

Skull Injuries

Presented

By

Dr. Said Said Elshama

Professor of Forensic Medicine and Clinical Toxicology

Medical Education (DHPE)

College of Medicine - Taif & Suez Canal University

Types of head injuries

1- Scalp injuries

2- Skull injuries (Fractures)

3- Intra – cranial injuries (Brain)

- **Definition**

- **A skull fracture** is a break in one or more of eight bones of the cranial bones (skull) as a result of trauma.

Factors affecting the types of skull fractures

1- Momentum of the force

(Severity of the force “weight and velocity”)

2- Size of the striking surface

(Area of contact)

3- Head is supported or not

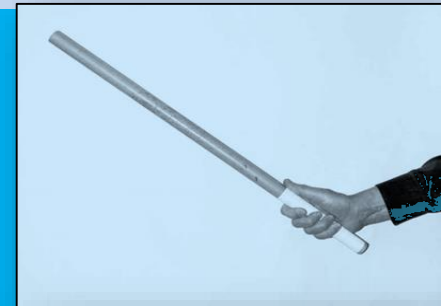
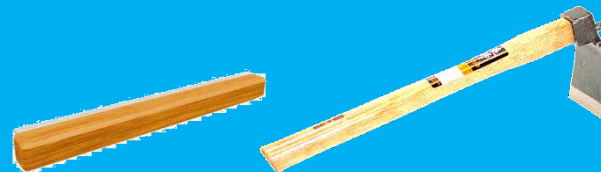
(Movement of skull)

4- Type of the causative instrument

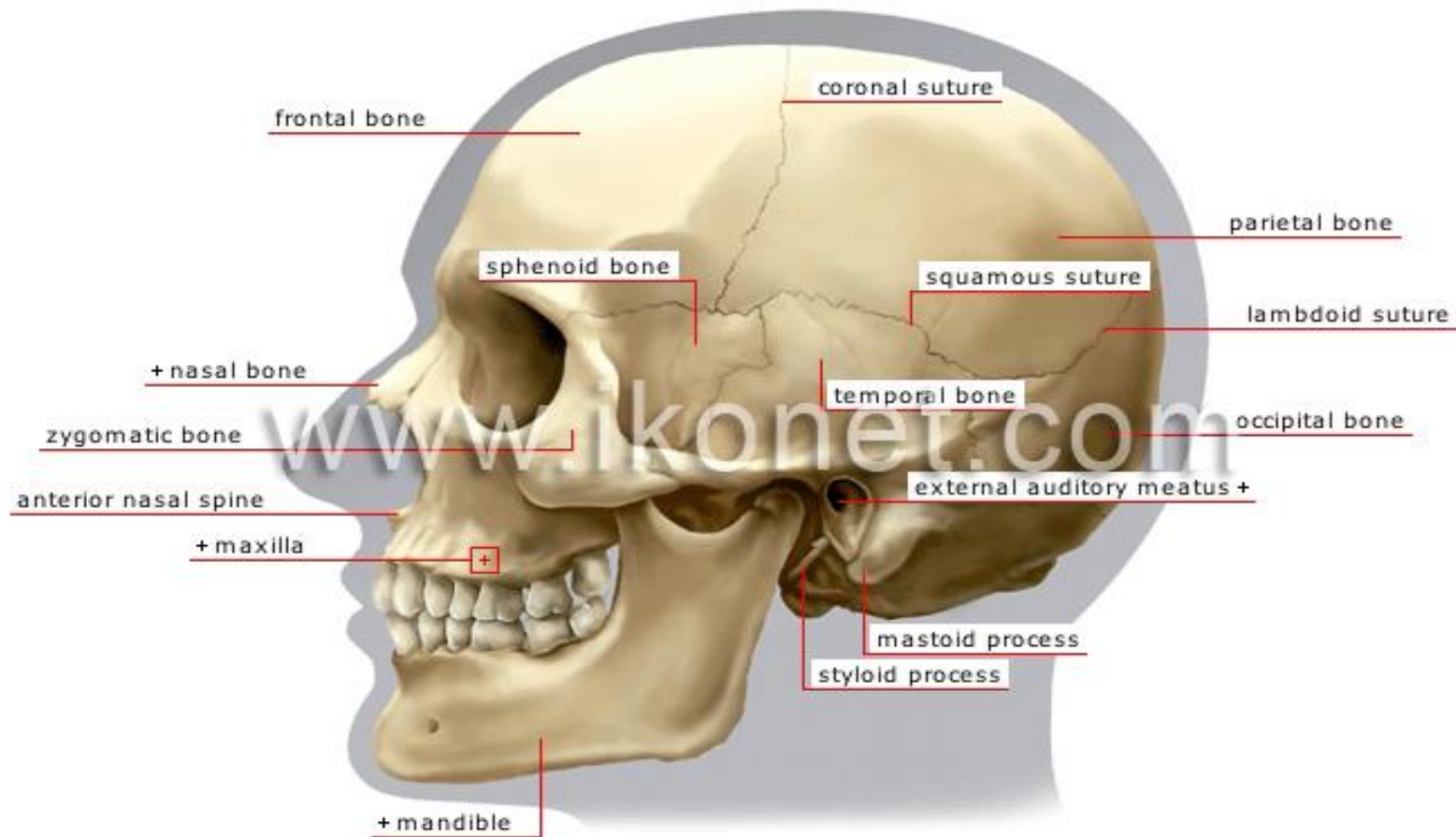
(blunt , sharp)

