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# NEUROLOGIC EMERGENCIES

Eric Christensen RN, BSN, CEN, CPEN

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## CEN EXAM: NEURO CONTENT



CEN  
NEURO

- **Neurological Emergencies** (10% of test) (16 Questions)
- A. Alzheimer's disease/dementia
- B. Chronic neurological disorders (i.e., multiple sclerosis, myasthenia gravis, etc)
- C. Guillain-Barré syndrome
- D. Headache (i.e., including temporal arteritis, migraine)
- E. Increased intracranial pressure (ICP)
- F. Meningitis
- G. Seizure disorders
- H. Shunt dysfunctions
- I. Spinal cord injuries
- J. Stroke (e.g., ischemic or hemorrhagic)
- K. Transient ischemic attack (TIA)
- L. Trauma

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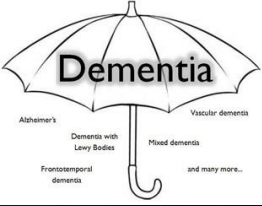
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## DEMENTIA



CEN  
NEURO

- Deterioration of memory and other cognitive functions.
- It is a broad category with multiple potential causes
- Symptoms:
  - Mild: 2-4 years
  - Moderate
  - Severe: 1-3 years
- Nursing Focus on Safety



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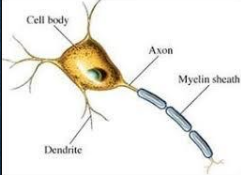

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### CHRONIC NEURO: MULTIPLE SCLEROSIS

- 3<sup>rd</sup> cause of disability between 15-60
- Etiology is unknown
- Structures involved:
  - Optic/oculomotor nerves, corticospinal and posterior column systems
- Exacerbations / Remissions


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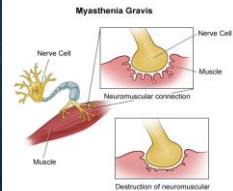

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### CHRONIC NEURO: MYASTHENIA GRAVIS

- Fatigue of Voluntary Muscles
- Peak Onset
  - Females 20-30
  - Males >40
- Treatment
  - Neostigmine
  - Steroids / Cytotoxics
  - Thymectomy


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### ACUTE INFECTIOUS POLYRADICULONEURITIS Guillain-Barre syndrome

- Autoimmune Inflammatory Disease
- Cause: UNKNOWN
- Signs and Symptoms
  - CSF and Nerve Conduction
  - Weakness Develops
- Treatment:
  - Possible plasmapheresis

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# Headaches

- Cluster
- Tension
- Migraine

<b>Cluster</b> pain is in and around one eye.	<b>Tension</b> pain is like a band squeezing the head.	<b>Migraine</b> pain, nausea and visual changes are typical of classic form.
		



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# Headaches

## CLUSTER

- Described as the most Painful-
- Cyclical Patterns
- Pain location
- Cause
- Treatments



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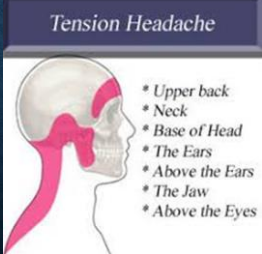
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# Headaches

## TENSION

- Pain Description
  - Episodic
  - Chronic
- Cause- (Theory) Heightened sensitivity to pain
- Treatment



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# Headaches      MIGRAINES



- One sided :Throbbing / Pulsing
  - Auras
- The Attack- 4-72 hours (Frequency and Duration vary)
- Post-Drome Period (24 hours)
- Causes
- Treatments-

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# VENTRICULOPERITONEAL SHUNT DYSFUNCTION



- RX for Hydrocephalus
- Shunt Malfunction
- Infections
- Signs of Infections
- Sudbural / Peritonitis

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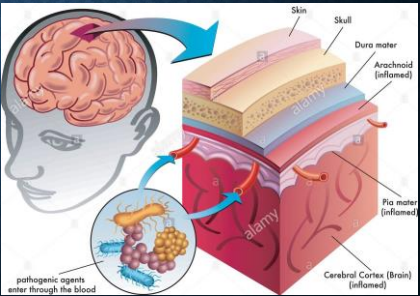
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# Meningitis

