



HEAD INJURIES

Incidence

- *Major cause of morbidity and mortality.*
- *Most common reasons for attending accident and emergency department.*
- *Traumatic injury (head injury > 50%) leading cause of death in the population below 45 years of age and, overall, the third leading cause of death, succeeded only by cardiocerebral vascular disease and cancer.*

Head Injuries according to Mechanisms of Injury

a. CLOSED Head Injuries:

- *Road traffic accidents.*
- *Falls.*
- *Assaults.*
- *Workplace injuries.*
- *Sport injuries.*
- *Home injuries.*

b. Penetrating Head injuries:

- *Bullets, shells, and missiles injuries.*
- *Stab injuries.*

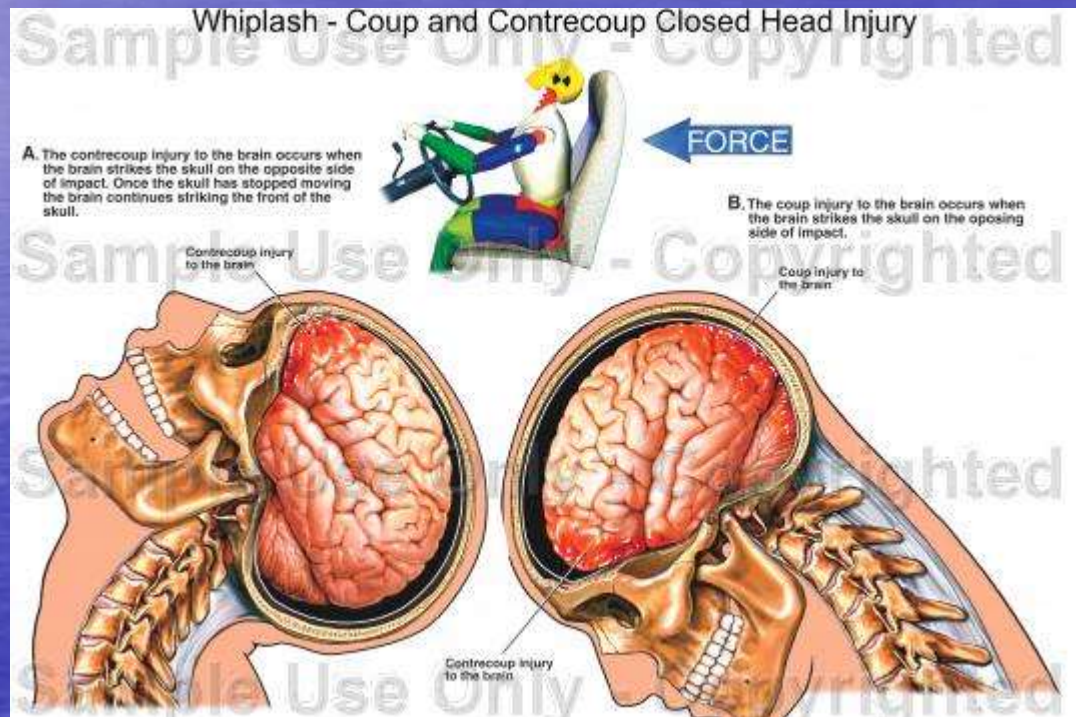
Pathophysiology of head injuries

- *A. Head Motion (Inertial) Injuries*
- *B. Contact Injuries*

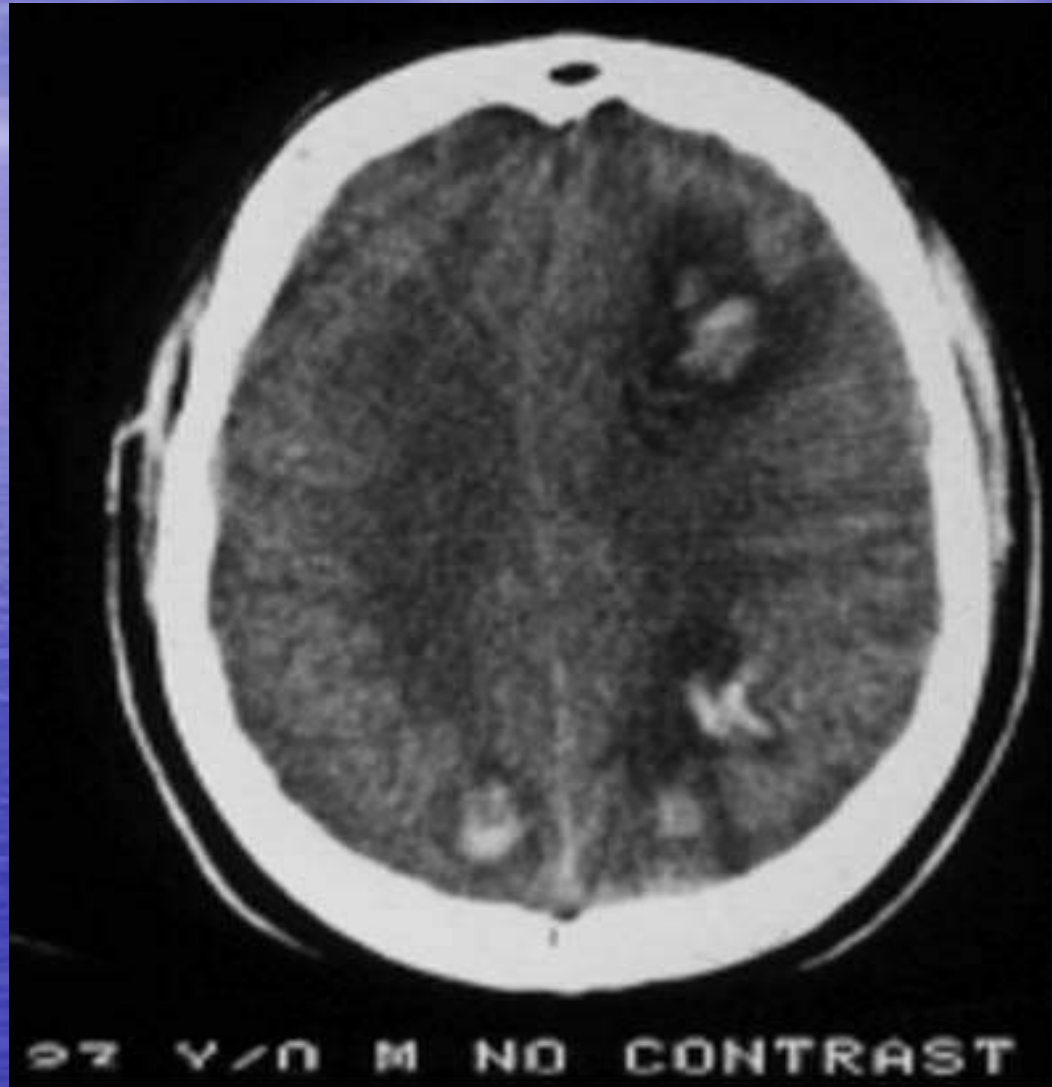
Contact Injuries

- 1. Linear skull fractures.*
- 2. Depressed skull fractures.*
- 3. Basilar skull fractures.*
- 4. Vascular damage (Extradural haematoma).*
- 5. Coup contusions*
- 6. Countercoup contusions*

Coup and Countercoup



Coup and Countercoup



Head Motion (Inertial) Injuries

- 1. Translational acceleration.*
- 2. Rotational acceleration.*
- 3. Angular acceleration.*

Classification of Head Injuries according to the SITE of injury

***A.** Scalp Injuries*

***B.** Skull Injuries*

***C.** Intra-cranial Injuries (Brain
Injuries)*

Scalp Injuries

- 1. *Scalp laceration (wounds of the scalp)*
- 2. *Scalp Haematoma (Subgaleal Haematoma)*

1. Scalp laceration (wounds of the scalp)

- They are caused by sharp or blunt instruments or fall on the head.*
- Common and may give rise to sever haemorrhage if not controlled.*
- In infants this can cause sever shock.*
- Depressed skull fractures may underlie a scalp injury.*
- Healing is rapid.*
- If infection occurs in the area of loose areolar tissue, extensive cellulitis is likely to occur.*

Scalp Laceration Gun Shot



Scalp Laceration + Cellulitis



Management of *Scalp laceration* (*wounds of the scalp*)

- *Plain X-ray is performed.*
- *Shaving widely around the wound.*
- *Closure in 2 layers*