5- Site of trauma

(Weakest point of skull “squamous and temporal bone”)



Weakest point of skull (squamous and temporal bone)



Types of Skull Fractures

- 1- Fissure Fracture
- 2- **Diastatic fracture**
- 3- Depressed Fracture
- 4- Comminuted Fracture
- 5- Cut Fracture
- 6- Ring Fracture
- 7- **Pond fracture**

1- Fissure Fracture

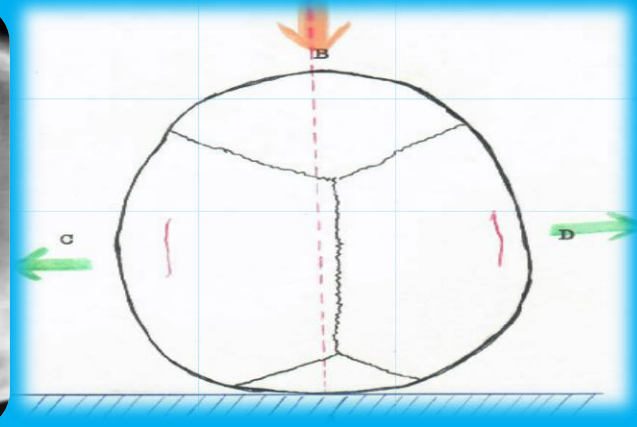
- It is caused by a **blunt** object with a **low** momentum (heavy stick)
- **Types** (Polar, thermal, ring, hinge)
 - Polar means fissure at bulging poles and extend parallel to axis of compression.
 - Ring and hinge means fissure in the base of skull.
 - Thermal is due to extreme heat (cases of burn).



