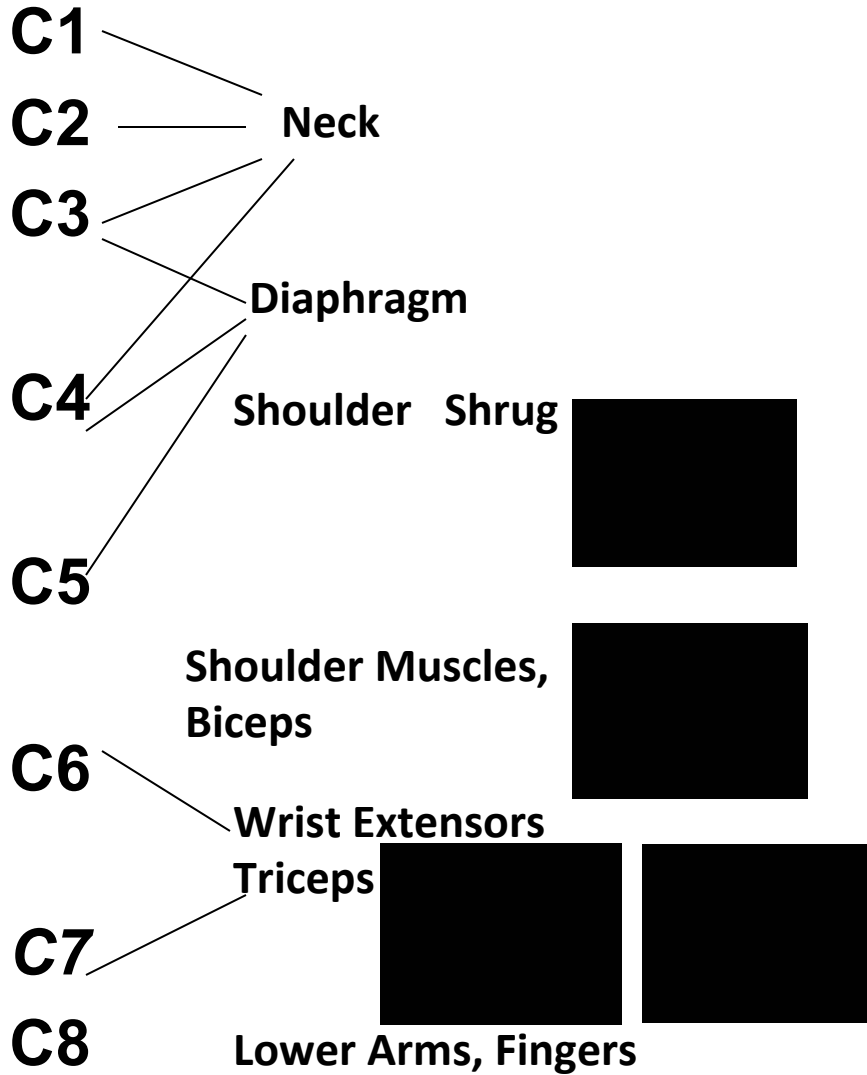


CERVICAL BONES (C1 – C7)