Scalp Lacerations

Scalp Avulsion Laceration



15 cm scalp laceration
on the right side of the
head



A. The edges of the wound are
debrided and the necrotic
material is excised.

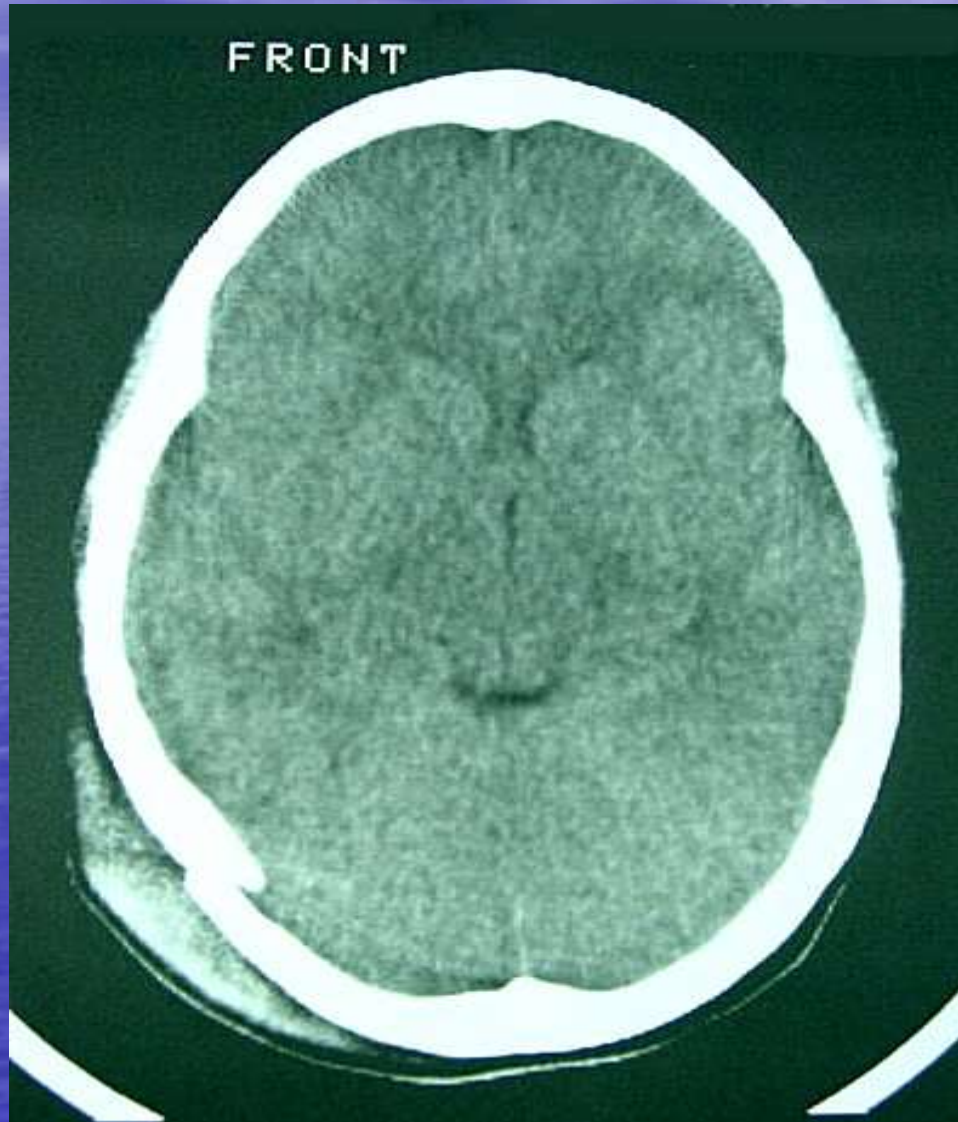


B. The subcutaneous tissue and
wound edges are approximated
and sutured closed.

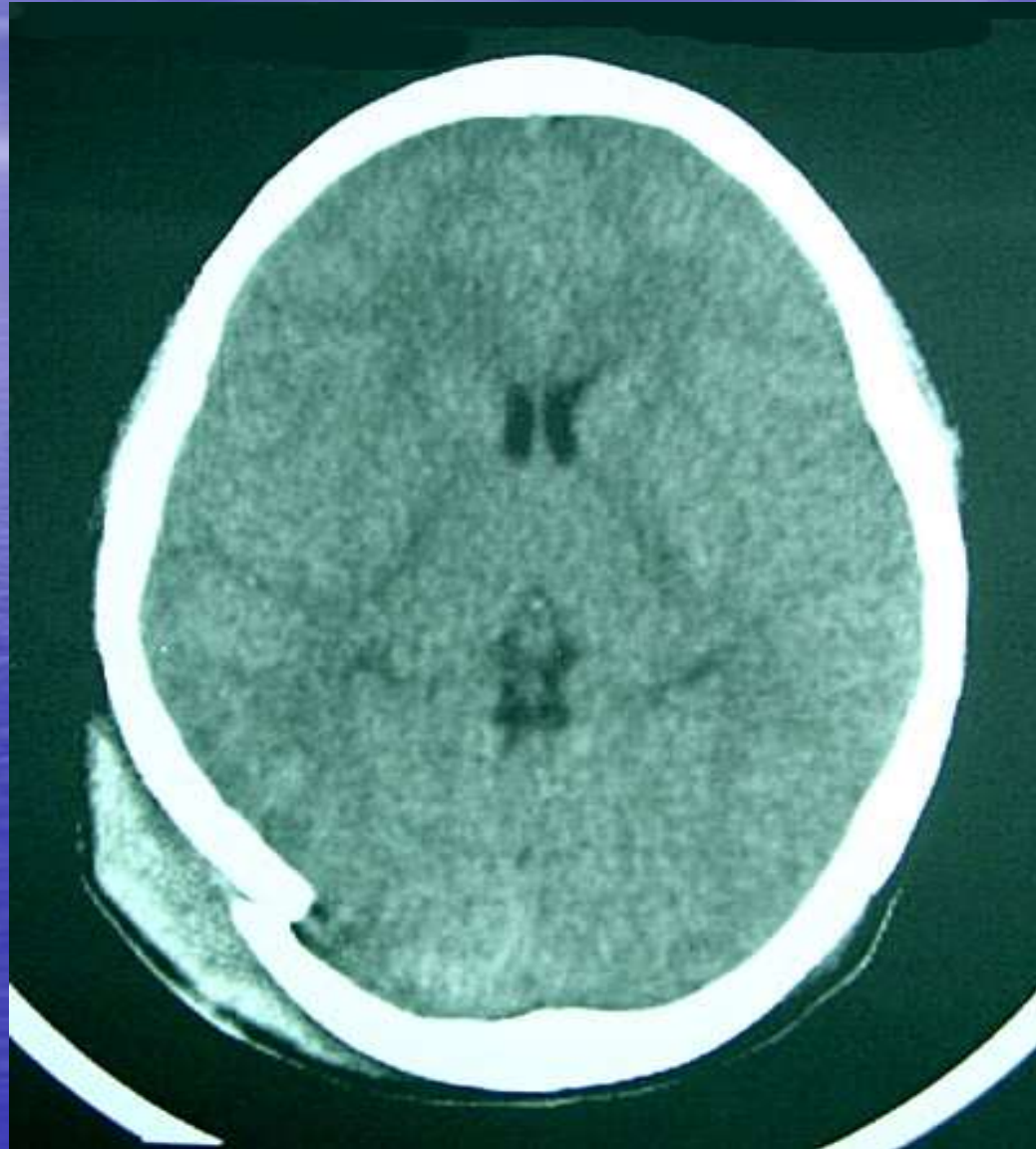
2. Scalp Haematoma (Subgaleal Haematoma)

- *May be subgaleal or subpericranial.*
- *The soft fluctuant centers of scalp haematoma may be disguising as depressed skull fracture on palpation.*
- *They are always associated with skull fracture in infants.*

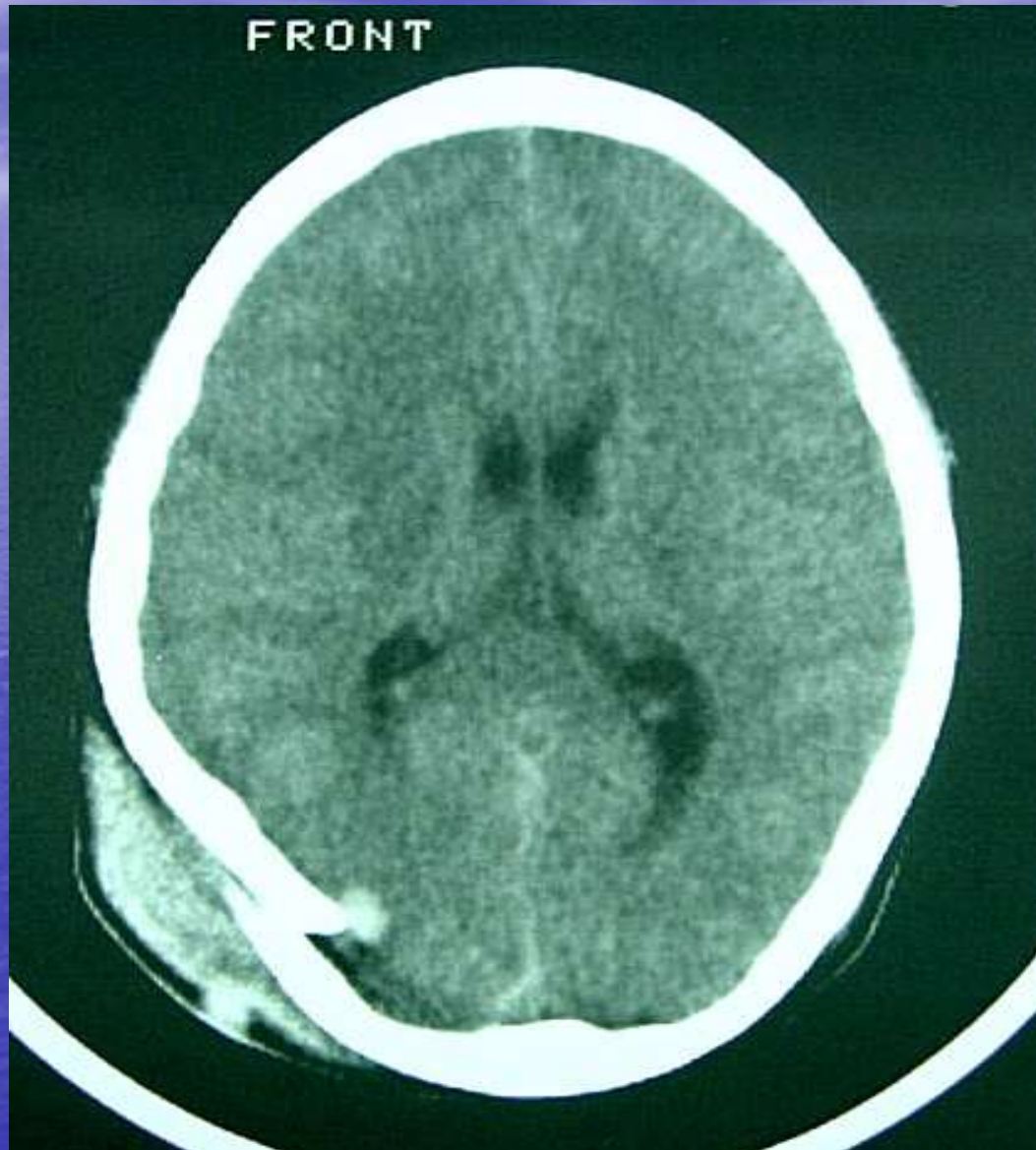
Subgaleal Haematoma



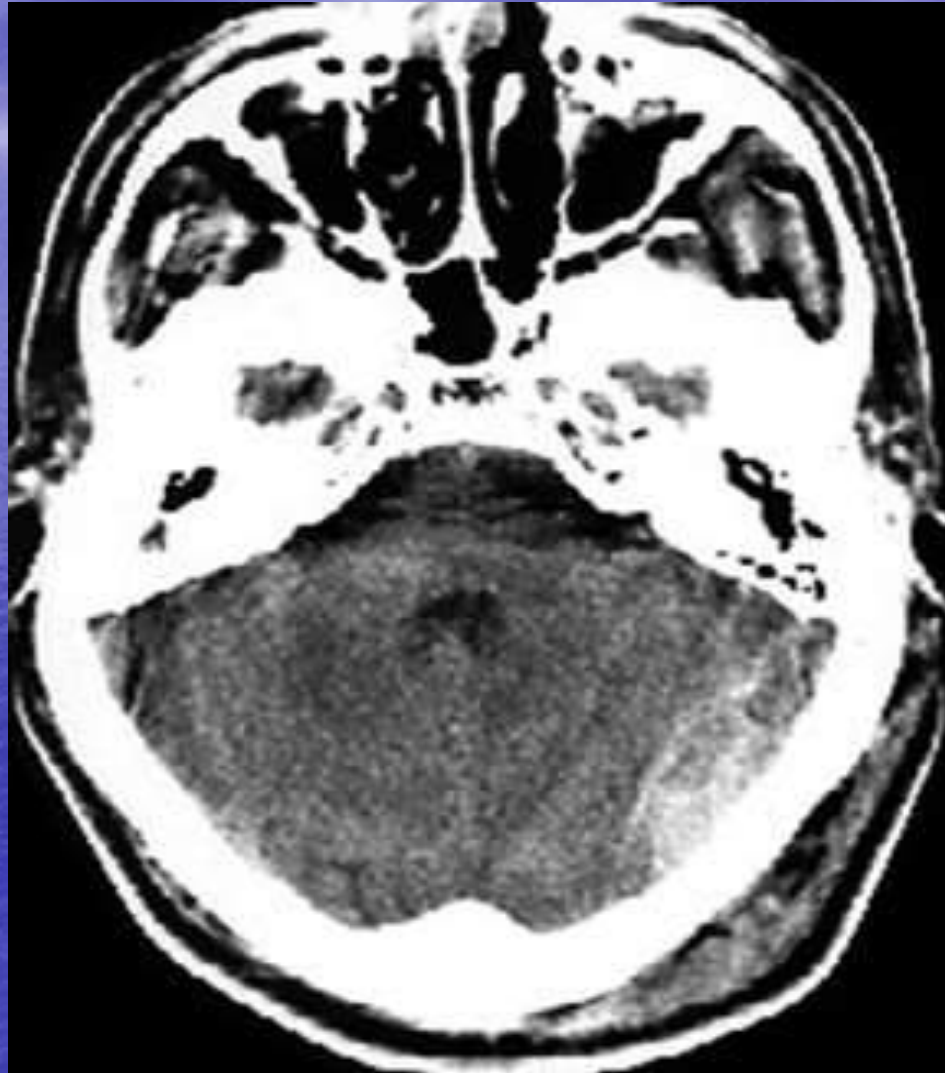
Subgaleal Haematoma



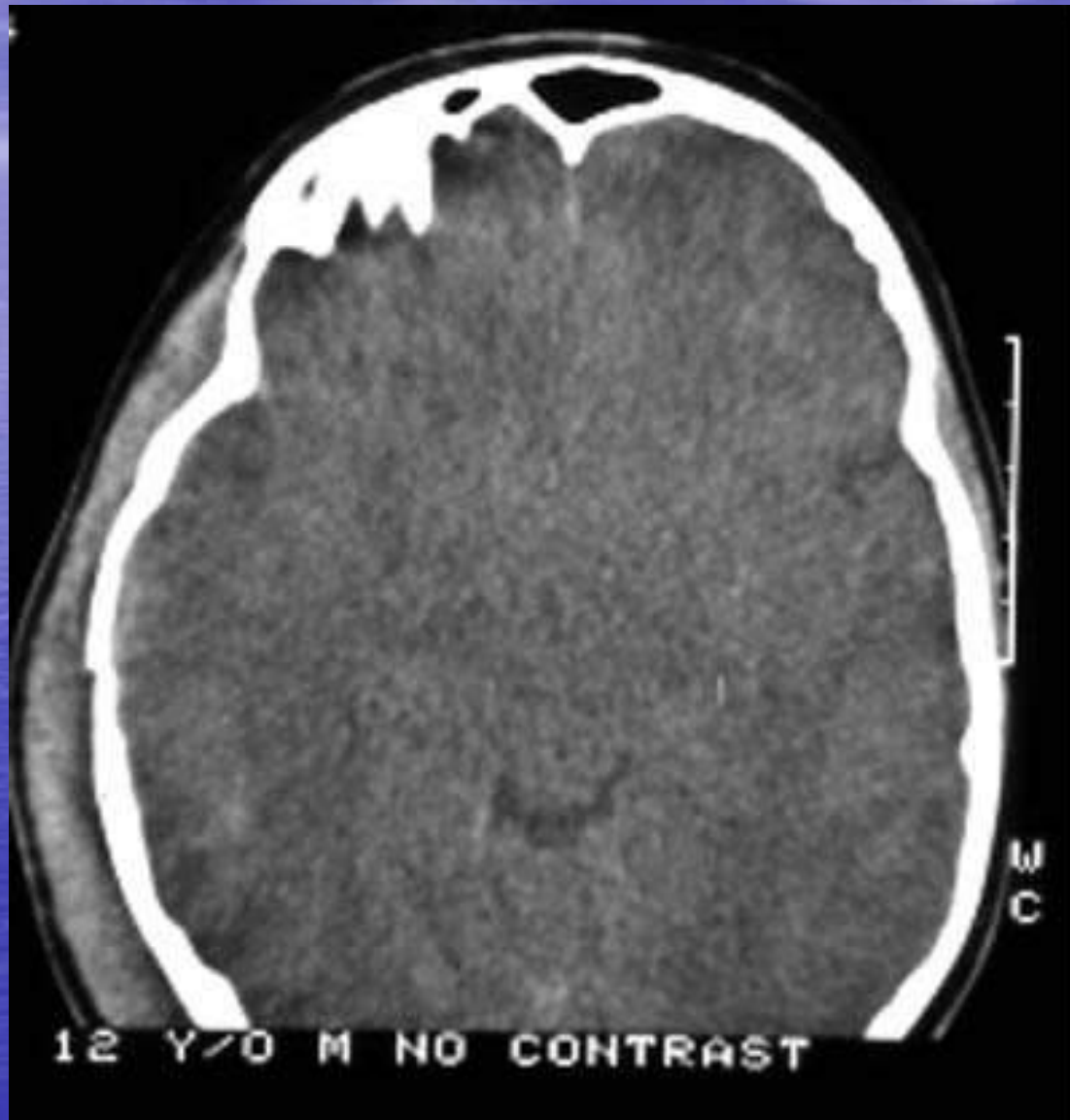
Subgaleal Haematoma



Subgaleal Haematoma



Subgaleal Haematoma



Management of Scalp Haematoma (Subgaleal Haematoma)