Stick



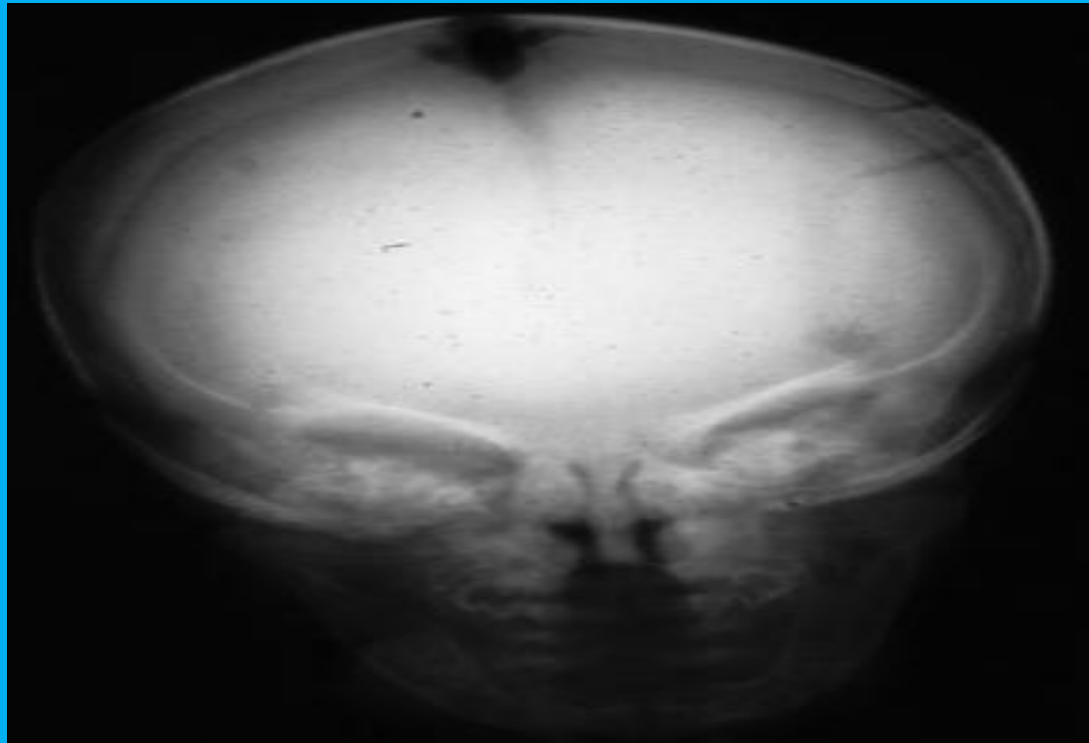
Linear (Fissure) fracture



Polar Fissure

2- Diastatic skull fracture

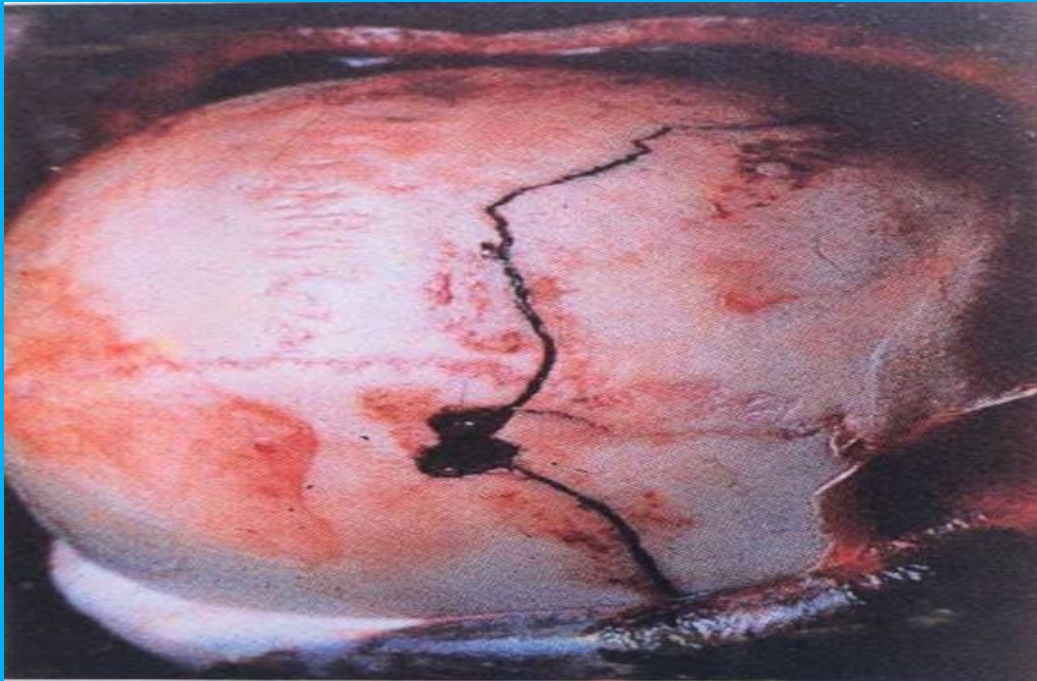
- It is a traumatic separation of the suture (widened).
- It affects newborns and infants because the suture fusion has not yet happened



Diastatic fracture of sagittal suture (traumatic separation)

3- Depressed Fracture

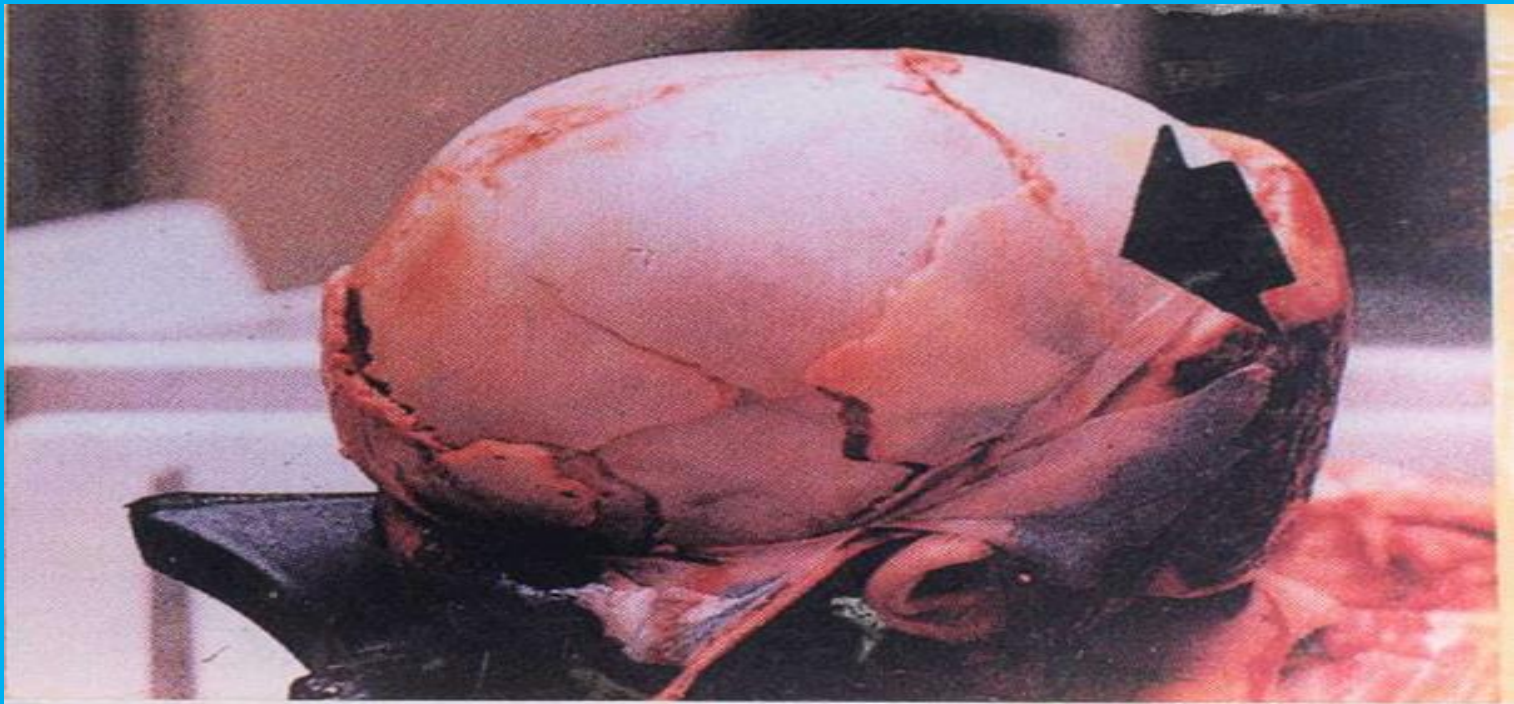
- It is caused by a **heavy blunt** object with a localized (**small**) striking surface (head of hammer)