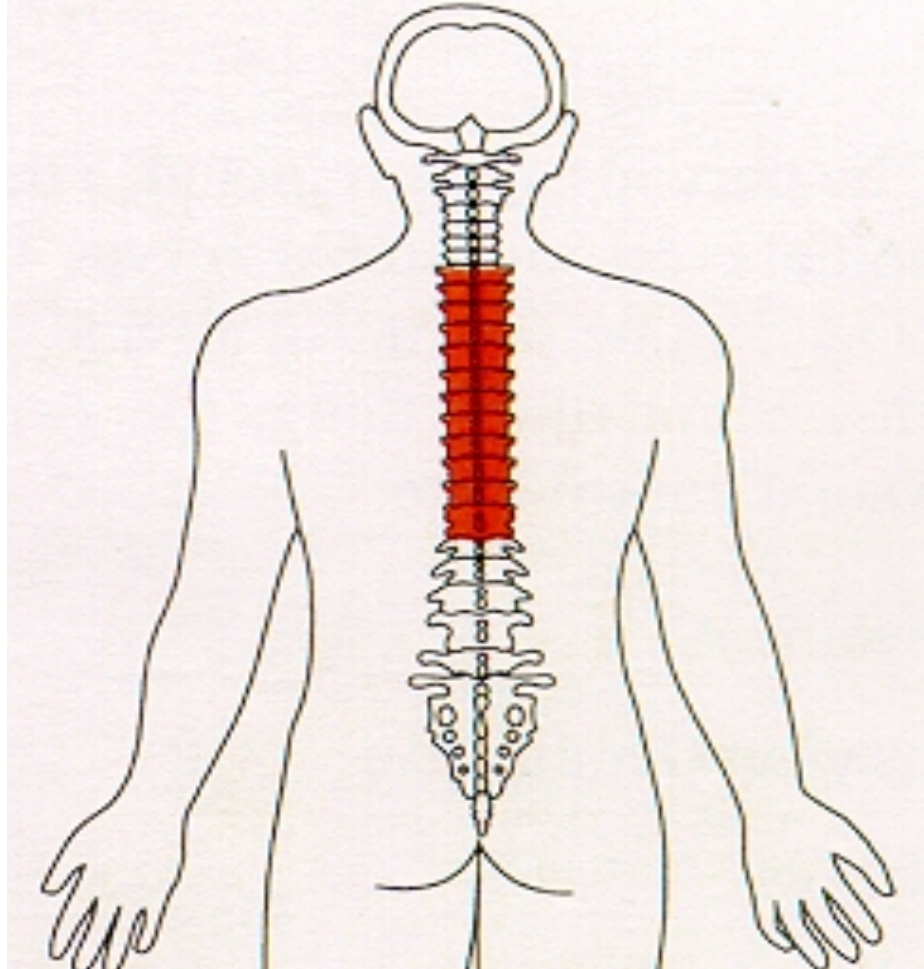


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CERVICAL NERVES (C1 – C8)



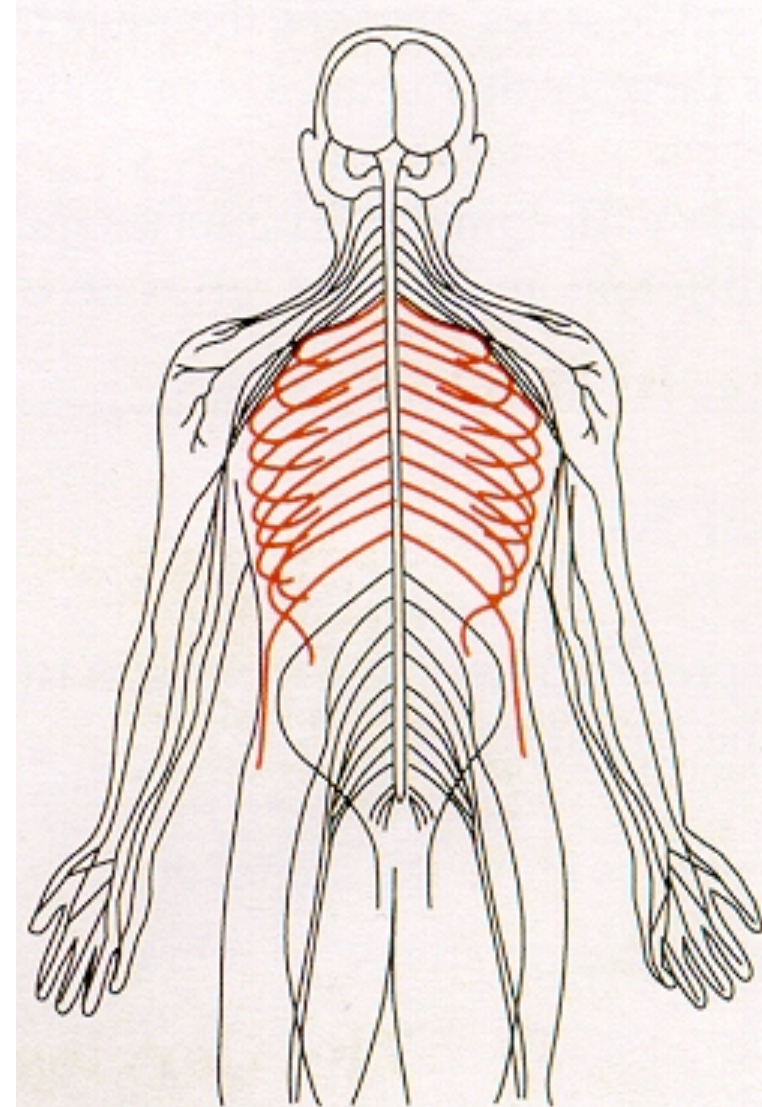
THORACIC BONES (T1 – T12)



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THORACIC NERVES {T1 – T12}

T1	Hand
T2	
T3	
T4	Chest;
T5	Transverse Thoracis
T6	Intercostals
T7	
T8	
T9	Trunk; Intercostals
T10	Abdominal
T11	(coughing and
T12	sneezing)