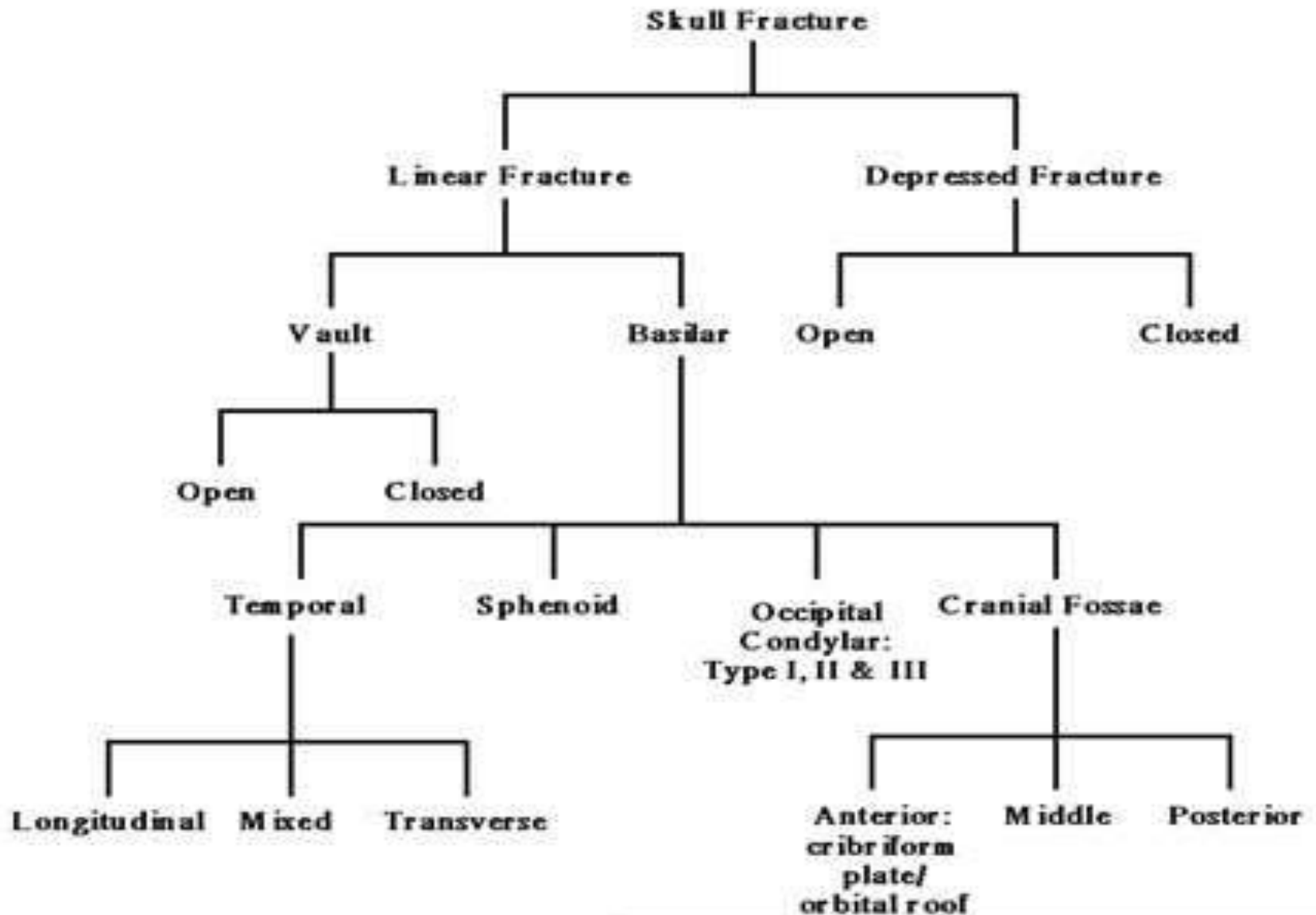
- *Leave the lesion alone.*
- *It should not be tapped.*
- *Correction of anaemia in children less than 1 year of age.*

Skull Injuries (Skull Fractures)

I. Fractures of the Vault

II. Fractures of the base (Basilar skull fractures)

Skull Fractures Classification



Fractures of the Vault

- *a. Simple linear fractures*
- *b. Depressed skull fractures*
- *c. Diastatic fractures*
- *d. Pond (ping pong fractures)*

a. Simple linear fractures:

- *May be closed or opened.*
- *Require no specific neurosurgical management.*
- *Result of blunt trauma.*
- *Usually require computed tomography (CT)*
- *Patient should be admitted for 48 hours of observation.*
- *Fractures crossing the squamous temporal bone may lacerate middle meningeal vessels and cause extradural haematoma.*

Linear Skull Fracture



Linear Skull Fracture

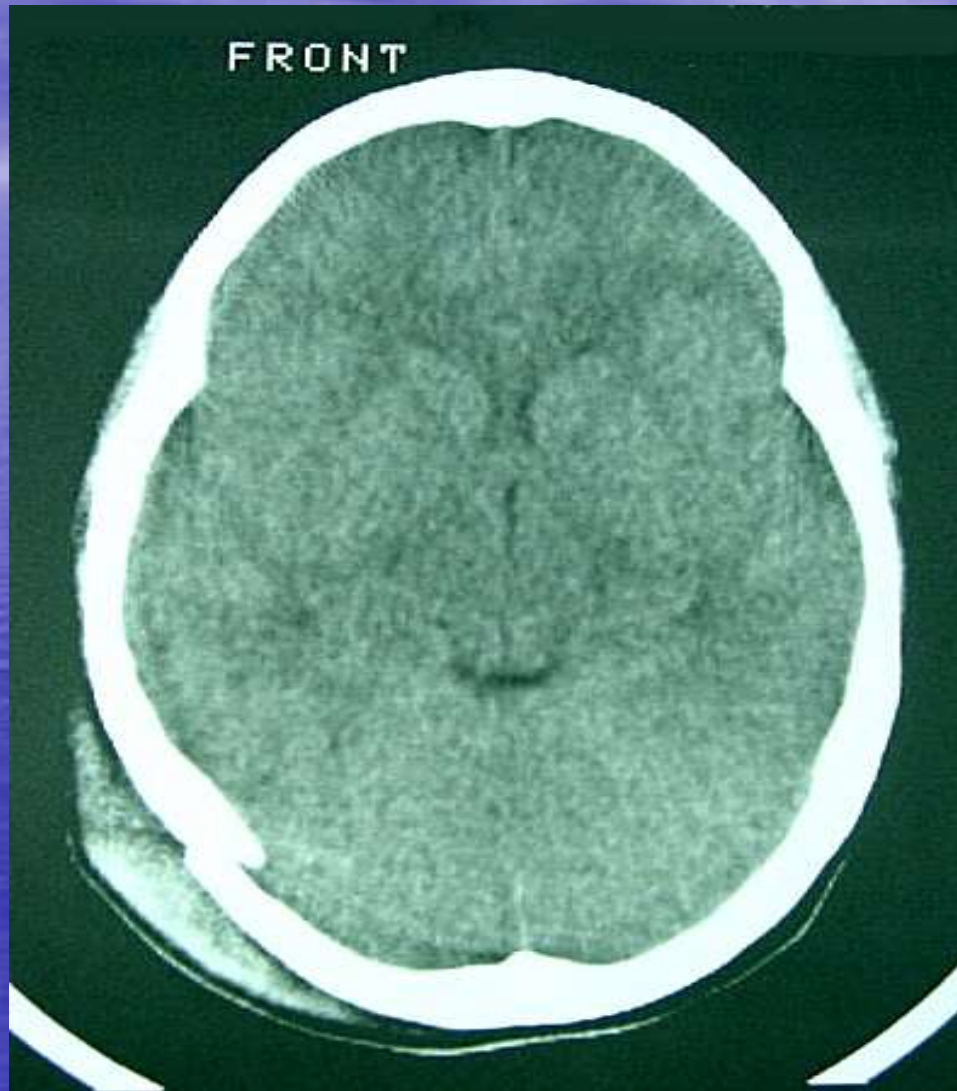


Linear Skull Fracture

Bone Window



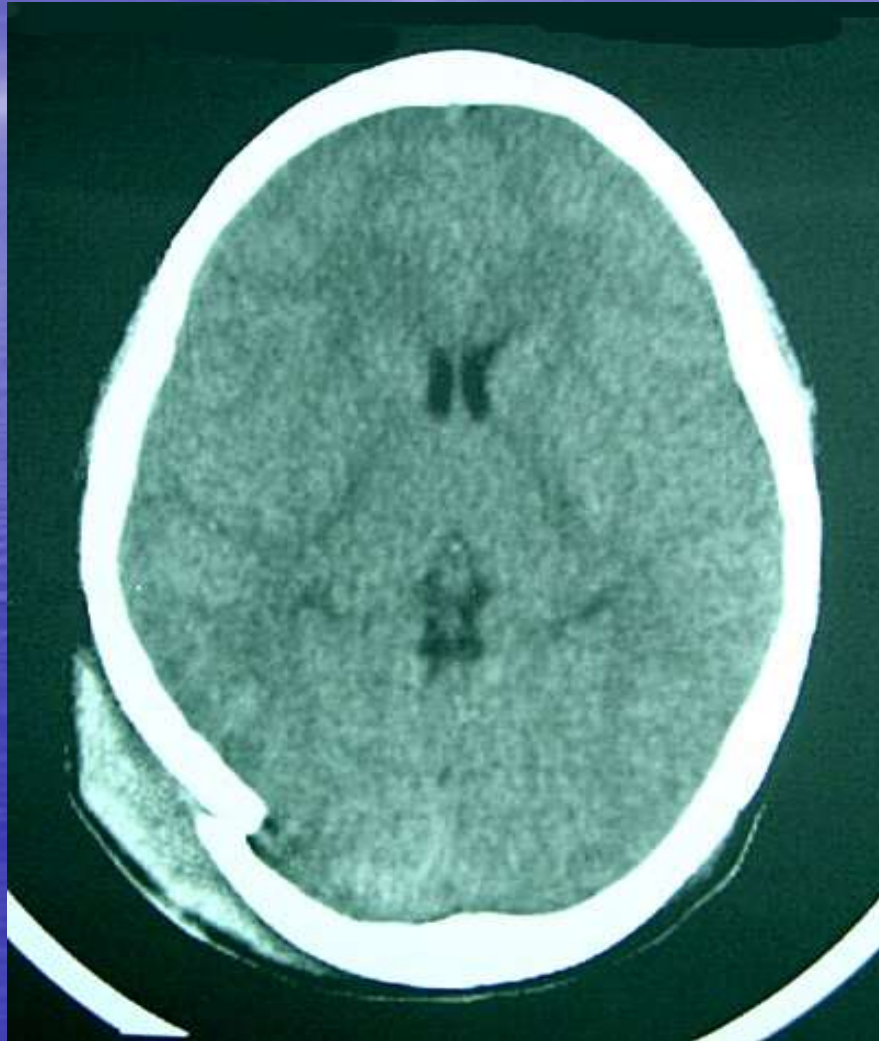
Linear Skull Fracture



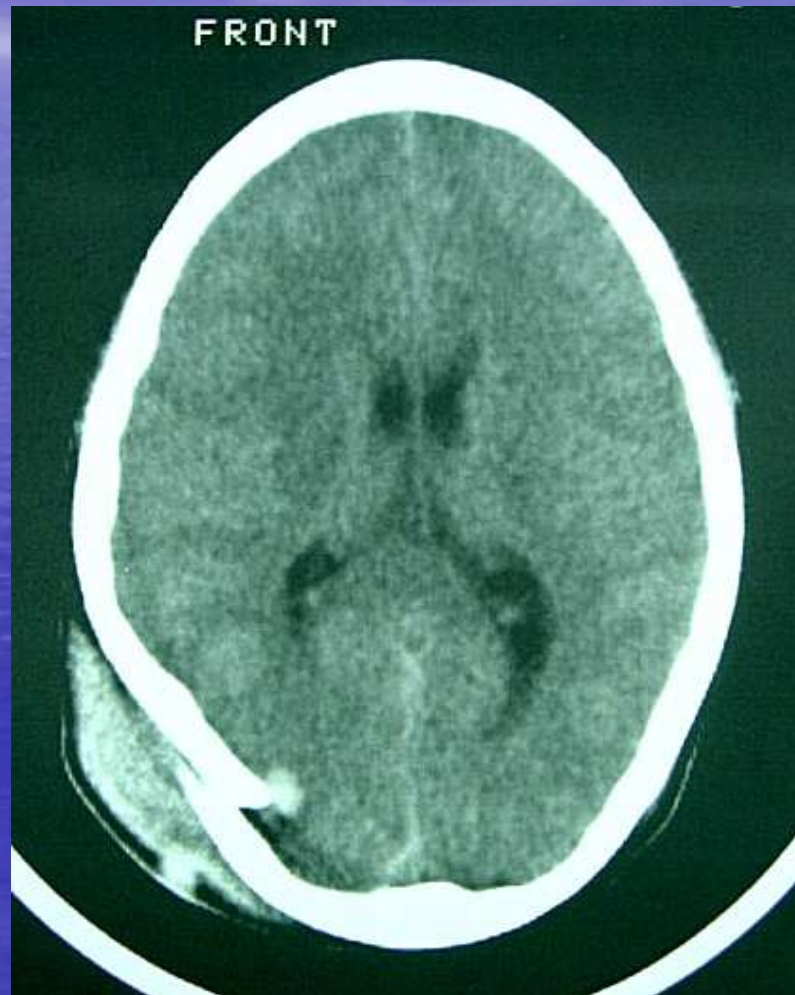
Linear Skull Fracture



Linear Skull Fracture



Linear Skull Fracture



b. Depressed skull fractures

- *Usually result from sharper trauma.*
- *Depressed skull fractures may be:*
 - *Closed depressed fractures*
 - *Compound depressed fracture (opened)*