Localized depressed fracture with radiating fissures

4- Comminuted Fracture

- It is caused by a **heavy blunt** object with a **wide** striking surface (wide block of wood) leading to fragmentation of skull bone



Comminuted fracture with radiating fissures

5- Cut Fracture

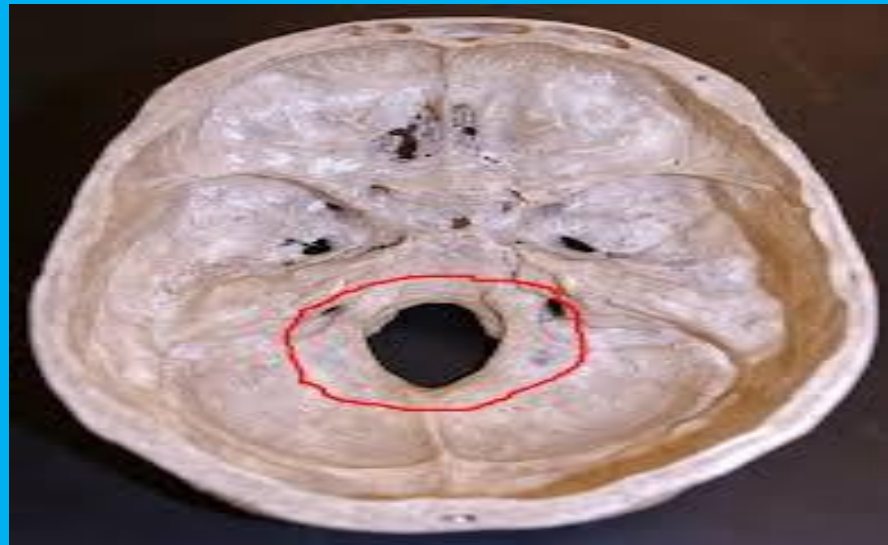
- It is caused by a **heavy sharp** object (grubber) leading to regular, straight, sharp, cut edges



Cut fracture

6- Ring Fracture

- It is caused by the force transmission from the lower parts of the body through the vertebral column (a fall from a height) leading to a ring fracture around the foramen magnum (**inward driven due to the impact of cervical spine against skull base**).



Ring fracture

7- Pond Fracture (indented)

- It is a shallow, round, depressed fracture in occipital, frontal or parietal bone of infant skull .
- The skull bone is thin and elastic due to the presence of greater proportion of cartilage than bone .
- It is caused by a **blunt** object (obstetric forceps) .



Pond fracture



General classification of Skull fractures

Closed fracture

A simple fracture where the skin (scalp) covers the fracture area .

Open fracture (Compound fracture)

A compound fracture where the skin is broken and bone emerges .