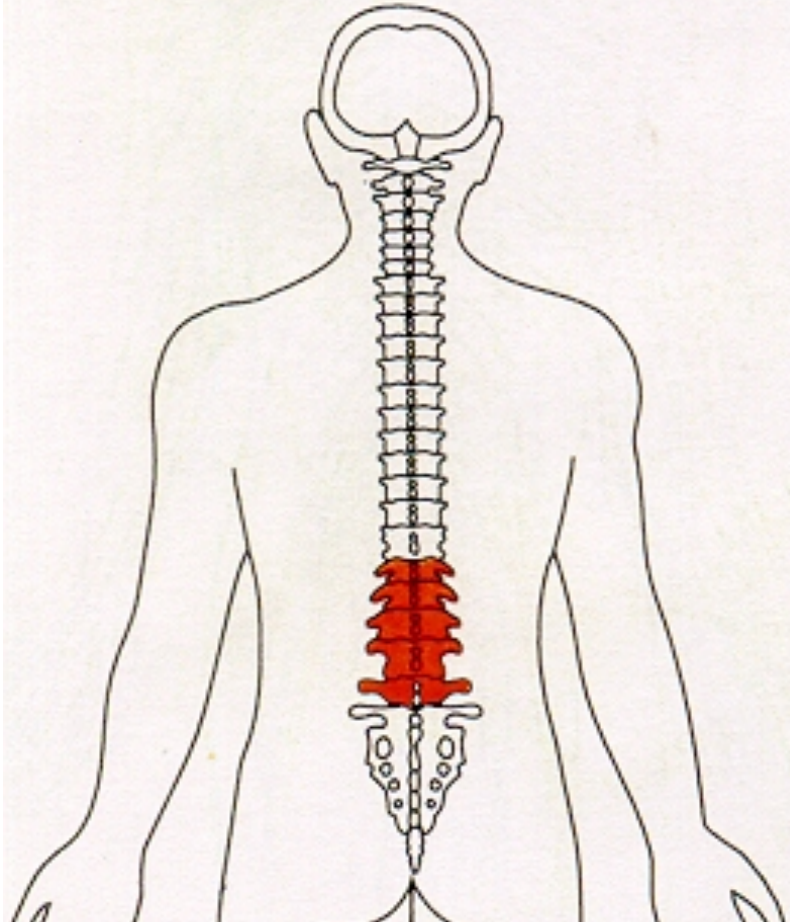
ASSIST COUGH



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LUMBAR (L1 – L5)