Depressed Skull Fractures



Depressed Skull Fractures

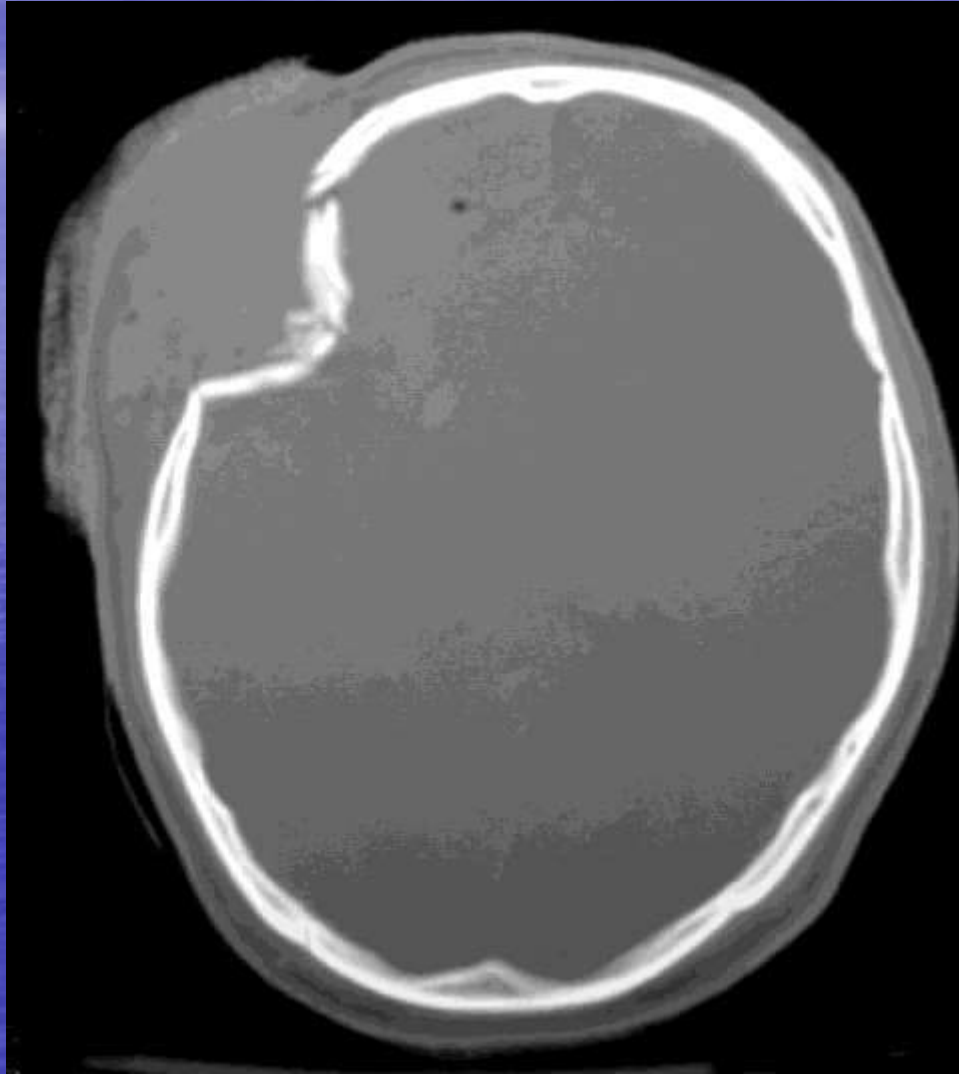


Depressed Skull Fractures

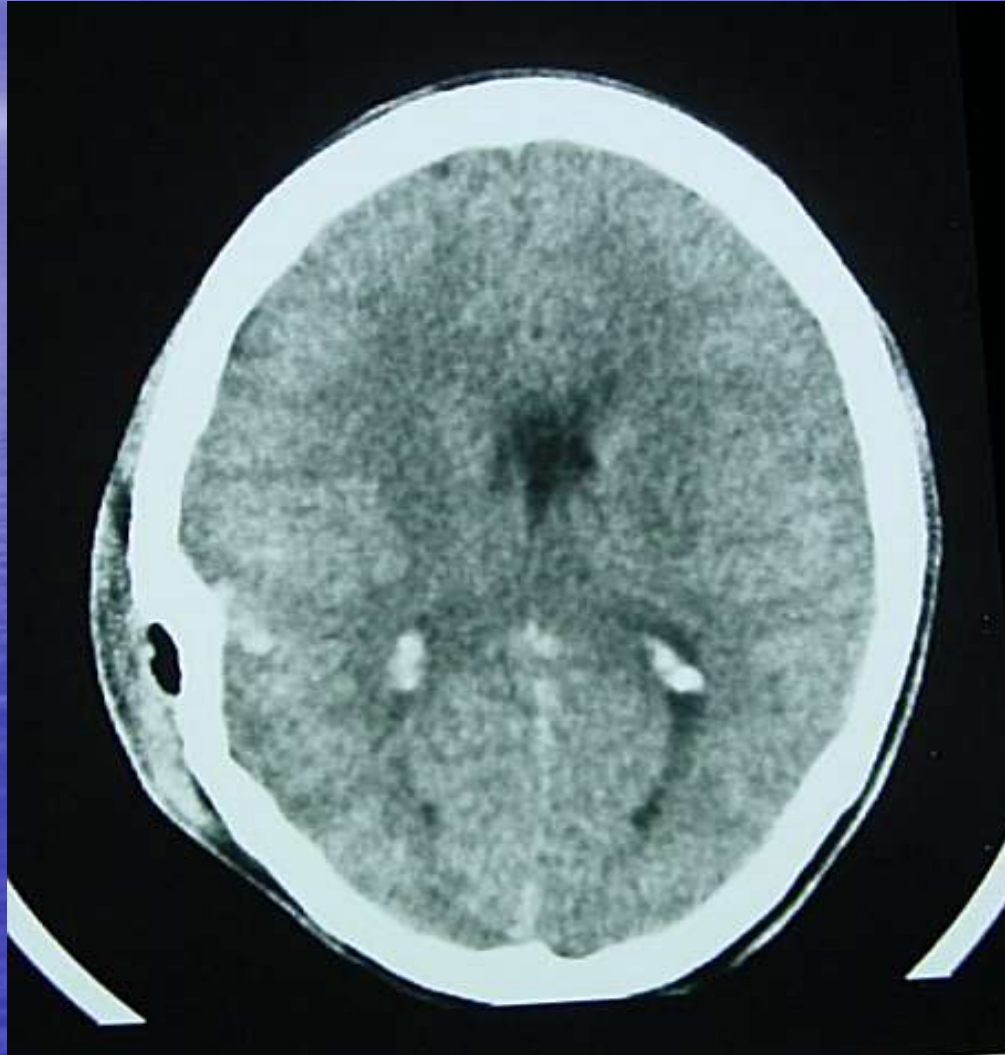


Depressed Skull Fractures

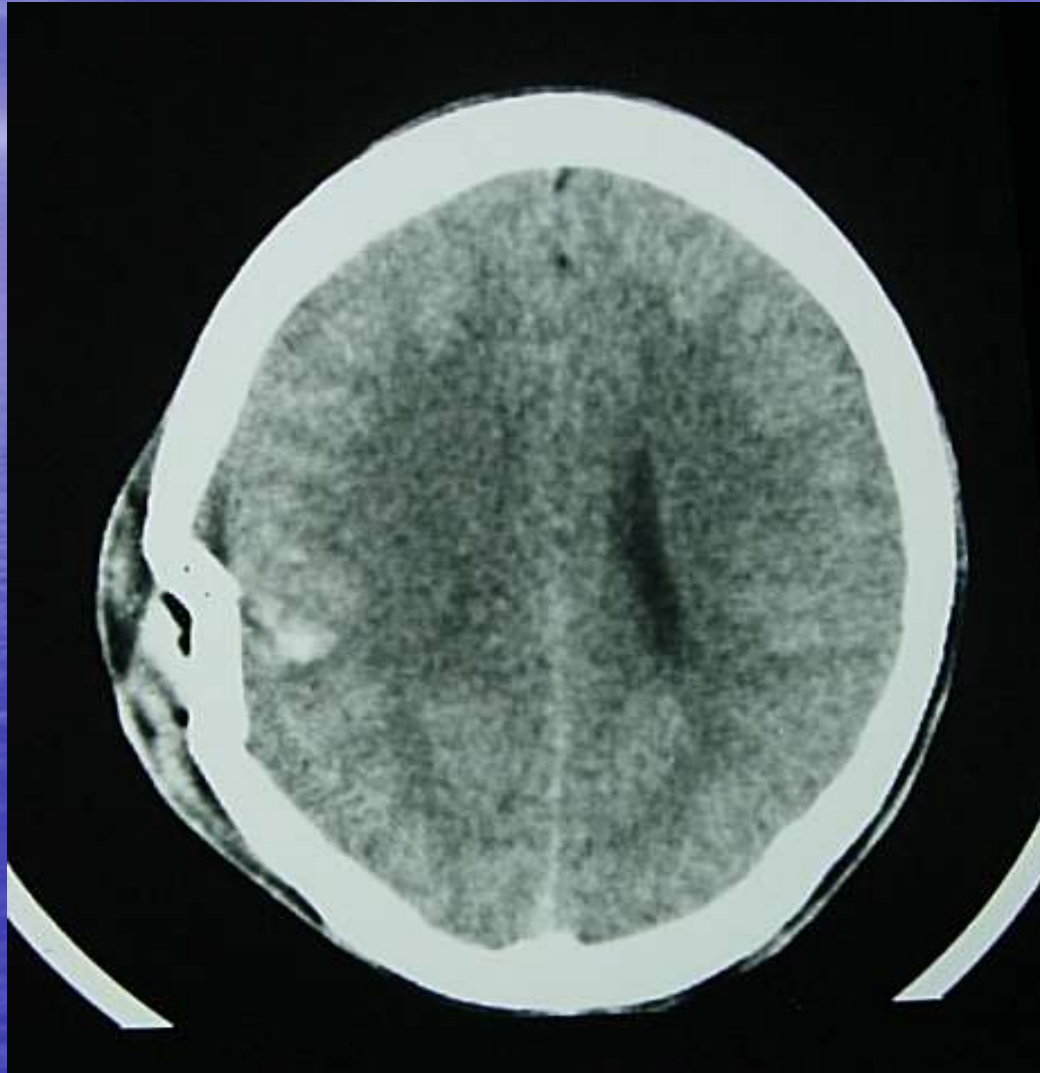
Bone Window



Depressed Skull Fractures

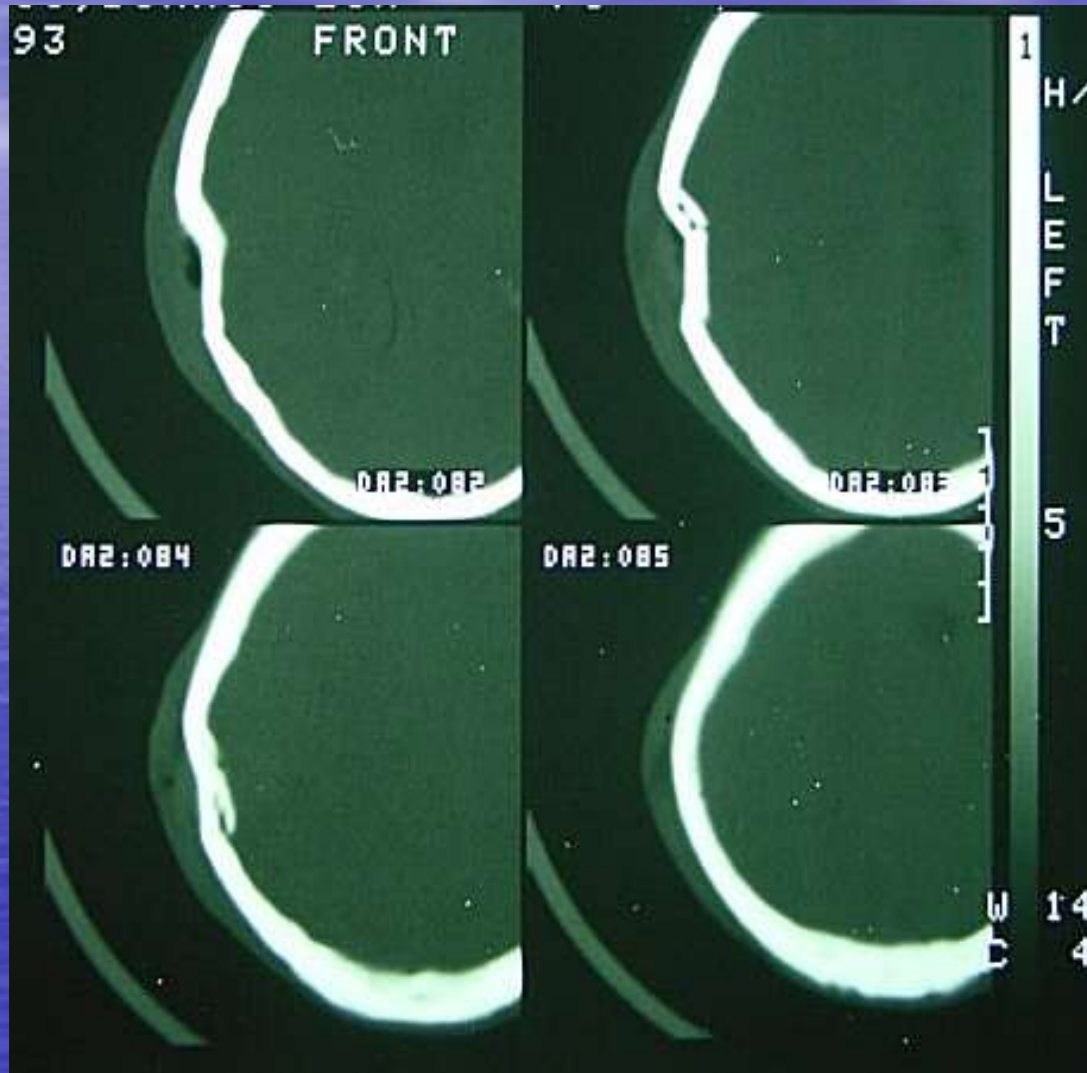


Depressed Skull Fractures