First Identified in 1805 :  
Geneva Switzerland

VIRAL / BACTERIAL



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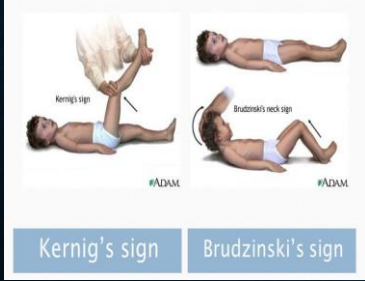
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**MENINGITIS**



The image contains two diagrams illustrating meningeal signs. On the left, 'Kernig's sign' is shown as a person lying on their back with their knees pulled up towards their chest; an arrow points to the lower back, indicating pain. On the right, 'Brudzinkski's sign' is shown as a person lying on their back with their head tilted back; an arrow points to the neck, indicating pain. Both diagrams are labeled with '#ADAM' at the bottom.

- Objective Data
  - High Pitched Cry / AMS
  - Temp  $>38.3 < 36$
  - Petechia / Purpura
  - Kernigs Sign
  - Brudzinkski's Sign
  - Photophobia

Kernig's sign      Brudzinkski's sign

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VIRAL	BACTERIAL
<ul style="list-style-type: none"><li>• MILD AND SHORT LIVED</li><li>• Late Summer / Early Fall</li><li>• Enteroviruses<ul style="list-style-type: none"><li>• Herpes, HIV</li><li>• Mumps</li><li>• West Nile</li></ul></li><li>• Contact / Droplet Precautions</li></ul>	<ul style="list-style-type: none"><li>• Severe / Life Threatening</li><li>• Late Winter / Early Spring</li><li>• Bacterium<ul style="list-style-type: none"><li>• Strep pneumonia</li><li>• Neisseria Meningitides (Meningococcal)</li><li>• Haemophilus influenza type b</li></ul></li><li>• Contact / Droplet Precautions</li></ul>

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**LUMBAR PUNCTURE**



The image shows two test tubes side-by-side. The tube on the left contains a clear, colorless liquid. The tube on the right contains a yellowish, turbid liquid. Both tubes have white caps and are shown against a dark background.

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## MENINGOCOCCAL MENINGITIS

- Neisseria Meningitides
- Petechial / Purpuric Rash
- Neurologic Disfunction

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## Seizures

A sudden paroxysmal discharge of neurons causing *transient* impairment of consciousness movement sensation or memory



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## Seizures

<b>CAUSES</b>	<b>120 / 100,000</b>
• IONIC	
• Metabolic	<b>&lt; 2 &amp; &gt; 65</b>
• Structural changes	
• Idiopathic	<b>40% &lt;18</b>
• Fever	
• CO-MORBIDITIES	



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# Seizures

- **Grand Mal vs Petite Mal**
- **Generalized vs Partial**
- **Status Epilepticus**

GEN NEURO

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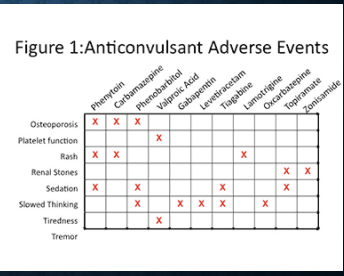
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# Seizures

**Medications**  
Stop the Seizure  
Prevent the Seizure

**Nursing Implications**

GEN NEURO




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I	Olfactory	S	Smell
II	Optic	S	Vision
III	Oculomotor	M	Most Eye Movement
IV	Trochlear	M	Moves eyes
V	Trigeminal	B	Facial Movement, Mastication
VI	Abducens	M	Abducts the eyes
VII	Facial	B	Facial Expression, taste
VIII	Auditory	S	Hearing, Balance
IX	Glossopharyngeal	B	Taste, Gag reflex
X	Vagus	B	Gag, parasympathetic stimulation
XI	Accessory	M	Shoulder Shrug
XII	Hypoglossal	M	Swallow, Speech

