CNS Trauma

- accidents are the 4th most common cause of death in all ages
- leading cause of death under the age of 44

SKULL FRACTURES

- **Diastatic –** cross sutures
- **open –** communicates with the surface
- **closed –** does not communicate with the surface
- **linear –** ones to worry about because they go unnoticed – radiolucent lines of fracture
- **communuted –** fractured bone is highly fragmented
- **depressed skull fracture –** margins are not flush; bone sunken in; usu. low-velocity impact
- **Hinge fracture –** extends across the base of the skull
- **Growing fracture –** feared complication of skull fracture in children – fracture line widened as child's brain grows
- **Ring Fractures –** fracture line around the foramen magnum – from falling on butt
- **Orbital roof and Ethmoid plate fractures –** contrecoup type injury; explosive backlash of brain against the anterior skull
- TEMPORAL FOSSA region is one of thinnest and more fragile portions of the skull

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CEREBRAL PARENCHYMAL INJURIES

I. Focal Injuries

1. Contusions

- bruise of the brain's surface
- characterized by hemorrhage in SAS and wedge-shaped necrosis of the crests of the cortical gyri
- found most commonly along the orbital surface of the frontal lobes, inferior temporal lobe, and the occipital poles
- **COUP Contusions –** occur with blow to a stationary head
- **CONTRECOUP Contusions** – blow to a decelerating head; rebound effect

2. Intracranial Hemorrhage

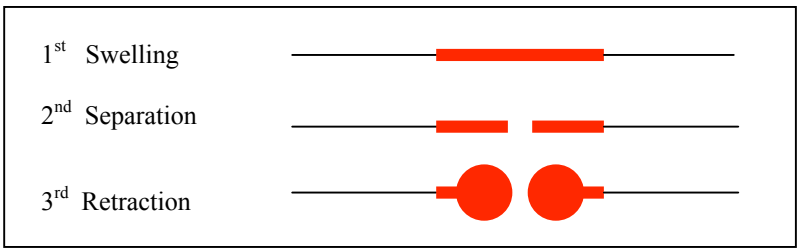
- **epidural hematoma**
  - accumulation of blood between the inner table of the skull and the outer dural surface
  - skull fracture present in 90% of all cases
  - 30% mortality, 100% if untreated
  - Results from skull fracture of temporal bone with accompanying laceration of **MIDDLE MENINGEAL ARTERY**
- **Subdural hematoma**
  - accumulation of blood between the inner dura and the arachnoid
  - skull fracture in 2/3 of adults
  - Etiology: bleeding from bridging veins which are intermediaries between dural venous sinuses and cortical veins
  - Most: Head trauma Other: blood dyscrasias or child abuse
  - occurs commonly in elderly because of atrophy and freedom of movement
  - very common in alcoholics
  - President Reagan had one.
  - Treatment: surgical evacuation
- **Intracerebral hematoma and traumatic subarachnoid hemorrhage**
  - perforating or penetrating head injury
  - direct laceration of cerebral vessels

- **Gunshot wound**
  - **KE = _ mv^2**
  - increases in velocity transmits more KE than the same porportion increase in mass of the bullet
  - **Penetrating injury –** missle enters, doesn't leave the cranium
  - **Perforating injury –** missle enters and leaves the cranium

II. Diffuse Injury

1. Diffuse axonal injury

- direct results of with matter injury sustained by angular head acceleration alone
- Pathologically: microscopic axonal injury, axonal retraction balls, or spheroids.
- thought to result from shearing force during acceleration and deceleration
- Process takes hrs to days



- patients are often comatose from the point of injury

2. Concussion

- temporary, reversible neurologic deficiency caused by trauma
- results in immediate, temporary loss of consciousness
- **length of amnesia correlates with severity of the injury**
- when unconsciousness > 24 hrs, diffuse brain injury usually present

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SEQUELAE OF BRAIN TRAUMA

- post-traumatic **hydrocephalus** from leptomeningeal scarring and previous hemorrhage with fibrosis
- **Dementia pugilistica** – Alzheimer-like disease 2^{o} to prolonged and repetitive head trauma (BOXERS)
- **Tumors** – meningiomas and malignant gliomas
- Psychiatric disorders, including PTSD
- Seizures

SPINAL CORD INJURY

- 80% men
- Clinical Syndromes
  - **Acute myelopathy**
    - flaccidity, atony, and loss of sensation; leads to spacticity
  - **Subacute myelopathy**
    - spacticity and loss of sensation below level of injury
    - slowly progressive
    - occurs in setting of compressive tumor, bony abnormality, or abscess
- **respiratory failure when above C4**