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LUMBAR NERVES {L1 – L5}

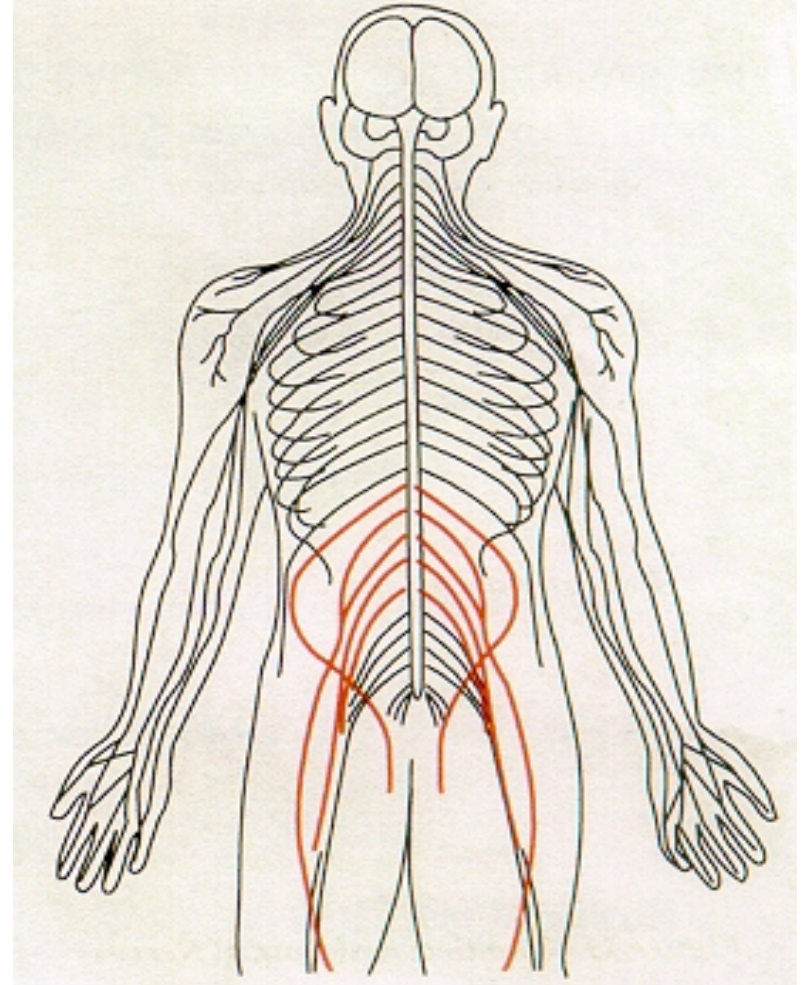
L1

L2 Hip Flexion; Iliopsoas

L3 Knee extension;
Quadriceps

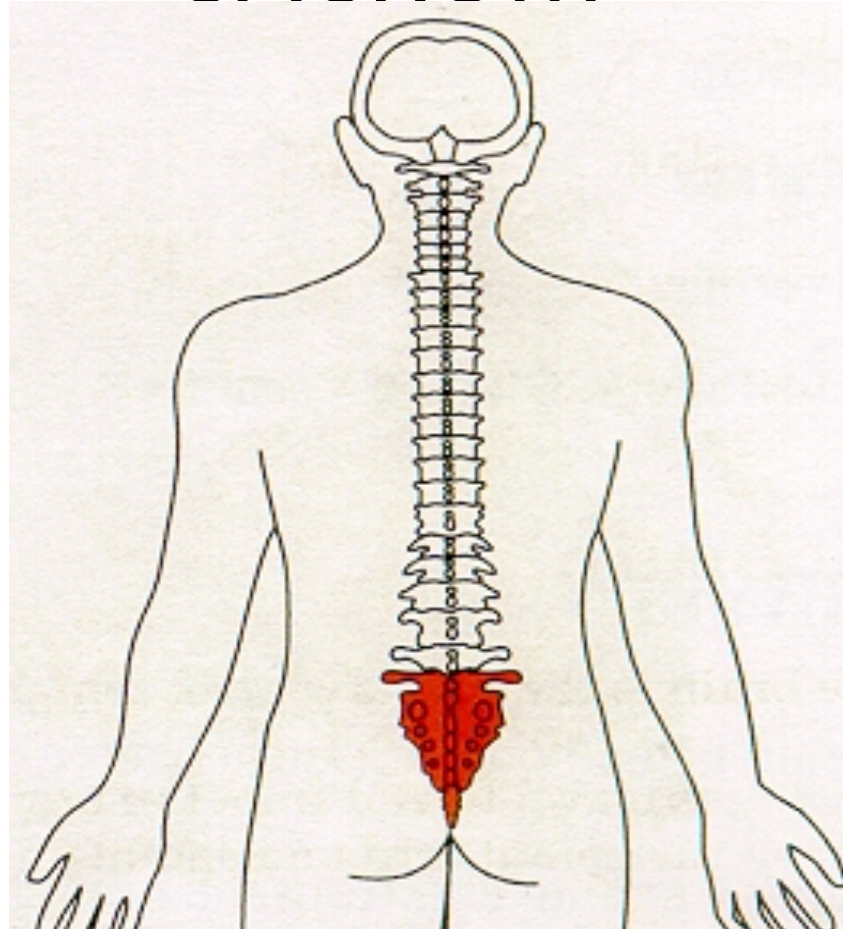
L4 Lower legs

L5 Foot



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SACRUM



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SACRAL NERVES {S1 – S5}

S1

Lower legs

S2

Foot

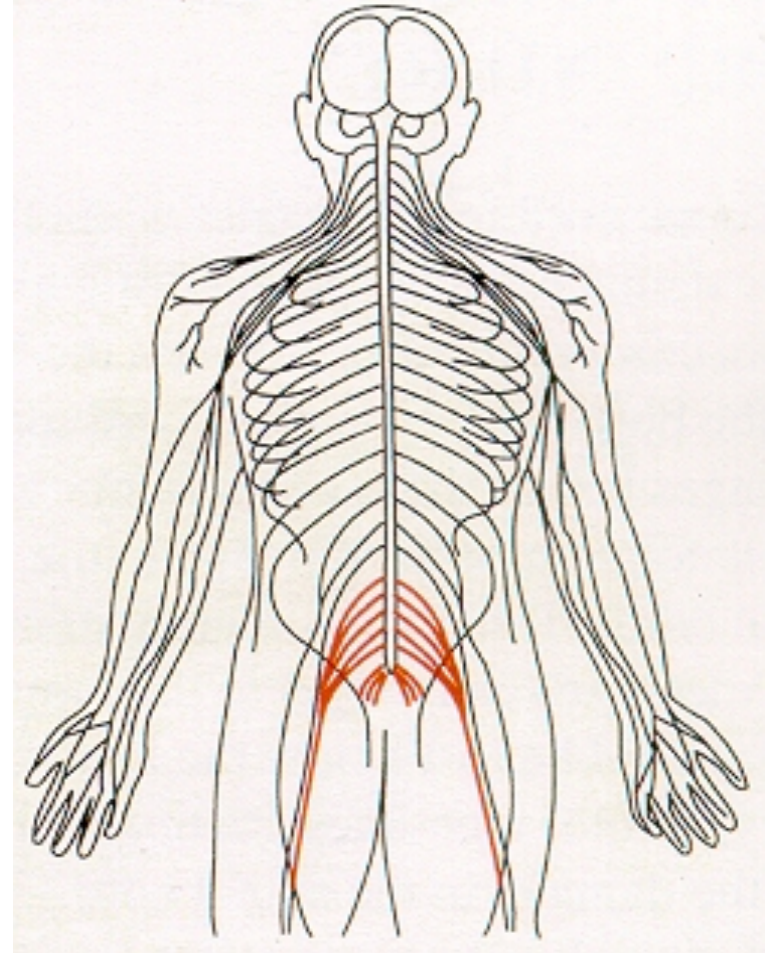
S3

Bowel, Bladder

S4

Sexual Function

S5



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CLASSIFICATION of SCI

American Spinal Injury Association

- AISA A – E
- most widely accepted
- “neurologic” basis



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ASIA CLASSIFICATIONS

ASIA A = no motor or sensory function is preserved in the sacral segments S4-S5.

ASIA B = sensory but not motor function is preserved below the neurological level and includes the sacral segments S4-S5

ASIA C = motor is preserved below the neurological level, and most of the key muscles below the neuro level have a muscle grade < 3 .

