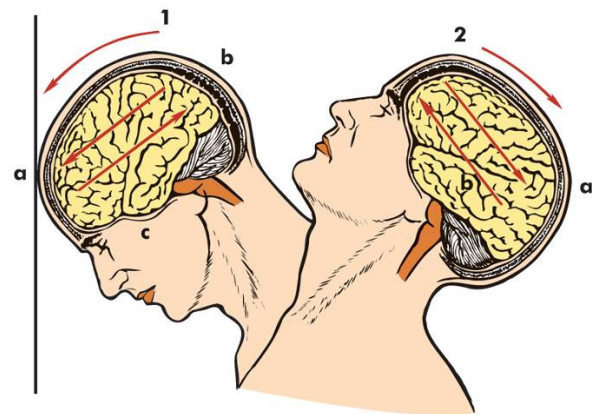
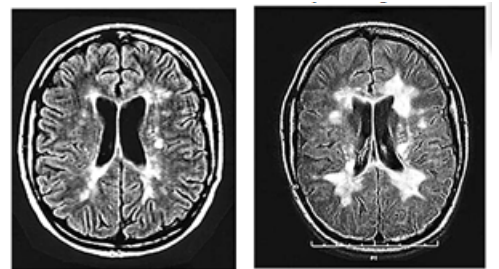
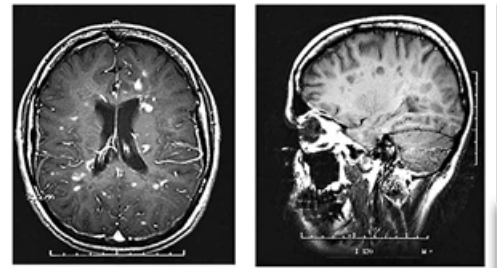


Nervous System Trauma and Head Injuries

Dr. Gary Mumaugh

Brain Trauma

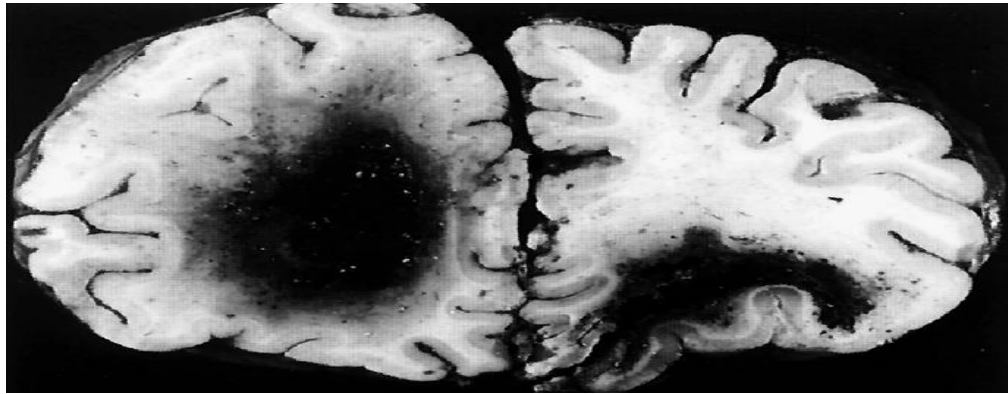
- Major head trauma
 - A traumatic insult to the brain possibly producing physical, intellectual, emotional, social, and vocational changes
 - Transportation accidents
 - Falls
 - Sports-related event
 - Violence
- Closed (blunt, nonmissile) trauma
 - Head strikes hard surface or a rapidly moving object strikes the head
 - The dura remains intact and brain tissues are not exposed to the environment
 - Causes focal (local) or diffuse (general) brain injuries
- Open (penetrating, missile) trauma
 - Injury breaks the dura and exposes the cranial contents to the environment
 - Causes primarily focal (local) injuries
- Coup injury
 - Injury directly below the point of impact
- Contrecoup
 - Injury on the pole opposite the site of impact
- Compound fractures
- Basilar skull fracture



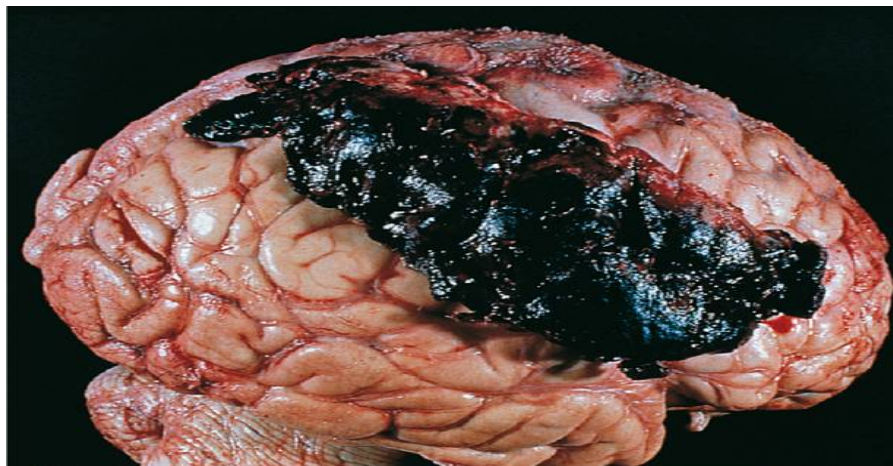
Focal Brain Injury

- Observable brain lesion
- Force of impact typically produces contusions
- Contusions can cause:
 - Extradural (epidural) hemorrhages or hematomas
 - Subdural hematomas
 - Intracerebral hematomas