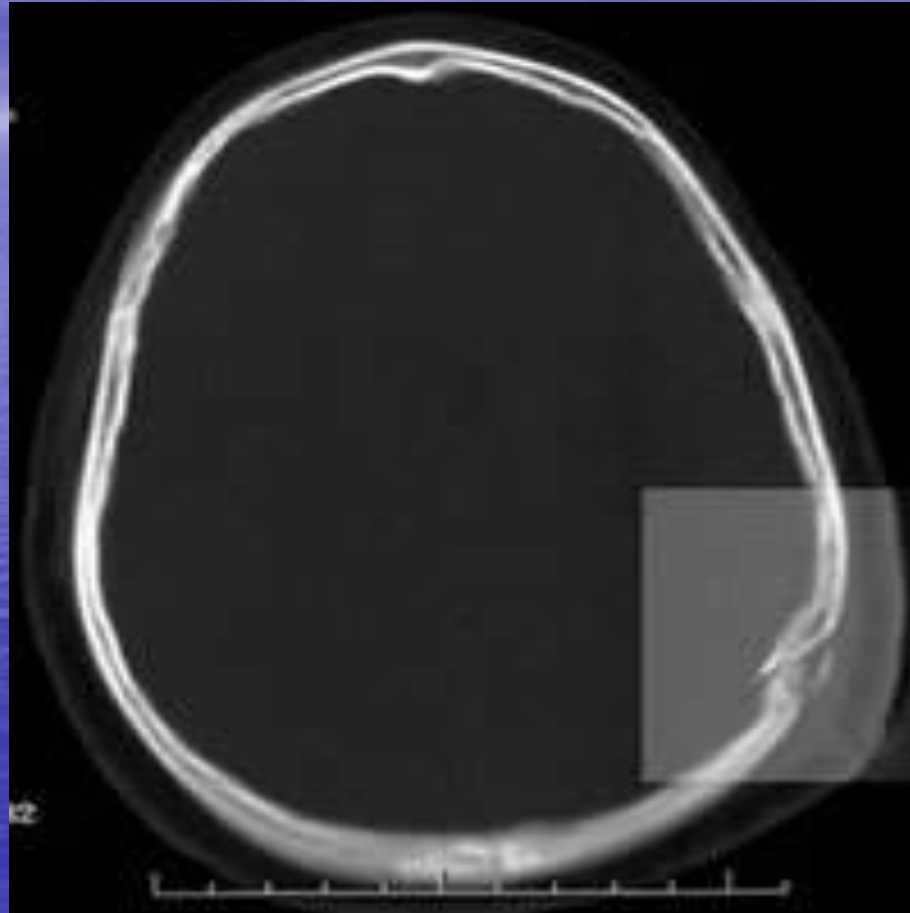


Depressed Skull Fractures

Bone Window

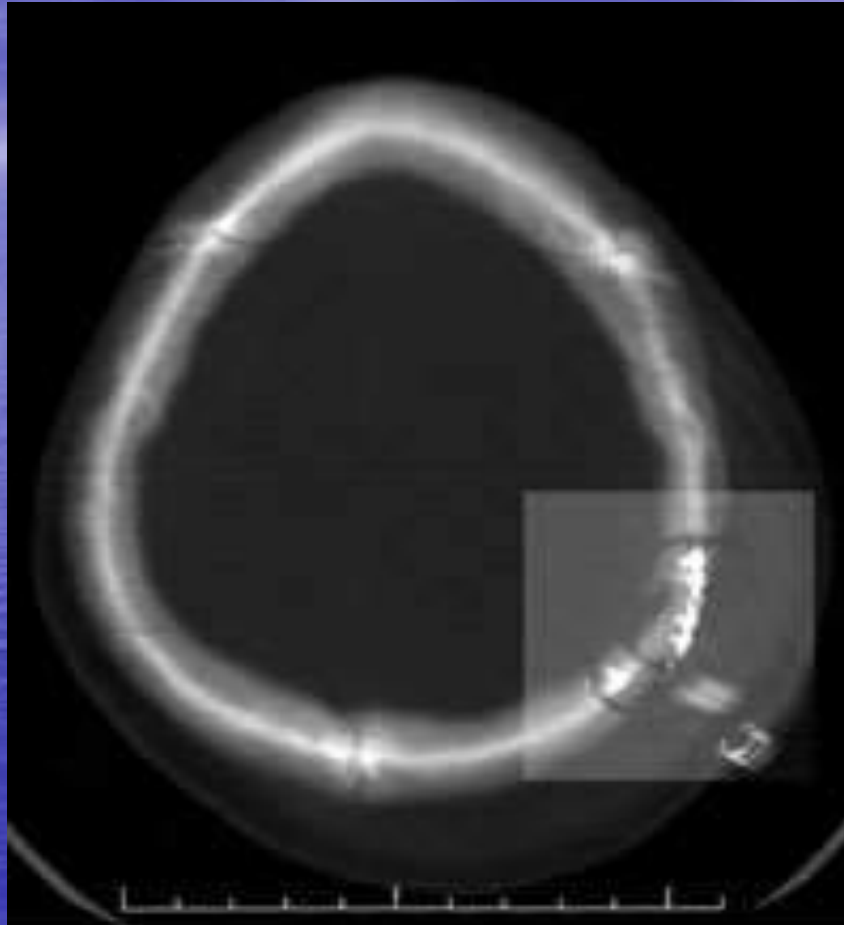


Depressed Skull Fractures



A computerized tomography scan of a depressed skull fracture caused by a golf-related injury.

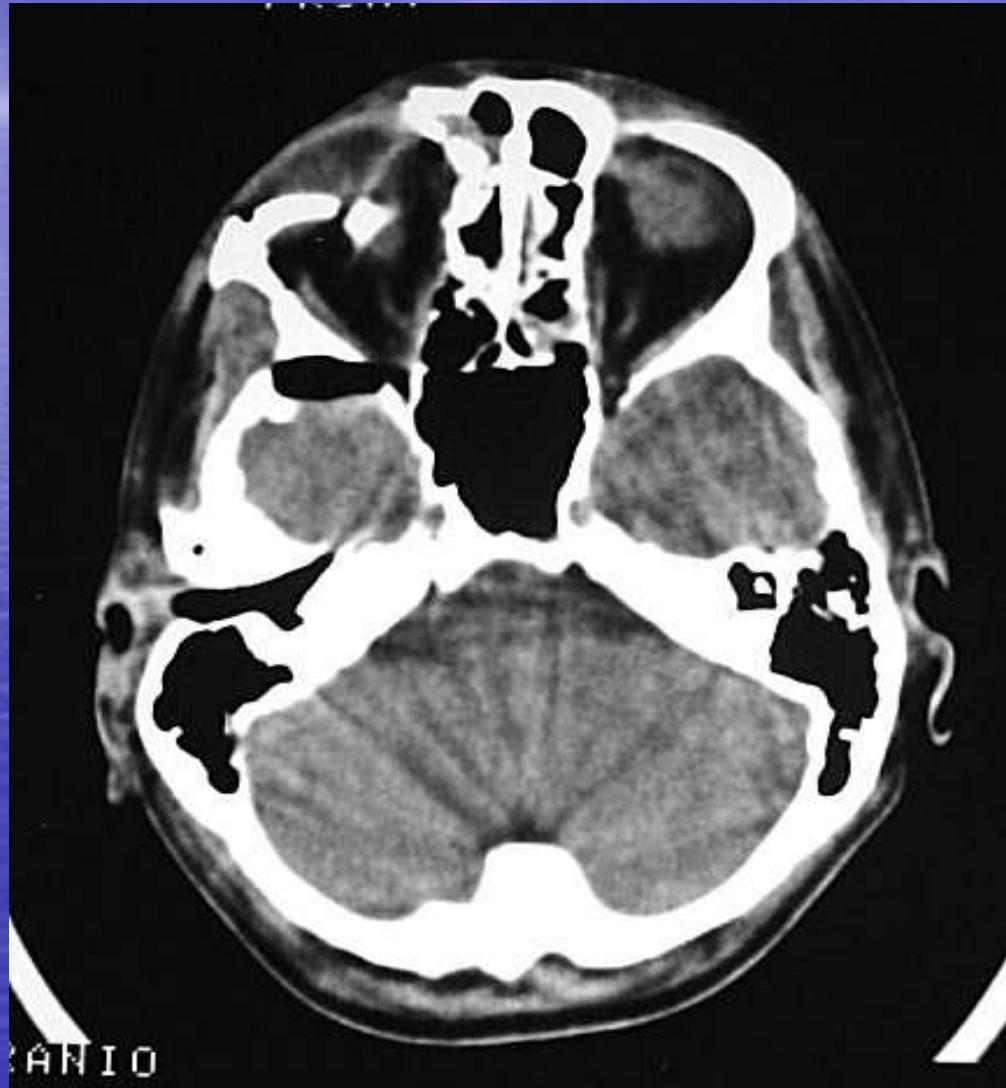
Depressed Skull Fractures



A depressed skull fracture repaired with titanium screws and plates.