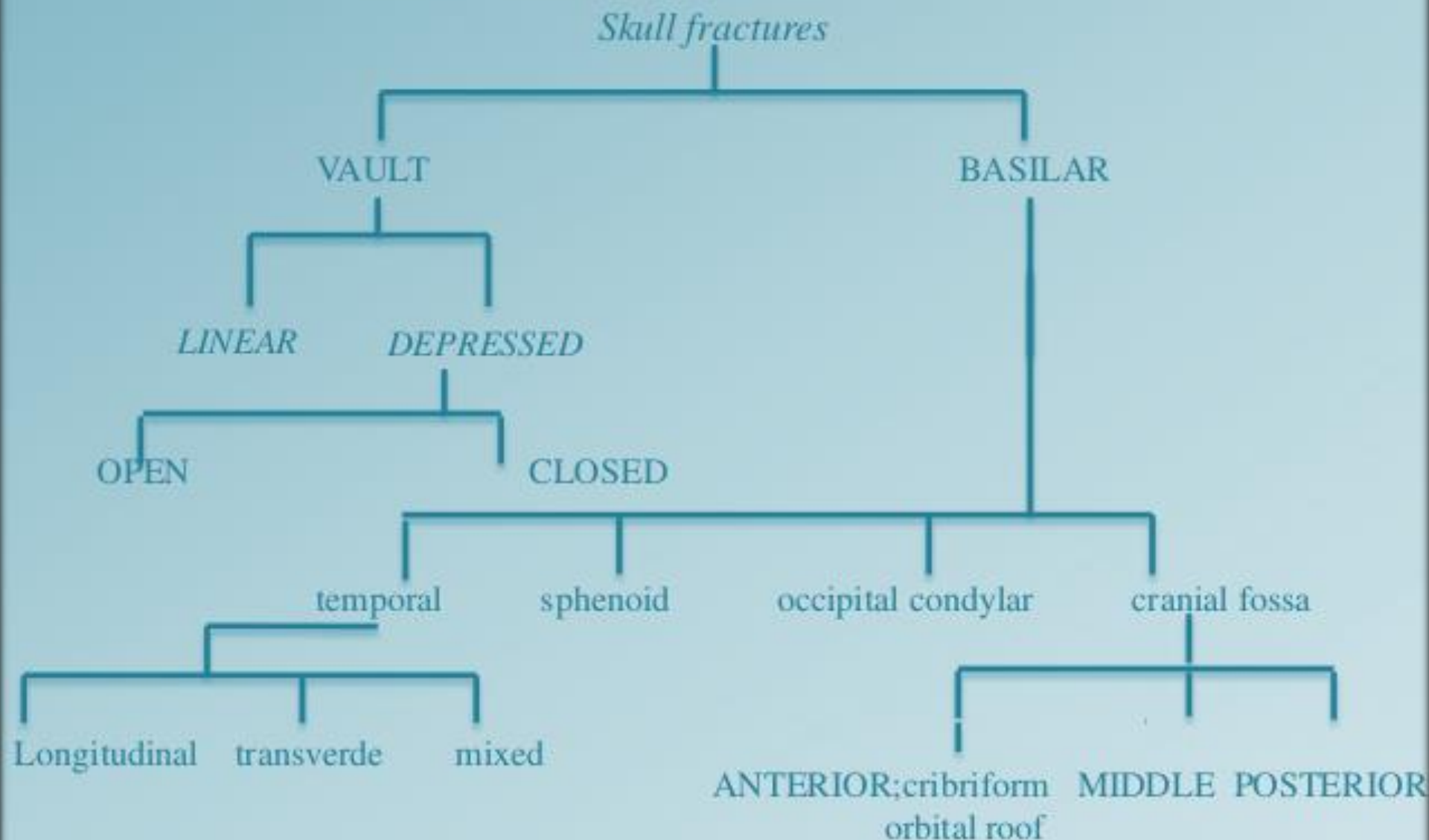
Depressed fracture

- It causes the skull to indent or extend into the brain cavity.