ASIA D = motor function is preserved below the neurological level, and at least half of key muscles below the neurological level have a muscle grade \geq or > 3 .

ASIA E = NORMAL motor and sensory testing.



CLASSIFICATION of SCI

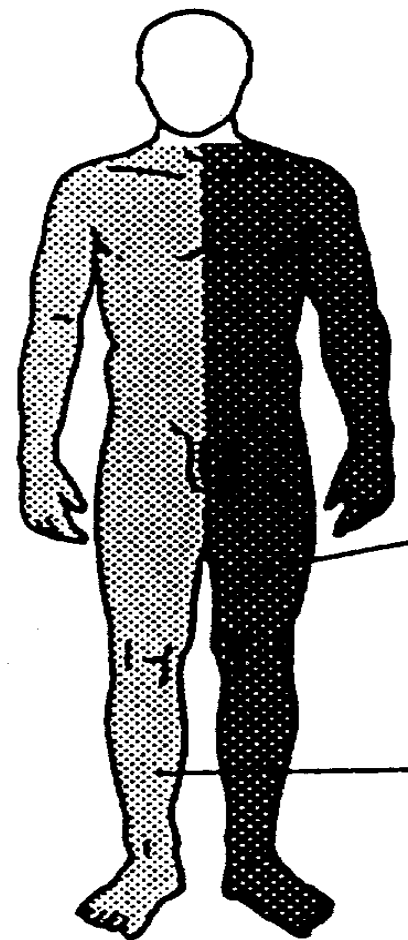
- Complete SCI = no motor or sensory function below the LOI.
- Incomplete SCI = any sensation present and/or any motor function below the LOI.



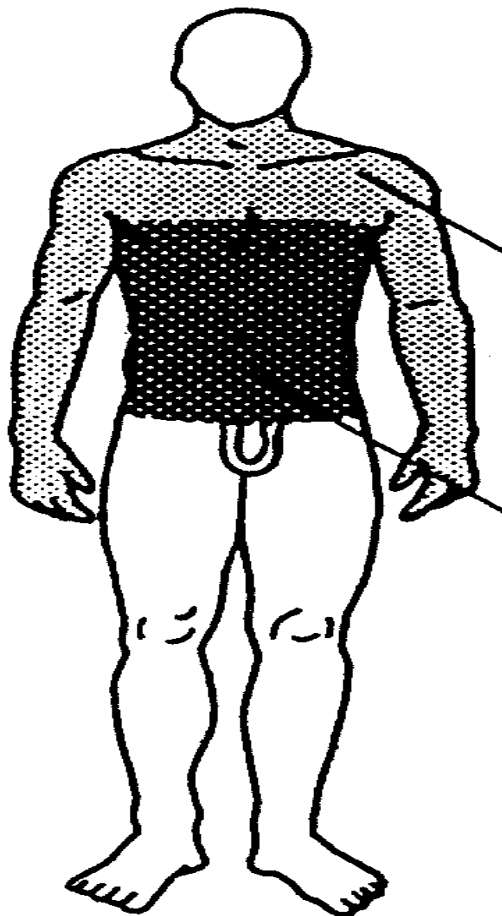
INCOMPLETE SYNDROMES

Brown Sequard: damage to one side of cord

- ipsilateral
paralysis, loss
proprioception
- contralateral loss
of pain and
temperature



INCOMPLETE SYNDROMES



- Central Cord:**
damage to central
part of cord
- greater weakness
in arms verses
legs
 - sacral sensation



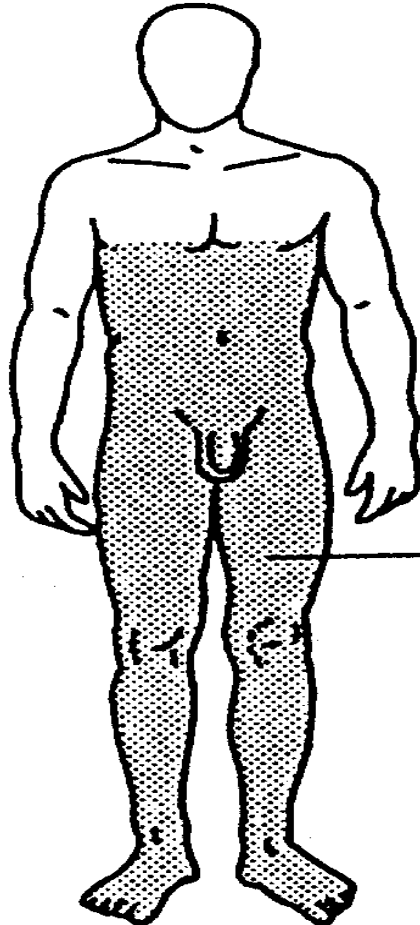
INCOMPLETE SYNDROMES

Posterior Cord:

Lesion within
posterior 1/3 of
cord

Sensory and
motor function
intact

Loss of
proprioception



Anterior Cord:

Lesion within
anterior 2/3 of
cord

Paralysis with loss
of pain and
temperature

Proprioception
intact



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INCOMPLETE SYNDROMES

- **Caudal Equina Syndrome**
 - L1 and below
 - Ambulation possible because quadriceps spared
- **Conus Medullaris**
 - Injury to the sacral cord and lumbar nerve root
 - Lower extremity motor and sensory loss
 - Arflexic bowel and bladder
 - Usually can ambulate



SPINAL SHOCK

Loss of all spinal reflexes below the level of injury.