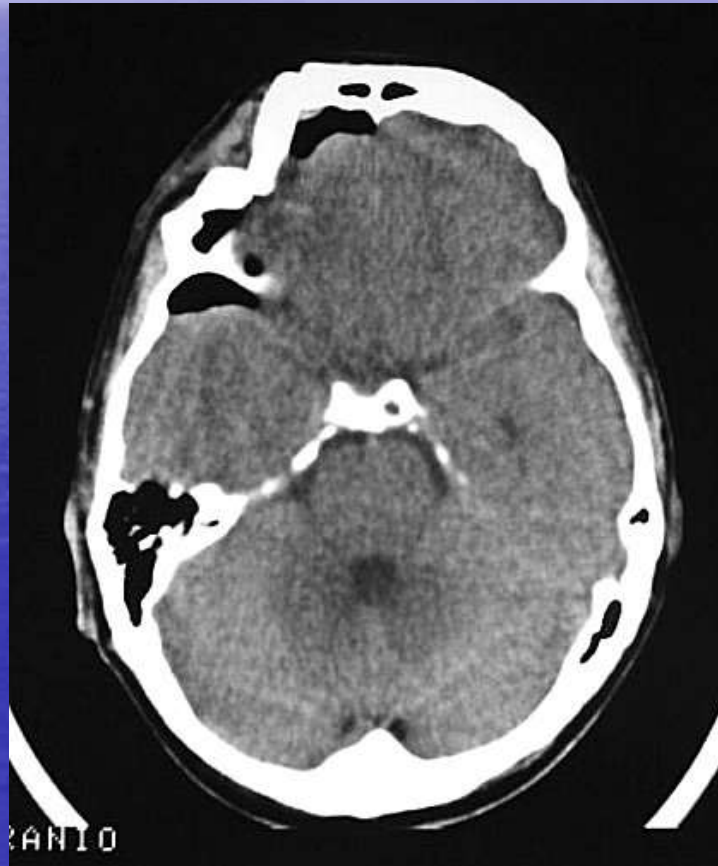
Depressed Skull Fractures

frontal Depressed Fracture



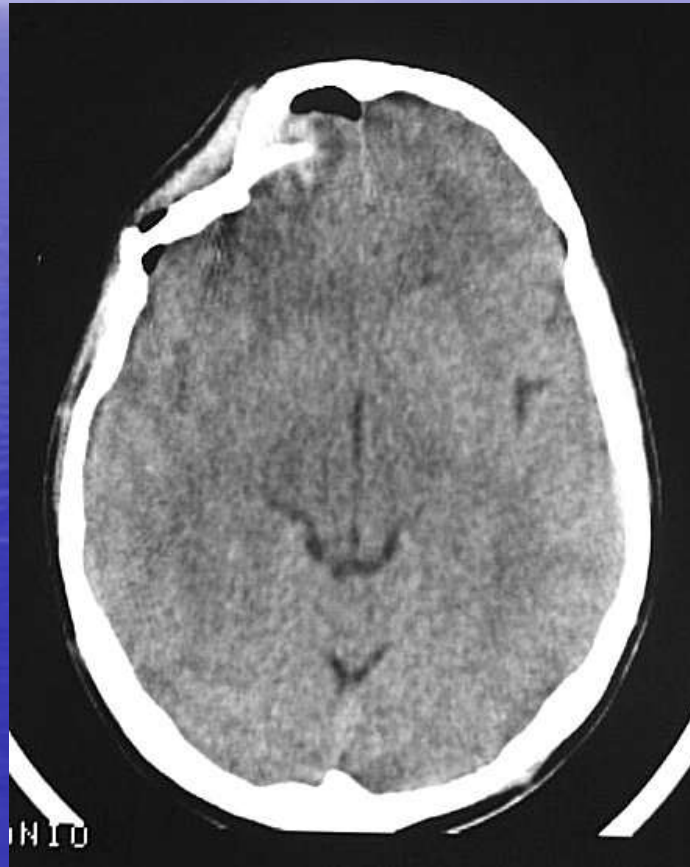
Depressed Skull Fractures

frontal Depressed Fracture



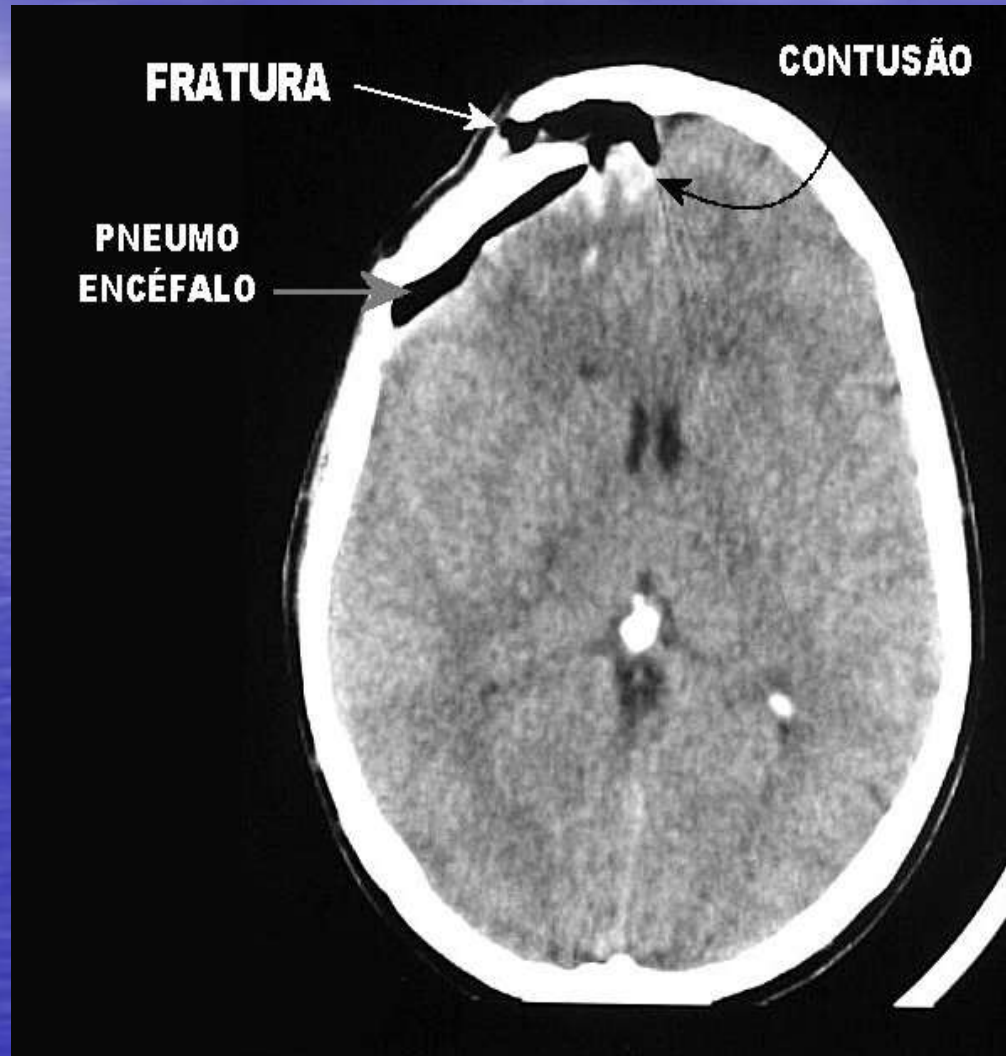
Depressed Skull Fractures

frontal Depressed Fracture



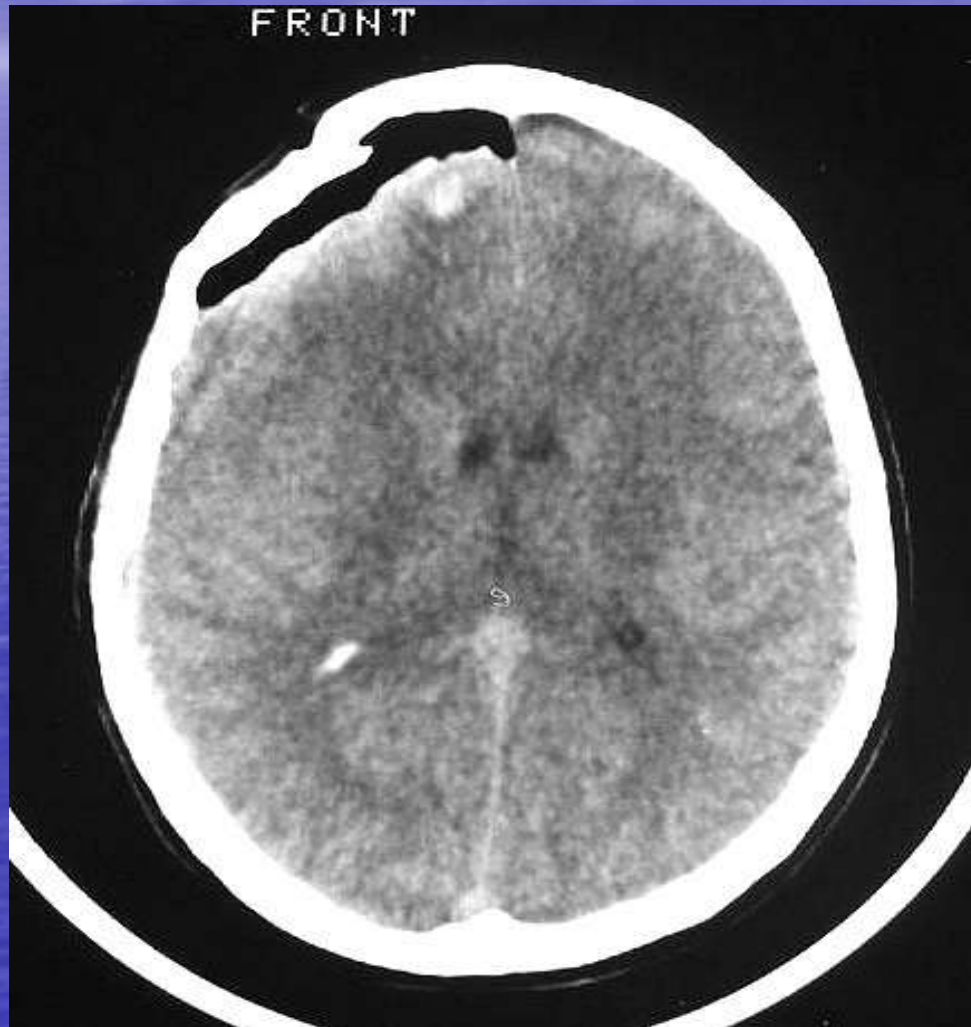
Depressed Skull Fractures

frontal Depressed Fracture



Depressed Skull Fractures

frontal Depressed Fracture



Closed depressed fractures

- *Rare in adults*
- *The depressed segment rarely causes cerebral compression*
- *Plain X-ray will visualize the depressed segment.*
- *Treatment : usually conservative measures*

Indications for surgery to raise the closed depressed fracture

- 1. Large depressed segment with possibility of dural tear.*
- 2. Alleviate mass effect.*
- 3. Cosmetic purposes.*
- 4. To prevent secondary infection.*

Compound depressed fracture

- Cause *profuse* bleeding, *leakage of CSF* and *prolapse of a portion of the brain*.
- Concussion is slight and there is usually no compression.
- The main hazard here is the *liability to infection*.

Treatment of compound depressed fracture

- 1. Foreign bodies are meticulously removed.*
- 2. The depressed segment is gently elevated to avoid tearing of the dura.*
- 3. Any prolapsed or necrotic tissue is sucked and haemostasis is performed.*
- 4. Any dural tear is repaired.*
- 5. Removed bone segments are cleaned and replaced.*
- 6. The pericranium and the scalp are sutured.*
- 7. Prophylactic antibiotics are administered.*

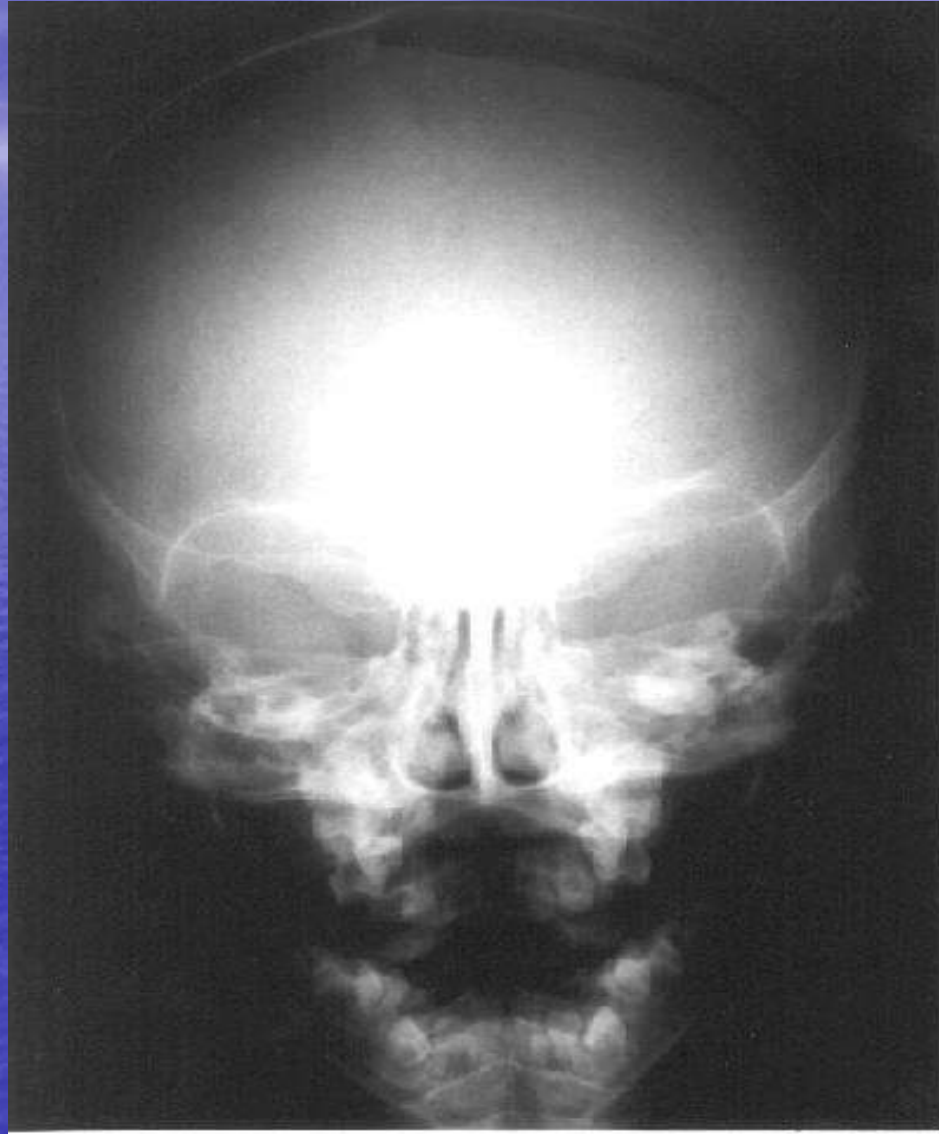
Complications of depressed fractures

- 1. Dural tear leading to prolapse of the brain.*
- 2. Infection; may lead to osteomyelitis or meningitis.*
- 3. Epilepsy: either early or late.*
- 4. Cosmetic deformity.*
- 5. Severe bleeding from one of the venous sinuses.*

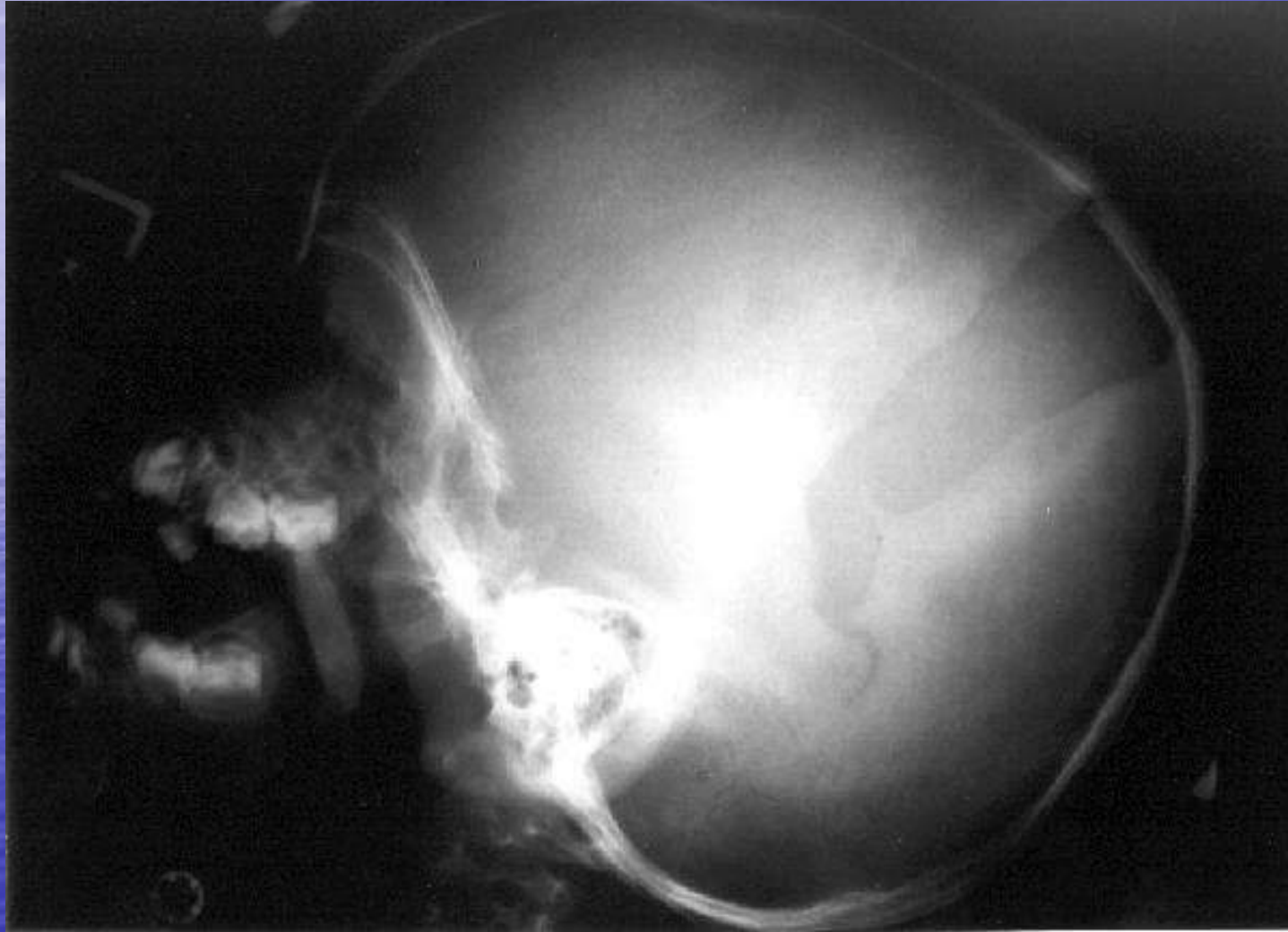
c. Diastatic fractures

- It is separation of a cranial suture line.*
- It involves the **coronal or lambdoid suture.***
- Diastatic fractures are **common in infants under 3 years old and rare in older age groups** except as part of a more extensive skull fracture.*