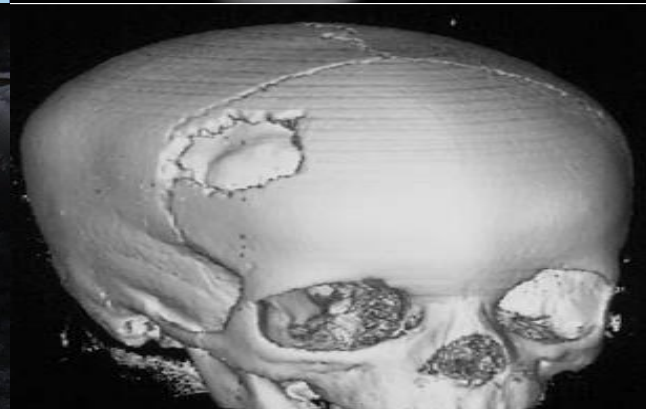
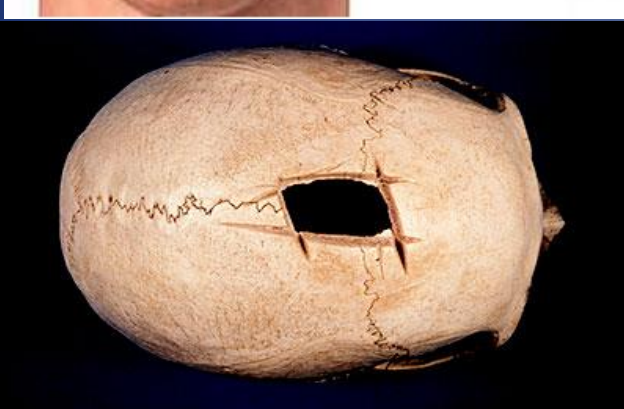
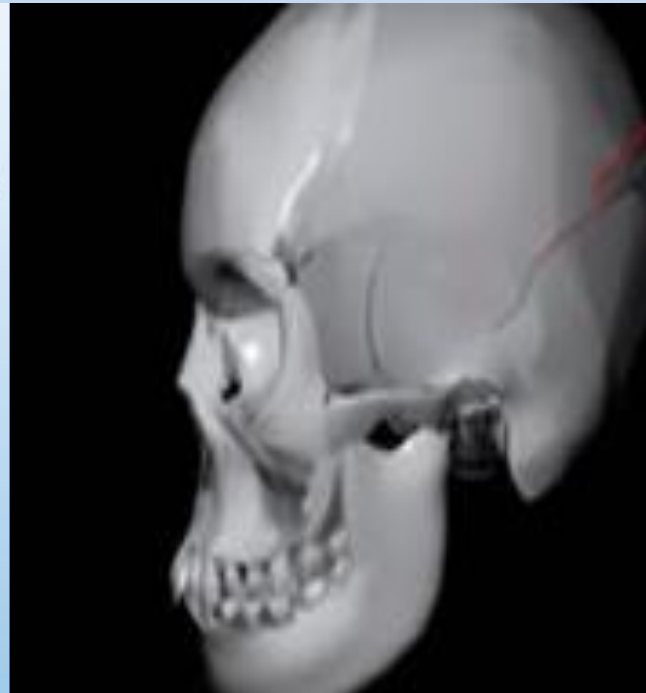
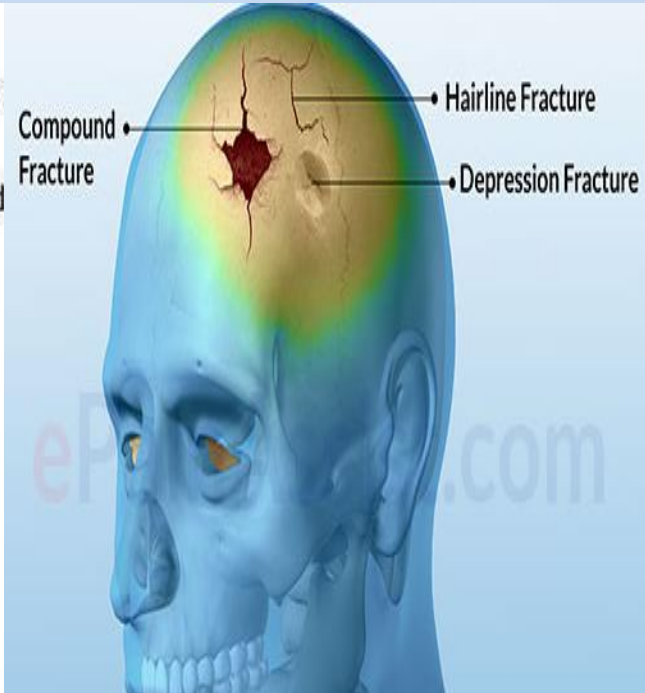
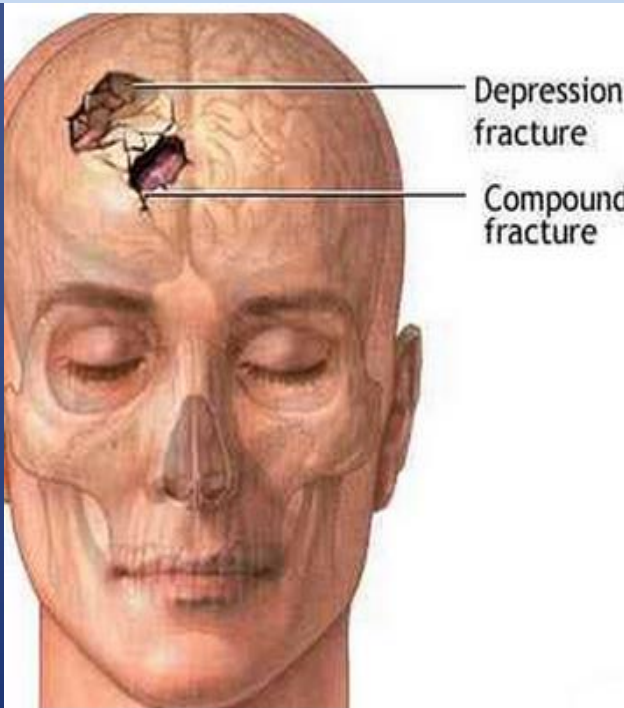
Basal fracture