GEN NEURO

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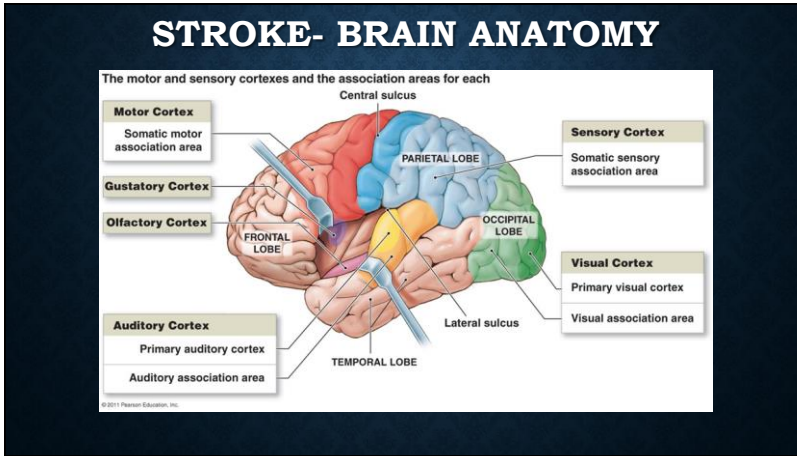
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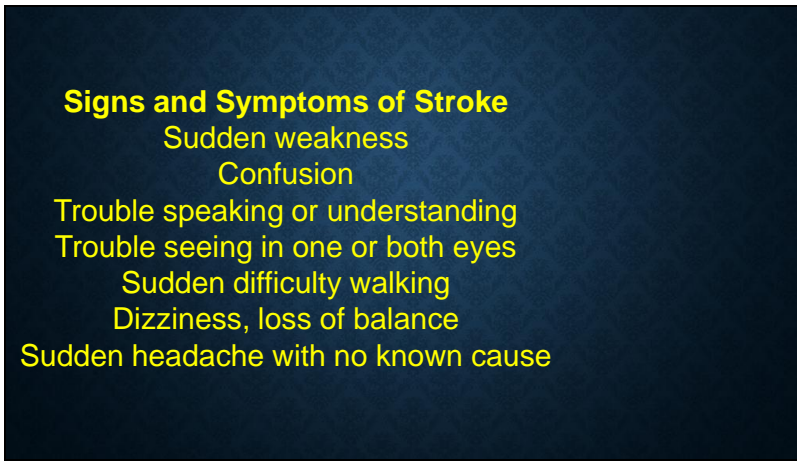
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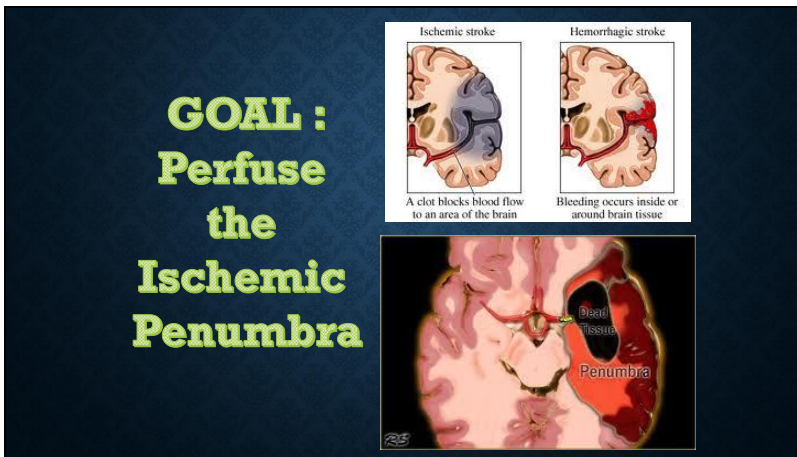
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# CINCINNATI PREHOSPITAL STROKE SCREEN

G  
O  
F  
A  
S  
T



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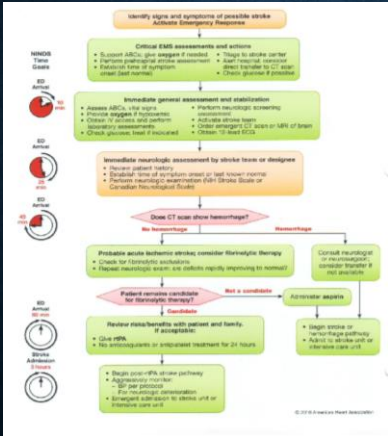
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## AHA STROKE ALGORITHM




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## NIHSS NATIONAL INSTITUTE OF HEALTH STROKE SCALE



Score	Stroke severity
0	No symptoms
1-4	Minor stroke
5-15	Moderate stroke
16-20	Moderate to severe
21-42	Severe stroke



You know how.  
Down to earth.  
I got home from work.  
Near the table in the dining room.  
They heard him speak on the radio last night.