Loss of all motor function.

Loss of sensation.

High dose steroids



Neurogenic SHOCK

Hypotension, bradycardia, and decreased preload to the heart in addition to spinal shock.



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Cervical Fixation

- Traction
- Halo and Vest
- Surgery





PROPER NURSING CARE OF THE HALO-VEST

Nursing Care:

- Care of skin beneath the vest: alcohol.
- Pin-site care: soap and water.
- Assure wrench taped to vest at all times.



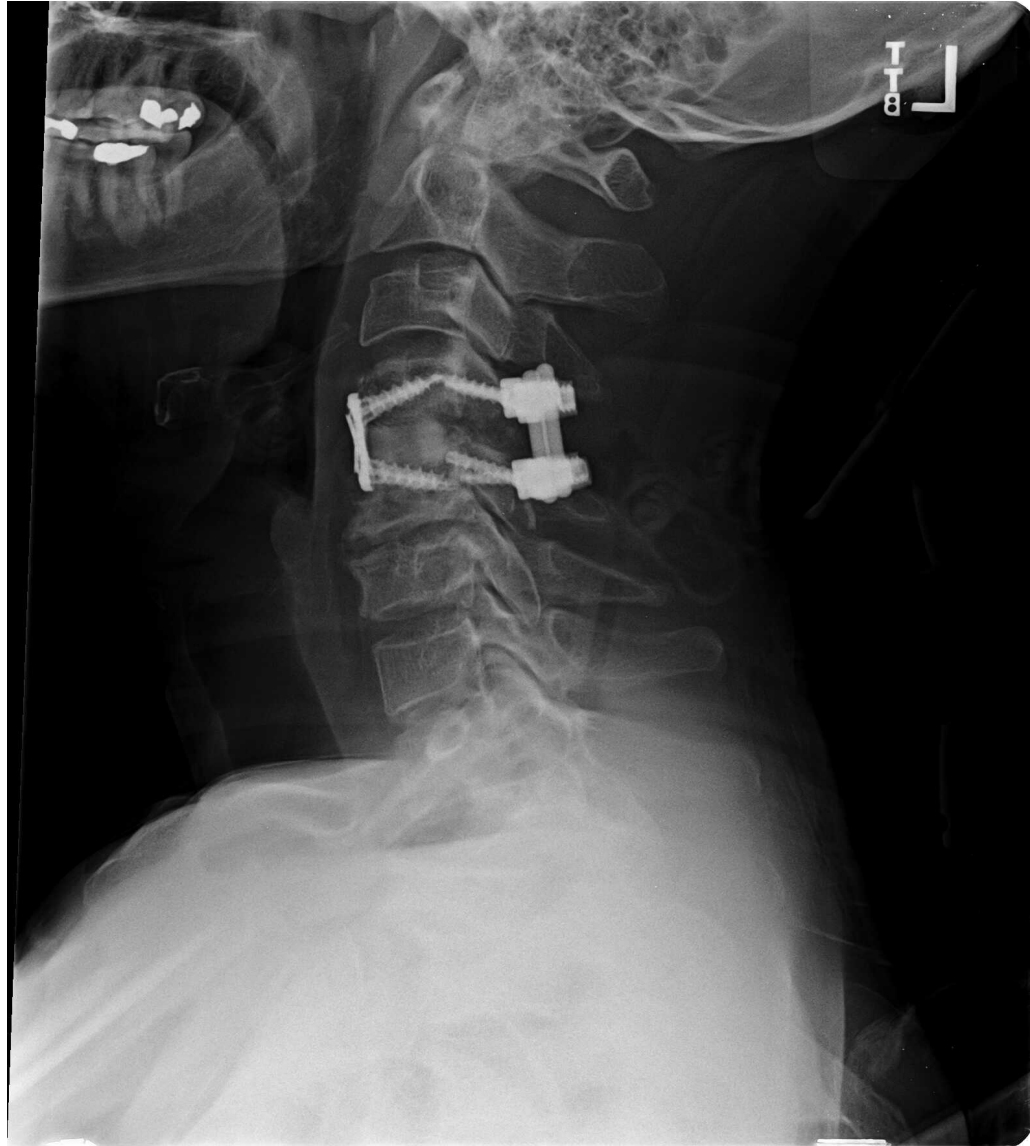
CERVICAL FUSION & WIRING

Anterior and/or Posterior Fusion.