- It occurs in the floor of the skull, in the areas that are around the eyes, ears, nose, or back (ring, hinge)

CLASSIFICATION OF SKULL FRACTURES



Different types of skull fractures



Signs of Fracture Base of Skull

A- Anterior Cranial fossa

- Black eye - blood or CSF from the nose (rhinorrhea) + Olfactory nerve "1" injury causing anosmia + Oculomotor "3", Trochlear "4" and Abducent "6" injury causing ocular paralysis



B- Middle Cranial fossa or temporal bone

- Blood or CSF from the ear + Oculomotor "3", Trochlear "4" and Abducent "6" injury causing ocular paralysis + Trigeminal "5" causing impairment in face sensation and mastication. Facial "7" causing facial paralysis and Vestibulo-cochlear "8" causing deafness + Battle's sign

C- Posterior Cranial fossa

- Blood or CSF from nasopharynx + Bruises behind the ear on mastoid process (Battle's sign) + Cranial nerve injury:- (Glossopharyngeal, Vagus, Accessory "9,10,11") causing dysphagia, visceral paralysis, shoulder dysfunction.

Basilar Skull Fracture

Battle's sign

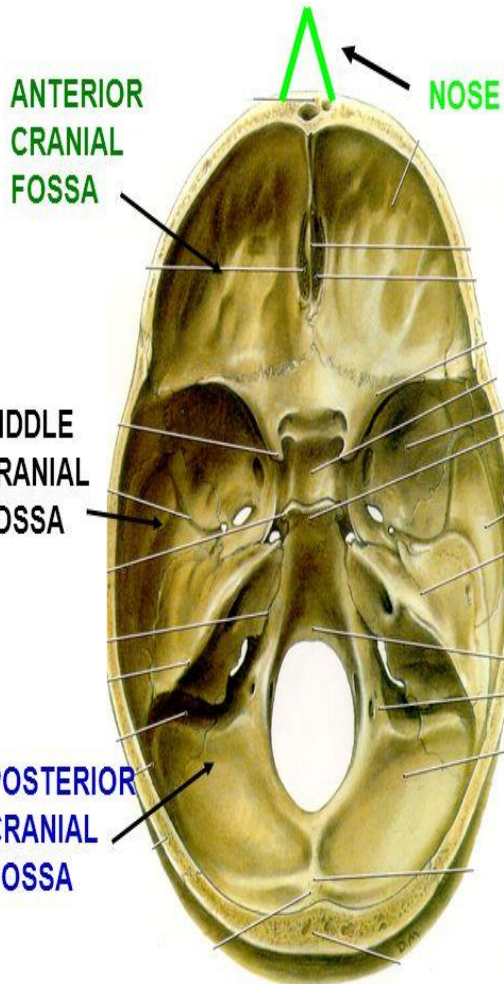


Raccoon eyes



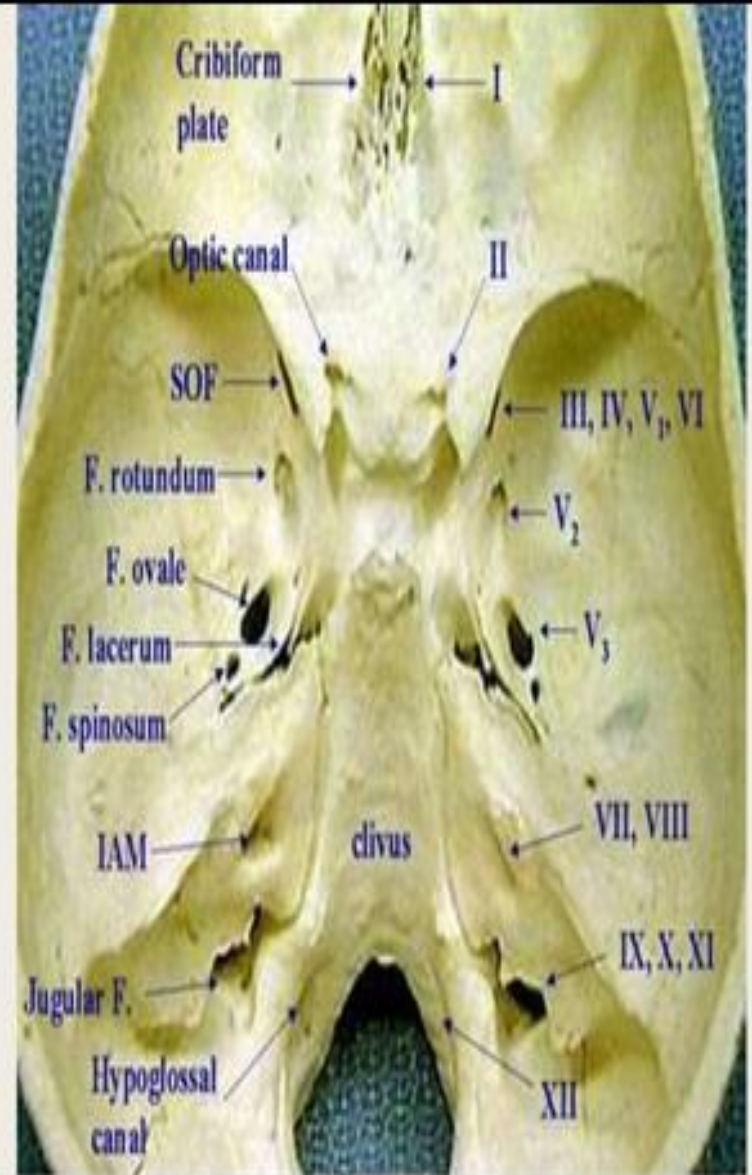
Cranial nerves and Cranial Fossa

INTERIOR OF SKULL - Calvarium removed



CRANIAL NERVES