MAMA  
TIP – TOP  
FIFTY – FIFTY  
THANKS  
HUCKLEBERRY  
BASEBALL PLAYER

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**TRANSIENT ISCHEMIC  
ATTACK : TIA**

What is the difference in initial  
presentation of an  
ischemic stroke vs a TIA?



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GLASCOW COMA SCORE  
CONCUSSION  
POST CONCUSSIVE SYNDROME  
EPIDURAL  
SUBDURAL  
SUBARACHNOID  
HERNIATION

**Traumatic  
Injuries**



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# Glasgow Coma Scale

EYE OPENING		VERBAL RESPONSE		MOTOR RESPONSE	
					
Spontaneous >	4	Orientated >	5	Obey commands >	6
To sound >	3	Confused >	4	Localising >	5
To pressure >	2	Words >	3	Normal flexion >	4
None >	1	Sounds >	2	Abnormal flexion >	3
		None >	1	Extension >	2
				None >	1

**GLASGOW COMA SCALE SCORE**

<b>Mild</b> 13-15	<b>Moderate</b> 9-12	<b>Severe</b> 3-8
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## Concussion



CEN  
NEURO

Traumatic brain injury that effects  
brain function

Symptoms- Can last from days to  
weeks

Complications-

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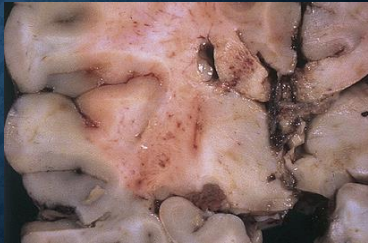
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# Diffuse Axonal Injury

- Major Mechanisms
- MRI Results
- Assessment Findings
- May involve the brainstem or the Reticular Activating System (RAS)



CEN  
NEURO

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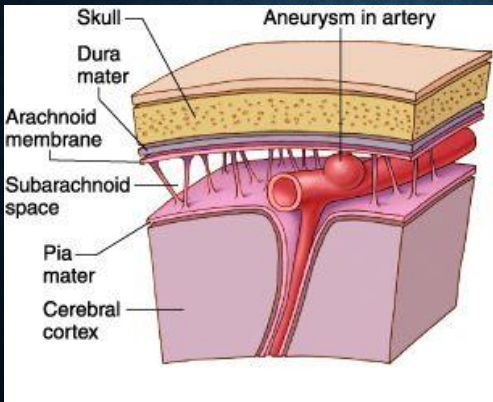
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# SUBARACHNOID BLEED



Skull  
Dura mater  
Arachnoid membrane  
Subarachnoid space  
Pia mater  
Cerebral cortex

Aneurysm in artery



CEN  
NEURO

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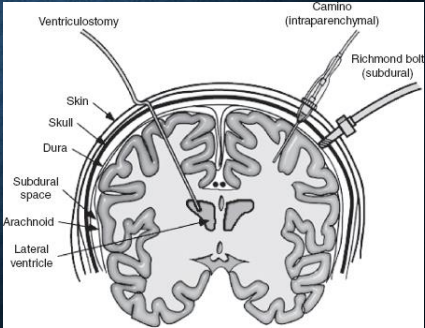
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# Intracranial Pressure : (ICP)

- 2-10, 15, 20
- $CPP = MAP - ICP$
- Autoregulation
- Cushing's TRIAD
- Causes
- Monitor / RX



Ventriculostomy  
Camino (intraparenchymal)  
Richmond bolt (subdural)  
Skin  
Skull  
Dura  
Subdural space  
Arachnoid  
Lateral ventricle



CEN  
NEURO

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### SIGNS OF INCREASED INTRACRANIAL PRESSURE

<b>Early</b> Nausea Vomiting Anxiety Repetitive Questioning Headache Confusion Double Vision	<b>LATE</b> Non Reactive Pupils Altered Respiratory Patterns Seizures Loss of Consciousness Coma
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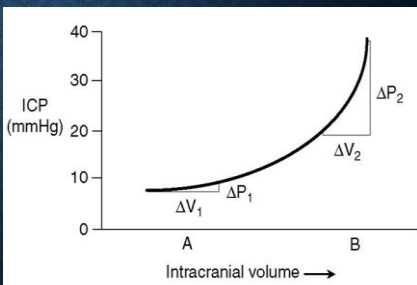
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## Monroe Kellie Doctrine