- Hard collar must be worn at all times for 6-8 weeks post op



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NURSING CARE: CERVICAL FUSION

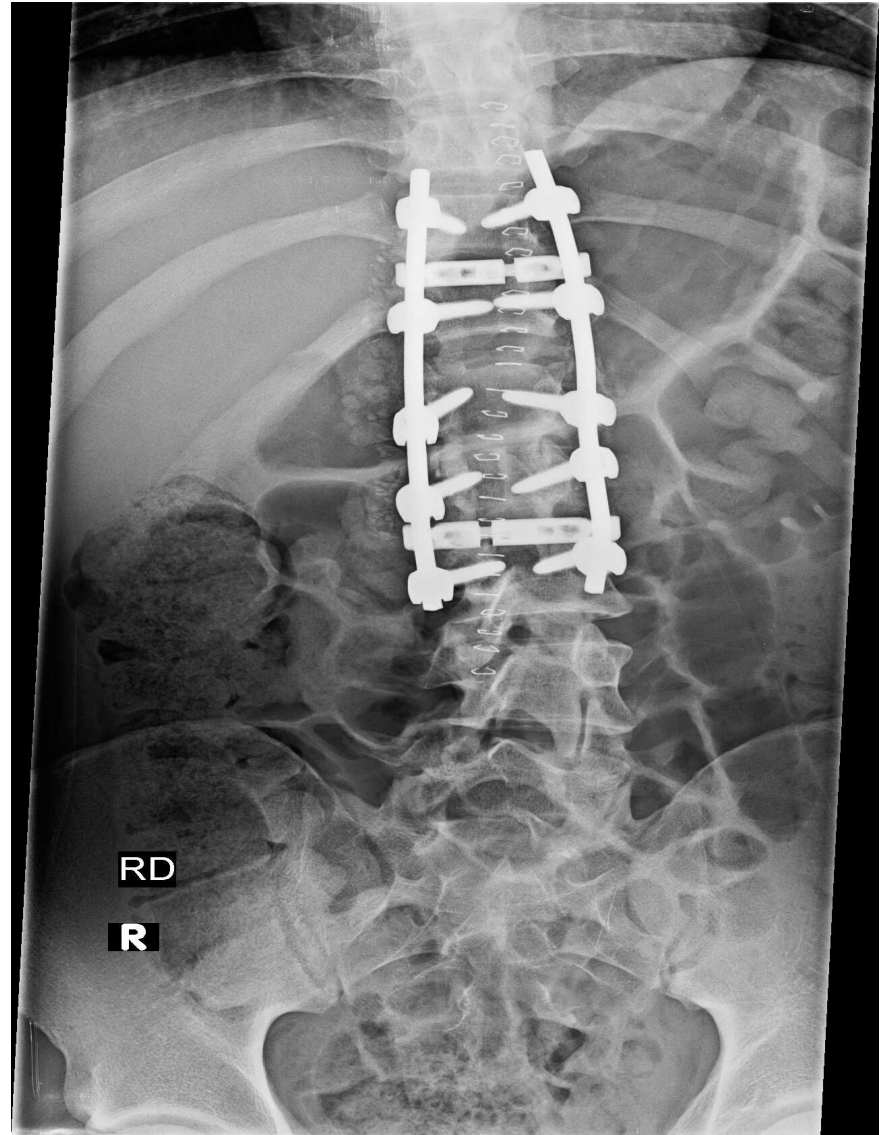
- Turn every two hours utilizing the “log-rolling” method.
- Monitor surgical incision sites for signs/symptoms of infection.



THORACIC/ LUMBAR FUSION

- Rods, plates or cages are used for thoracolumbar injuries.
- In conjunction with a supportive brace to maintain alignment and prevent torsion movements.
- Bracing decisions are made to allow for rehab and ADL retraining.





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JEWITT BRACE & TLSO



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AUTONOMIC NERVOUS SYSTEM DYSFUNCTION

- Bradycardia
- Hypotension
- Poikilothermia
- Pneumonia/
Atelectasis
- Deep Vein
Thrombosis
- Autonomic
Dysreflexia
- Stress Ulcers/
GI Bleed
- Bowel
- Bladder
- Skin



ANS DYSFUNCTION

Bradycardia:

- ANS disruption
 - Parasympathetic system dominant.
- Often due to vagal stimulation.
- Most prevalent in C2-4 injuries.
- Extreme bradycardia may require:
 - Hyperoxygenate before suctioning – 100% O2
 - Pre-medication prior to suctioning with Atropine.
 - Pacemaker.



ANS DYSFUNCTION

Hypotension:

- Parasympathetic dominance = vasodilation.
- Vasoconstrictive therapy may include inotropics such as dopamine and neosynephrine.
- Florinef and Midodrine may be used for the treatment of severe hypotension.



ANS DYSFUNCTION

Poikilothermia:

- Interruption of sympathetic pathways to hypothalamus.
- Loss of sympathetic response below level of injury resulting in the inability to shiver or perspire.
- Warming or cooling blankets may be used.



ANS DYSFUNCTION

Pneumonia/Atelectasis:

- Leading cause of death in SCI population.
- Due to inability to cough, immobilization, artificial ventilation, and general anesthesia.
- Medical Treatment/Interventions:
 - Aggressive pulmonary toiletry.
 - Antibiotics.
 - Bronchodilator therapy.