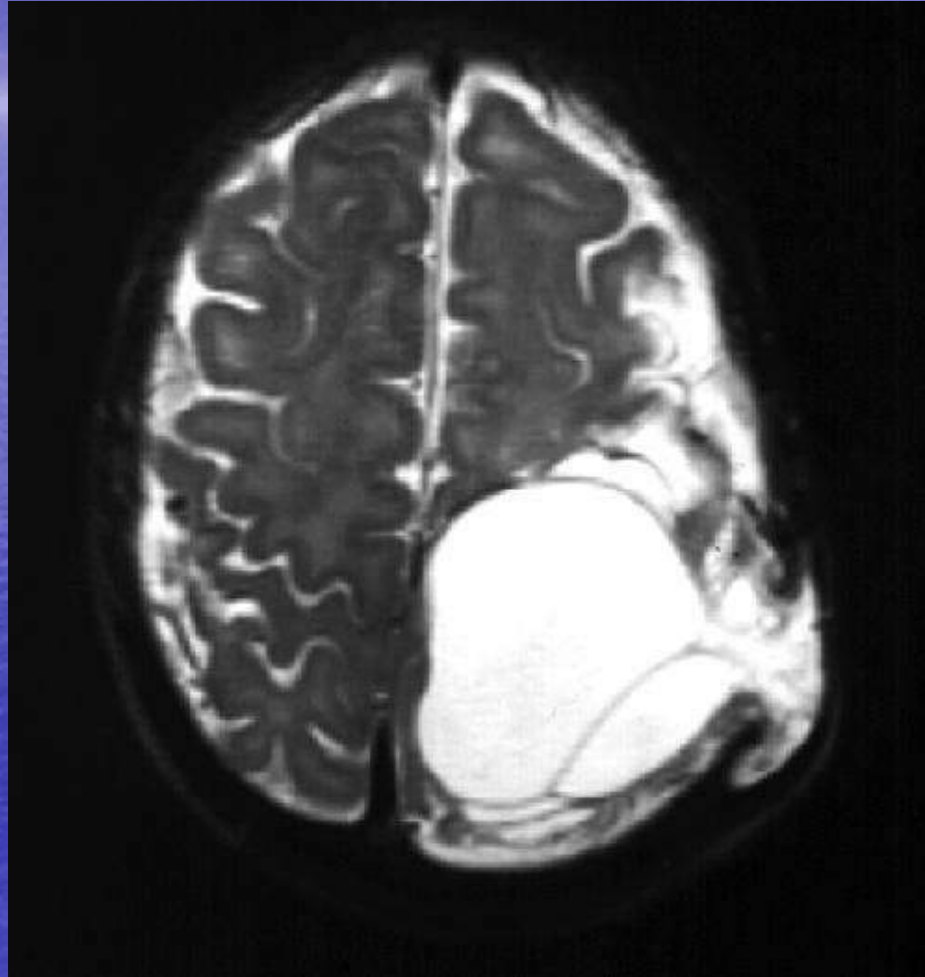
Diastatic Fractures



Diastatic Fractures



Diastatic Fractures



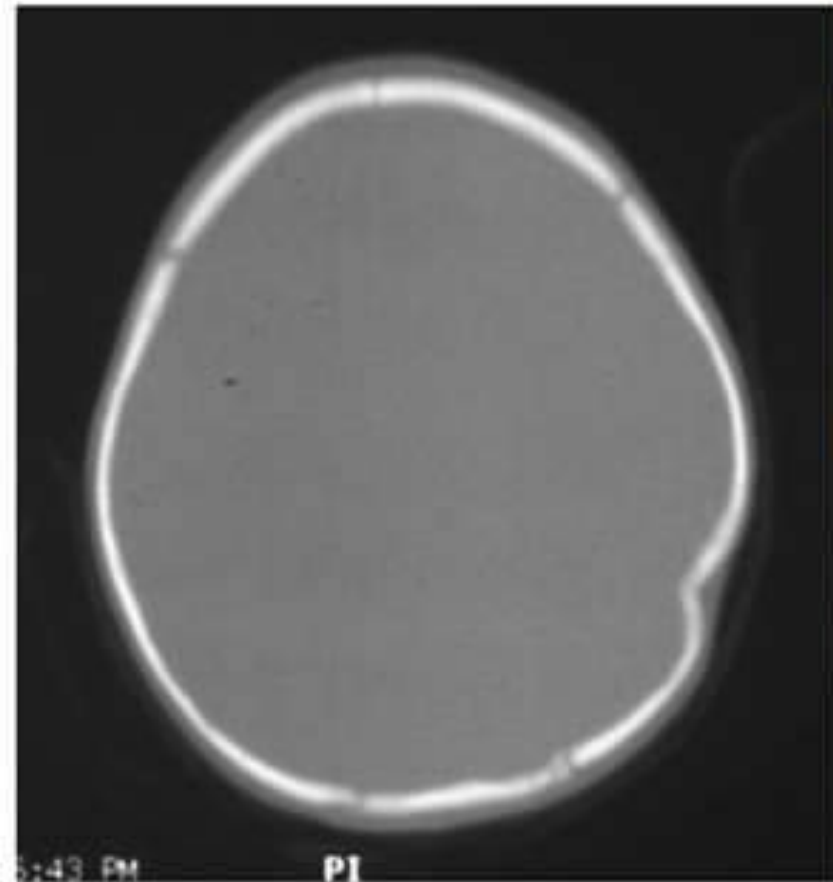
Diastatic Fractures



d. Pond (ping pong fractures)

- *This is a smooth concave depression due to blunt trauma to the cranial vault.*
- *Usually seen in children and also known as 'ping-pong fracture', as it looks similar to a dent in a ping-pong ball.*
- *Fracture will elevate spontaneously if less than 3cm in diameter.*
- *If the fracture is more than 5cm in diameter, it may need surgical elevation.*

Ping Pong Fractures



Fractures of the base (Basilar skull fractures)

- *These are relatively frequent fractures.*
- *Occult radiologically.*
- *Diagnosed on clinical examination.*
- *They can result in CSF fistula that may persist, but which usually seals off after a few days.*

Aetiology of skull base fractures

- *most are due to indirect violence on the vault producing deformation of skull, with compression of skull at one area and giving way or break of skull at other area, with the base of skull being most vulnerable.*

The essential features of base of skull fractures

- 1. Escape of cranial contents, e.g. blood, CSF, or brain matter.*
- 2. Injury of cranial nerves.*
- 3. Signs of brain injury.*

Types of skull base fractures

- *a. Anterior fossa*
- *b. Middle fossa*
- *c. Posterior fossa*

a. Anterior fossa basal fractures

- *May open into the frontal or ethmoidal air sinuses, or run across the cribriform plate.*
- *Clinical presentations:*
 1. *Subconjunctival haematoma.*
 2. *Epistaxis.*
 3. *Anosmia: due to olfactory nerve injury.*
 4. *CSF Rhinorrhoea.*
 5. *Nasal tip parraesthesia: due to injury to the 1st branch of 5th nerve.*
 6. *Periorbital haematoma or 'raccoon eyes'.*

The Raccoon



The Raccoon



The Raccoon



Anterior fossa basal fractures

Raccoon Eyes

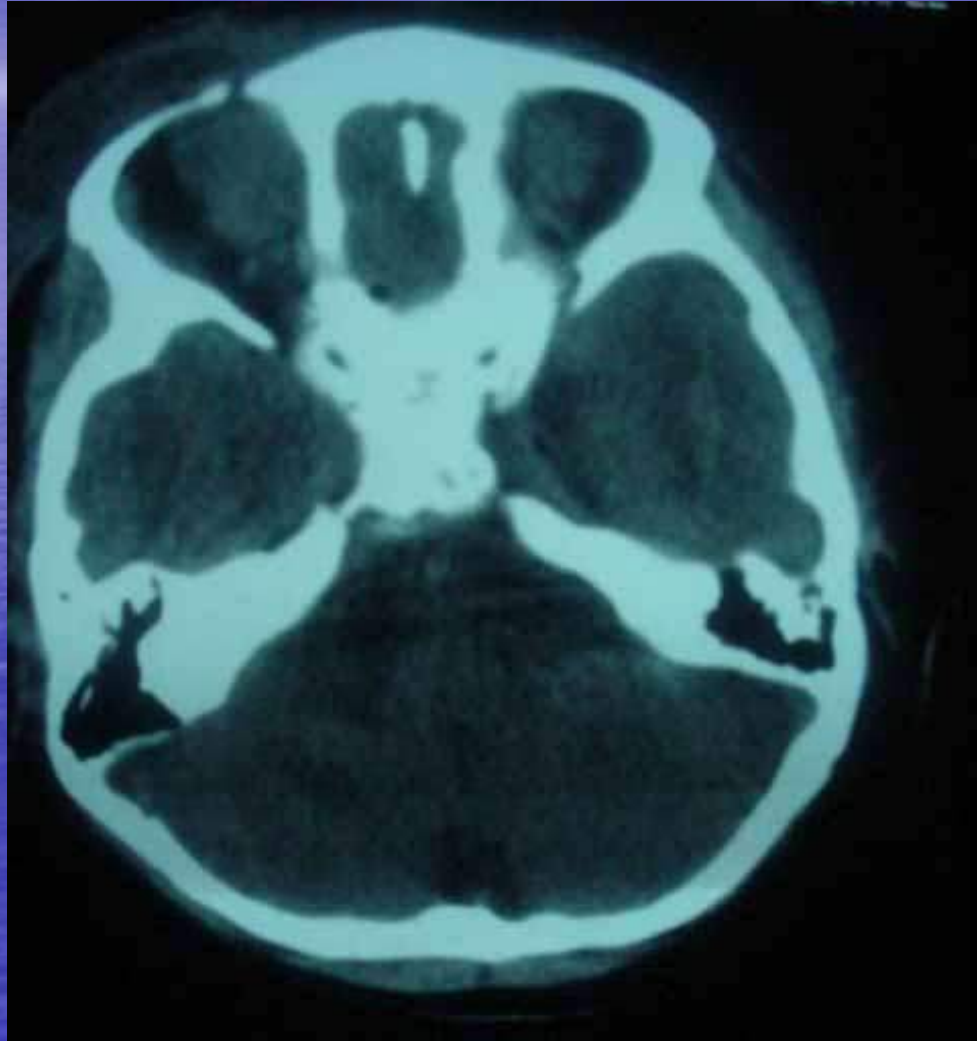


Anterior fossa basal fractures

Raccoon Eyes



Anterior fossa basal fractures



Anterior fossa basal fractures



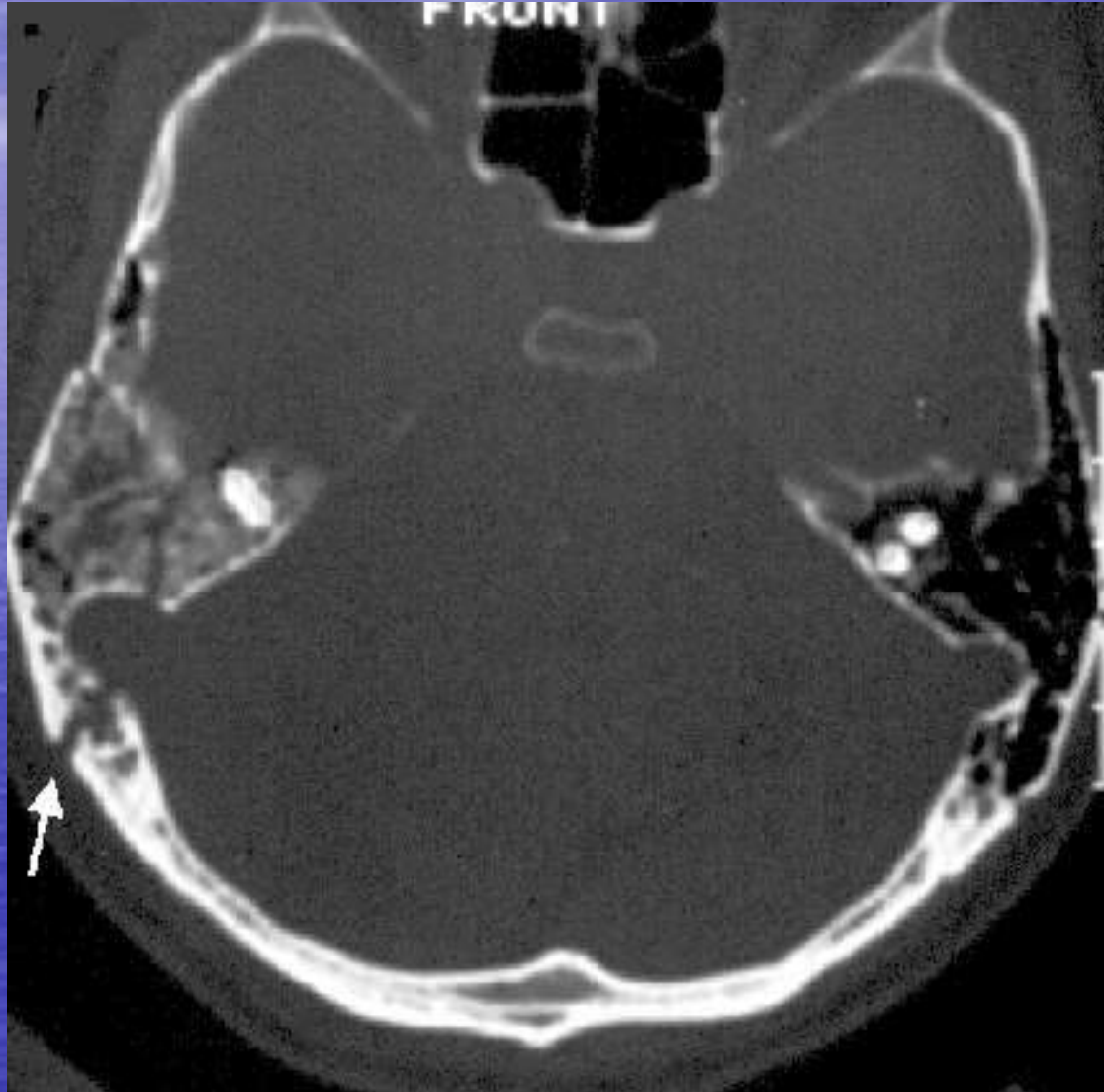
b. Middle fossa basal fractures

- *Involve the petrous temporal bone.*
- ***Clinical presentations:***
 1. *CSF Otorrhoea.*
 2. *Haemotympanum.*
 3. *Battle sign; discoloration over the mastoid process.*
 4. *VII and VIII cranial nerve palsies.*