- 80% Brain
- 10% Blood
- 10% CSF





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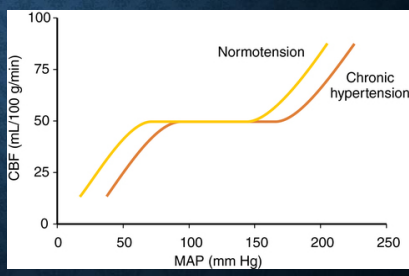
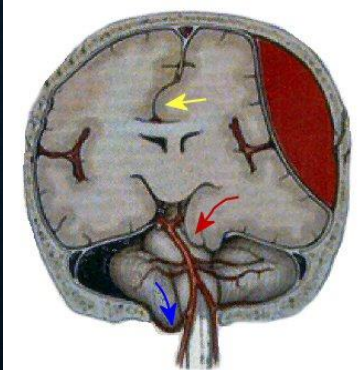
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## HERNIATION





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**Cushing's Triad**

Blood Pressure  
Bradycardia  
Altered Respirations



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**INTERVENTIONS**


**H** Head of Bed / Hyperventilation?????

**E** Evaluate ICP- BOLTS / CAMINO

**A** Airway- GCS 8 Intubate

**D** Drainage: Ventriculostomy : Straighten the C-Collar :  
Osmotic Diuretics: Craniotomy : Craniectomy

**S** Safety / Sedation



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PATTERNS of LOC

Epidural

Subdural

DAI

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**WHICH CRANIAL NERVE IS NOT RESPONSIBLE FOR EYE MOVEMENT?**

- A. Cranial Nerve II – Optic Nerve
- B. Cranial Nerve III – Oculomotor
- C. Cranial Nerve IV – Trochlear
- D. Cranial Nerve VI - Abducens

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**WHICH TYPE OF HEADACHE IS ASSOCIATED WITH HAVING AN AURA SIGNALING THE START OF THE HEADACHE?**

- A. Cluster
- B. Migraine
- C. Tension
- D. Temporal Arteritis

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**WHICH OF THE FOLLOWING IS CORRECT REGARDING IV ADMINISTRATION OF PHENYTOIN (DILANTIN)**

- A. Phenytoin (Dilantin) can cause hypotension and bradycardia
- B. When giving IV Phenytoin (Dilantin) it is recommended to administer at a rate of 50 mg/minute
- C. Phenytoin (Dilantin) can cause renal calculi due to hypercalcemia
- D. Phenytoin (Dilantin) can be diluted in D5W when used with a filter

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A 20 year old male arrives after falling from his skateboard. His friend states that he passed out and they could not wake him up. On your initial assessment, the patient has a GCS of 15 and no sensory or motor deficits. Thirty minutes after arriving, the patient now has a GCS of 10 (The patient opens his eyes to pain, he is confused, and when you pinch his nailbeds, he withdraws to pain) .These findings most likely represent which type of injury?



GEN  
NEURO

- A. Diffuse Axonal Injury
- B. Subdural hematoma
- C. Subarachnoid hemorrhage
- D. Epidural hematoma

GLASGOW COMA SCALE		
EYE OPENING	VERBAL RESPONSE	MOTOR RESPONSE
Spontaneous > 4	Orientated > 5	Obey commands > 6
To sound > 3	Confused > 4	Localising > 5
To pressure > 2	Words > 3	Normal flexion > 4
None > 1	Sounds > 2	Abnormal flexion > 3
	None > 1	Extension > 2
		None > 1
GLASGOW COMA SCALE SCORE		
Mild 13-15	Moderate 9-12	Severe 3-8

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**AFTER A FALL, A PATIENT IS NOTED TO HAVE LOSS OF FUNCTION IN THE UPPER EXTREMITIES, BUT THE LOWER EXTREMITY FUNCTION REMAINS INTACT. THERE IS NO LOSS OF BOWEL OR BLADDER FUNCTION. WHICH OF THE FOLLOWING INCOMPLETE SPINAL CORD INJURIES DO YOU SUSPECT?**



GEN  
NEURO

- A. Central cord syndrome
- B. Anterior cord syndrome
- C. Brown Sequard Syndrome
- D. Axial-Loading event

**BONUS QUESTION-  
What is the fourth  
type of incomplete  
lesion?**

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