ANS DYSFUNCTION

Deep Vein Thrombosis (DVT):

- Signs/symptoms
 - Unilateral swelling, temp change in limb, low grade fever with unknown etiology
- IMMEDIATELY institute regimen of prophylactic anticoagulants.
- DVT may result in pulmonary embolus



ANS DYSFUNCTION

Deep Vein Thrombosis (DVT):

- Vena Cava filter (Greenfield Filter)
 - May cause increased edema in limb
 - Long term anticoagulation therapy (3-6 months)
- 3-5% of the SCI population will suffer a pulmonary embolus when taken off anticoagulation therapy.



ANS DYSFUNCTION

Gastrointestinal:

- Gastroduodenal ulcers/GI bleeding.
- Causes
 - stress response and/or hypotension to the gastric lining
- Initiate methods for nutrition.
- Recommend prophylactic acid reducer asap after SCI

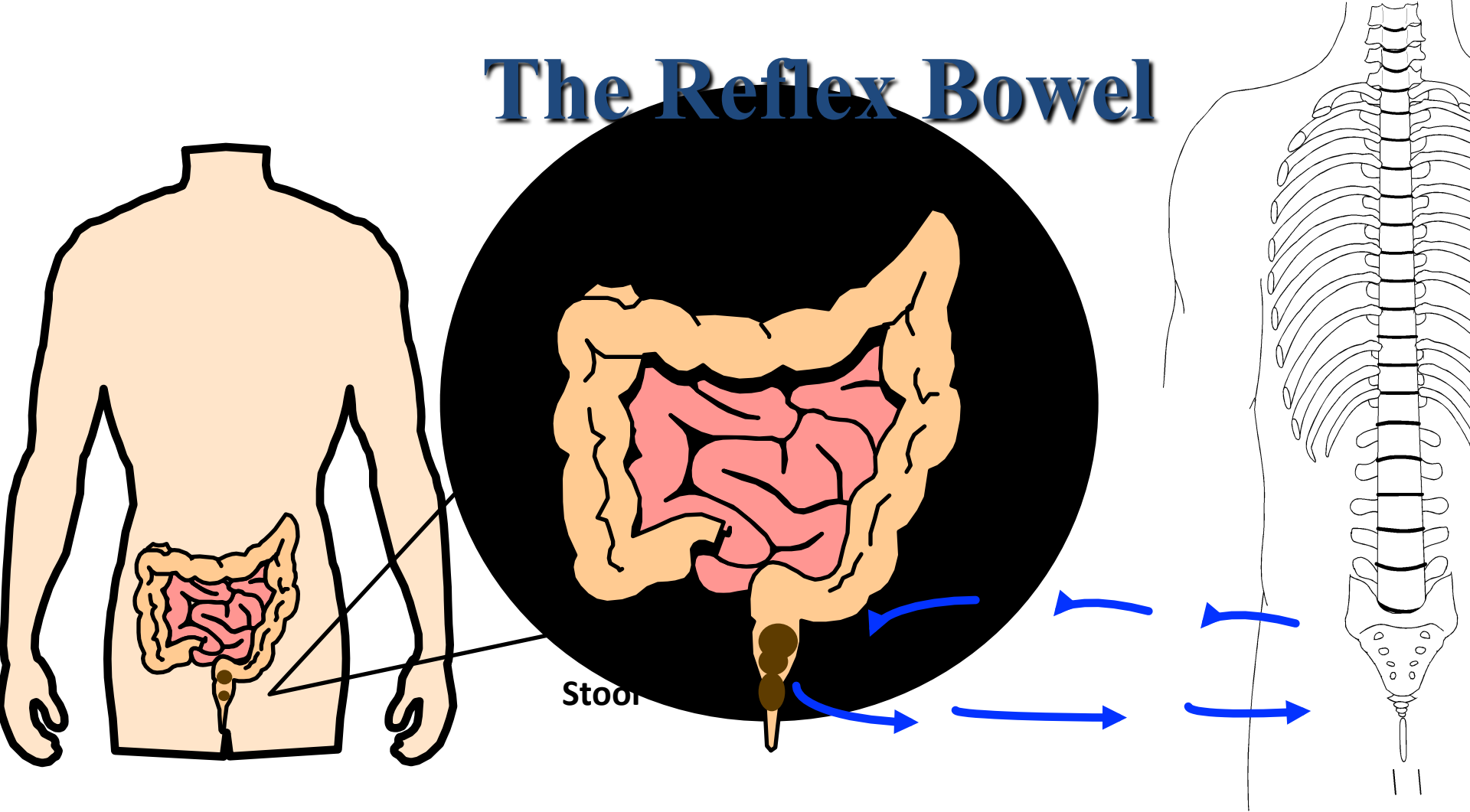


ANS DYSFUNCTION

- Bowel
 - Neurogenic
 - Flaccid vs Reflex bowels
- Bladder
 - Foley vs intermittent catheters
- Skin
 - Turn, Turn, Turn!



The Reflex Bowel



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HEAD INJURY

Initial Head CT may be negative but ...

Signs and symptoms of head injury:

1. Agitation
2. Difficulty weaning
3. Difficulty swallowing