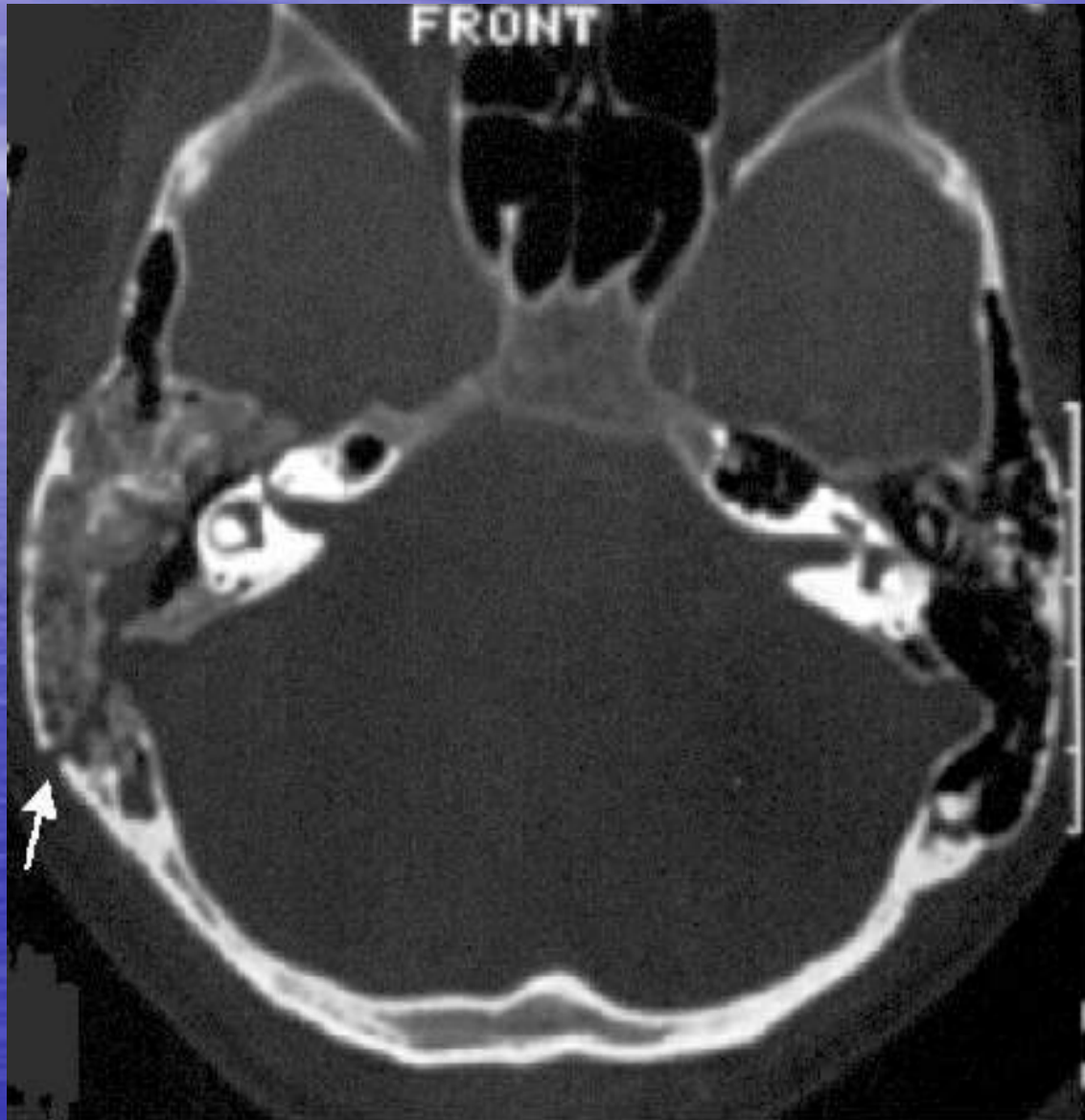
Battle sign



Middle fossa basal fractures



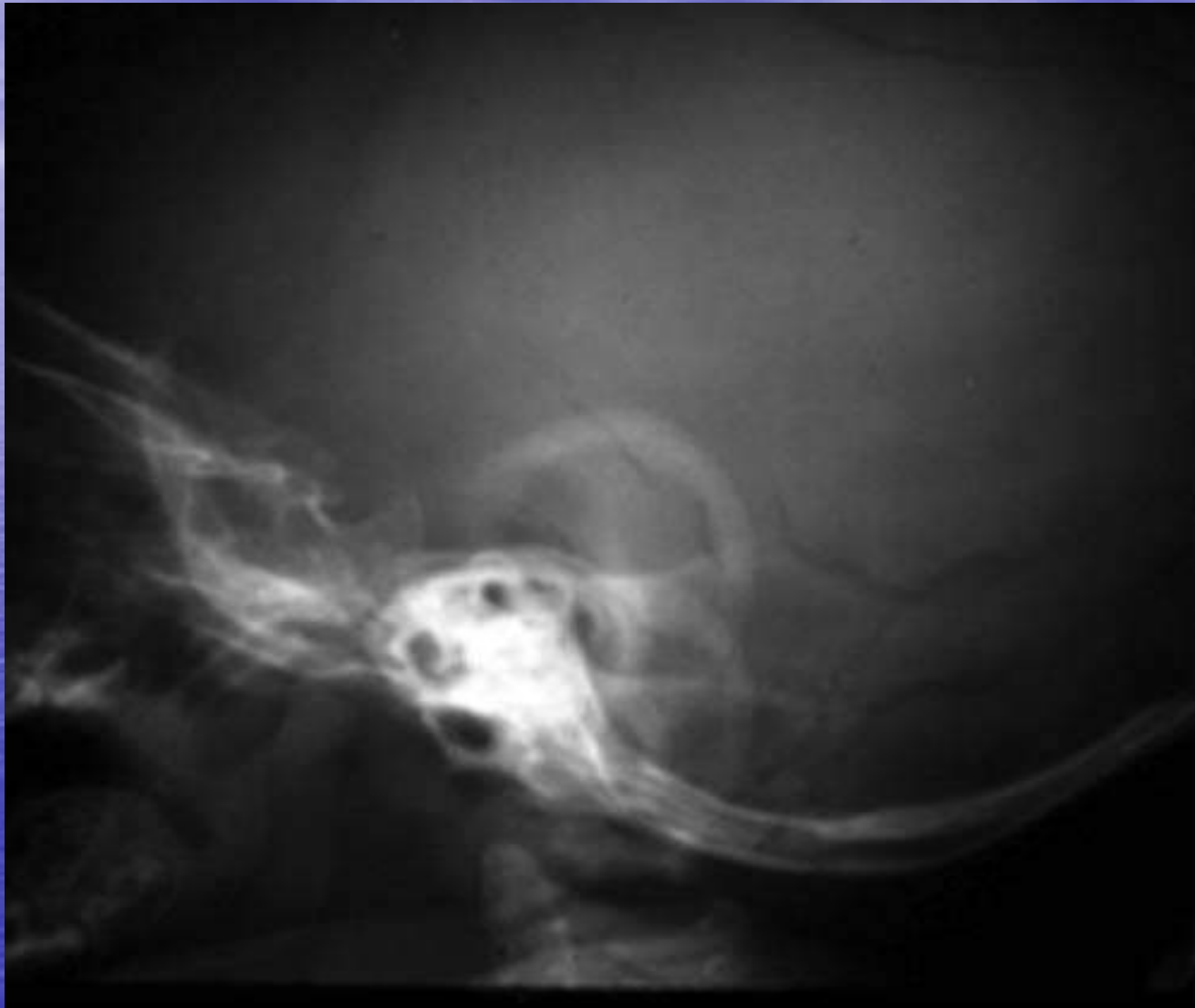
Middle fossa basal fractures



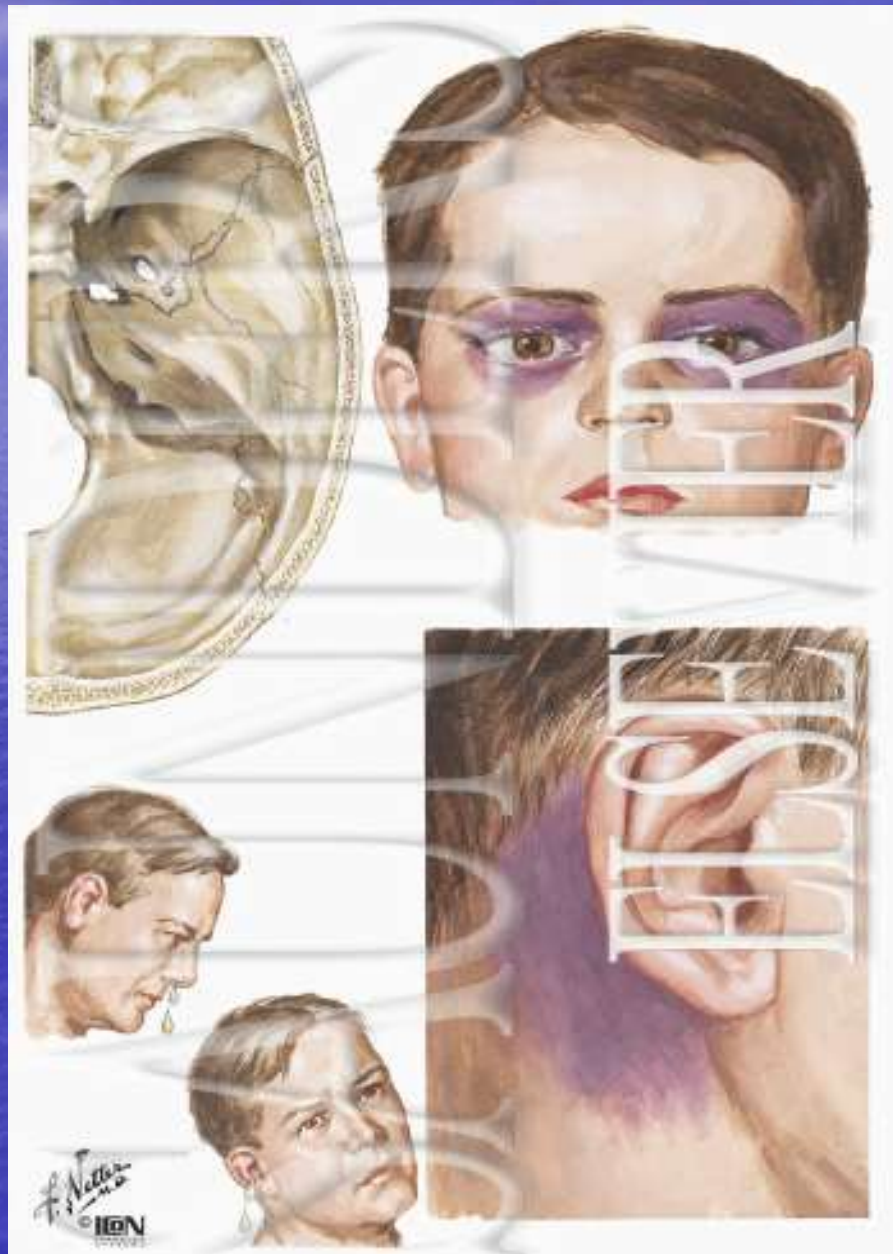
c. Posterior fossa basal fractures

- 1. Boggy swelling or discoloration at the neck due to extravasations of blood in the suboccipital region.*
- 2. Injury to cranial nerves: usually involve 9th, 10th, and 11th cranial nerves at the jugular foramen.*
- 3. Retraction of the head and stiffness of the cervical muscles due to upper cervical nerves irritation.*

Posterior fossa basal fractures



Skull Base Fractures



Management of skull base fractures

- 1. Prevention of infection: prophylactic antibiotics.*
- 2. Control of CSF leakage: conservative or surgical intervention.*
- 3. Treatment of associated brain injury.*

THANK

YOU