- I. Olfactory
- II. Optic
- III. Oculomotor
- IV. Trochlear
- V. Trigeminal
- VI. Abducens
- VII. Facial
- VIII. Vestibulo-cochlear
- IX. Glossopharyngeal
- X. Vagus
- XI. Accessory
- XII. Hypoglossal



Base of skull fracture signs

- a: raccoon eyes
- b: CSF rhinorrhea
- c: CSF otorrhea
- d: battle sign
- e: haemotympanum
- f: bump



Fracture base of skull

Hinge Fracture

It is a fissure extension in the skull vault passing to the base of the skull separating it into two halves (traffic accidents)

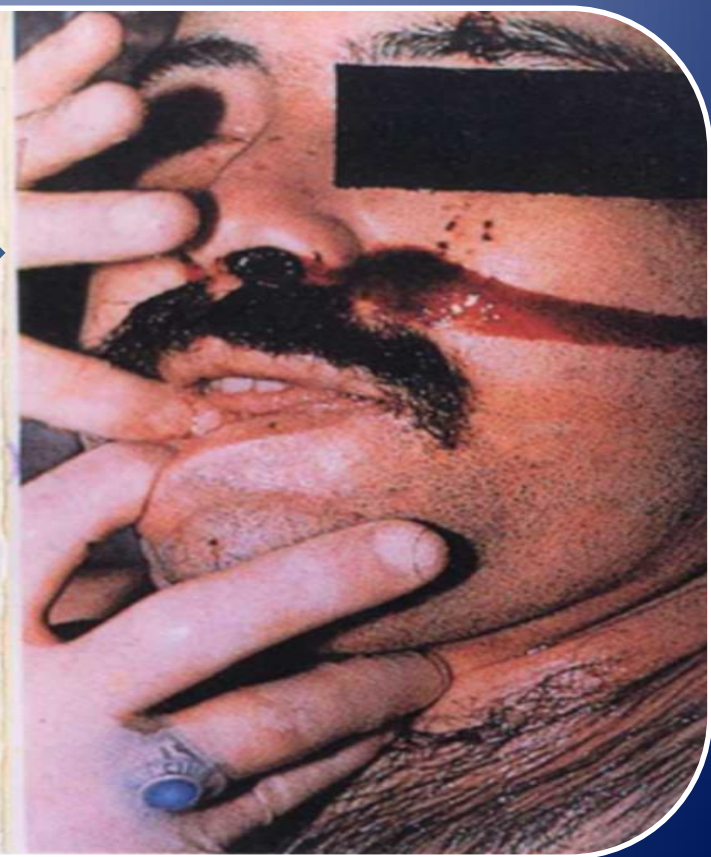
Ring fracture

it is a fissure around the foramen magnum (fall from height)



**Fracture in
Anterior cranial
fossa** →

←
**Fracture in
Middle cranial
fossa**



Healing of skull fractures

- **Healing of cranium** occurs by **fibrous membrane** not by new bone formation leading to **permanent infirmity** because the brain becomes more liable to **minor trauma , extreme weather and sepsis** that may pass from scalp to meninges causing jacksonian epilepsy due to meningeal adhesions during the healing .
- **The fibrous membrane** develop **three months** after fracture and fills the defect in **12 months**.
- **Fissure** is healed in **three months** completely.

Thank you