Hematomas



Subdural (Epidural) Hematomas



Diffuse Brain Injury

- Diffuse axonal injury (DAI)
 - Shaking, inertial effect
 - Acceleration/deceleration
 - Axonal damage
 - Shearing, tearing, or stretching of nerve fibers
 - Severity corresponds to the amount of shearing force applied to the brain and brain stem
- Categories:
 - Mild concussion
 - Classical concussion
 - Mild, moderate, and severe diffuse axonal injuries (DAI)

Mild Concussion

- Temporary axonal disturbance causing attention and memory deficits but no loss of consciousness
 - I: confusion, disorientation, and momentary amnesia
 - II: momentary confusion and retrograde amnesia
 - III: confusion with retrograde and anterograde amnesia

Classic Cerebral Concussion

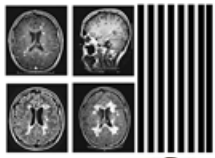
- Grade IV
 - Disconnection of cerebral systems from the brain stem and reticular activating system
 - Physiologic and neurologic dysfunction without substantial anatomic disruption
 - Loss of consciousness (<6 hours)
 - Anterograde and retrograde amnesia
 - Post-concussive syndrome

Diffuse Axonal Injury

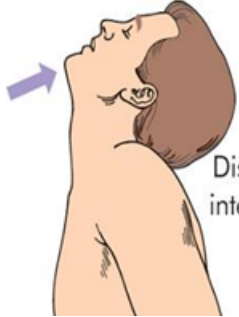
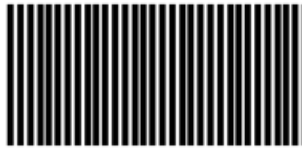
- Produces a traumatic coma lasting more than 6 hours because of axonal disruption
 - Mild
 - Moderate
 - Severe

Spinal Cord Trauma

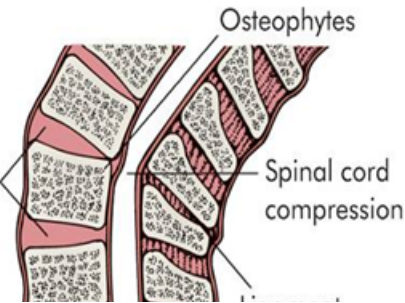
- Most commonly occurs due to vertebral injuries
 - Simple fracture, compressed fracture, and comminuted fracture and dislocation
- Traumatic injury of vertebral and neural tissues as a result of compressing, pulling, or shearing forces
- Most common locations: cervical (1, 2, 4-7), and T1-L2 lumbar vertebrae
 - Locations reflect most mobile portions of vertebral column and the locations where the spinal cord occupies most of the vertebral canal
- Spinal shock
 - Normal activity of the spinal cord ceases at and below the level of injury. Sites lack continuous nervous discharges from the brain.
 - Complete loss of reflex function (skeletal, bladder, bowel, sexual function, thermal control, and autonomic control) below level of lesion
- Paraplegia
- Quadriplegia



Spinal Cord Trauma

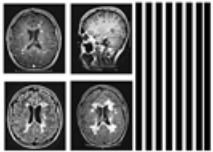


Disruption of intervertebral discs

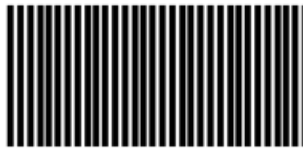


Osteophytes

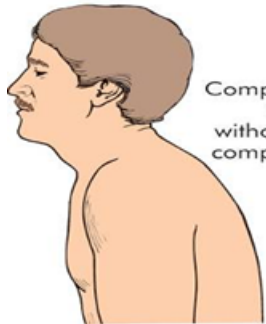
Spinal cord compression



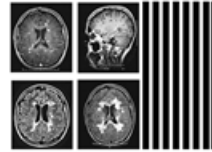
Spinal Cord Trauma



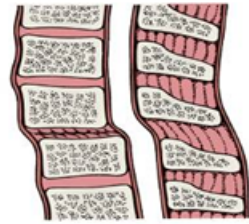
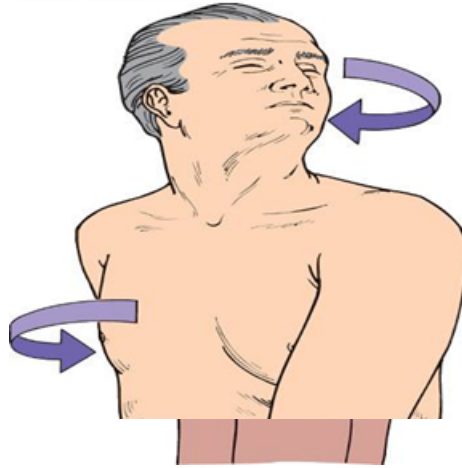
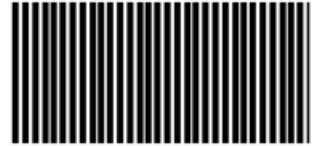
Crushed vertebral body with cord compression



Compression fracture without cord compression



Spinal Cord Trauma



Small text at the bottom of the diagram, possibly a reference or source.