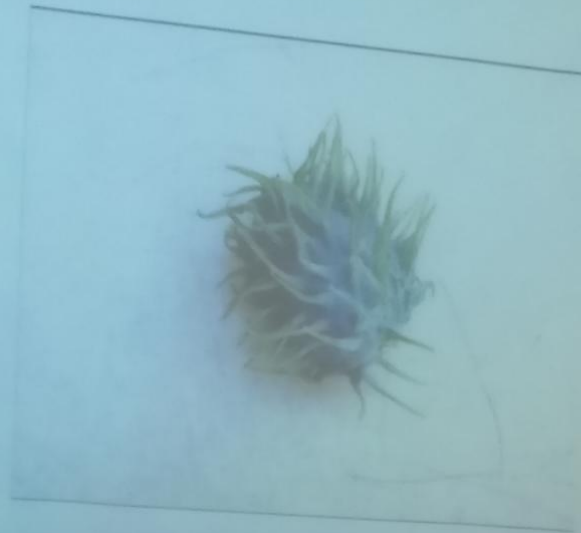
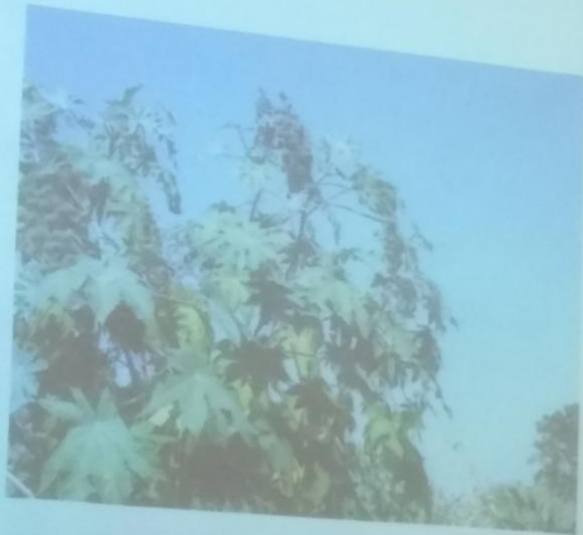


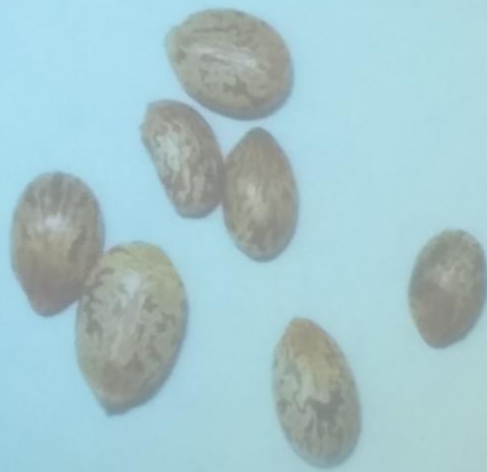
CASTOR FRUIT



CASTOR PLANT



CASTOR SEED



Toxic part of plants

- All parts of plant but seeds are more toxic
- **Toxic Principle**
- Ricin (toxalbumin)
- **Mechanism of Action**
- Ricin is composed of two polypeptide chains (A and B).
- These chains are connected by a disulfide bond.
- In GIT, chain "B" binds the cell surface and chain "A" enters into cytoplasm. Chain "A" acts on 60S ribosomal unit of cell and disrupt protein synthesis

- Death may be due to multiorgan failure or cardiovascular collapse
- The pulp of seed contains allergenic glycoprotein, which may cause dermatitis, rhinitis, asthma, and conjunctivitis in allergic individuals

Management

- Gastric lavage and give activated charcoal
- The urine should be alkalinized with sodium bicarbonate.
- This is to prevent precipitation of hemoglobin in the renal tubules. Supportive treatment

- Fatal dose
- 5 to 10 seeds
- 1 mg/kg body weight for Ricin
- Fatal period: 2 to few days

Autopsy Findings

- Mucosa of GIT may be inflamed with hemorrhages
- Crushed seeds with pericarp may be found in stomach
- Hemorrhages in organs

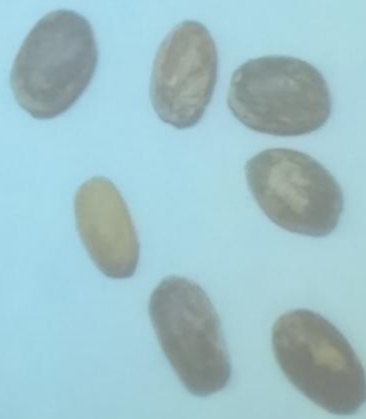
Medicolegal Importance

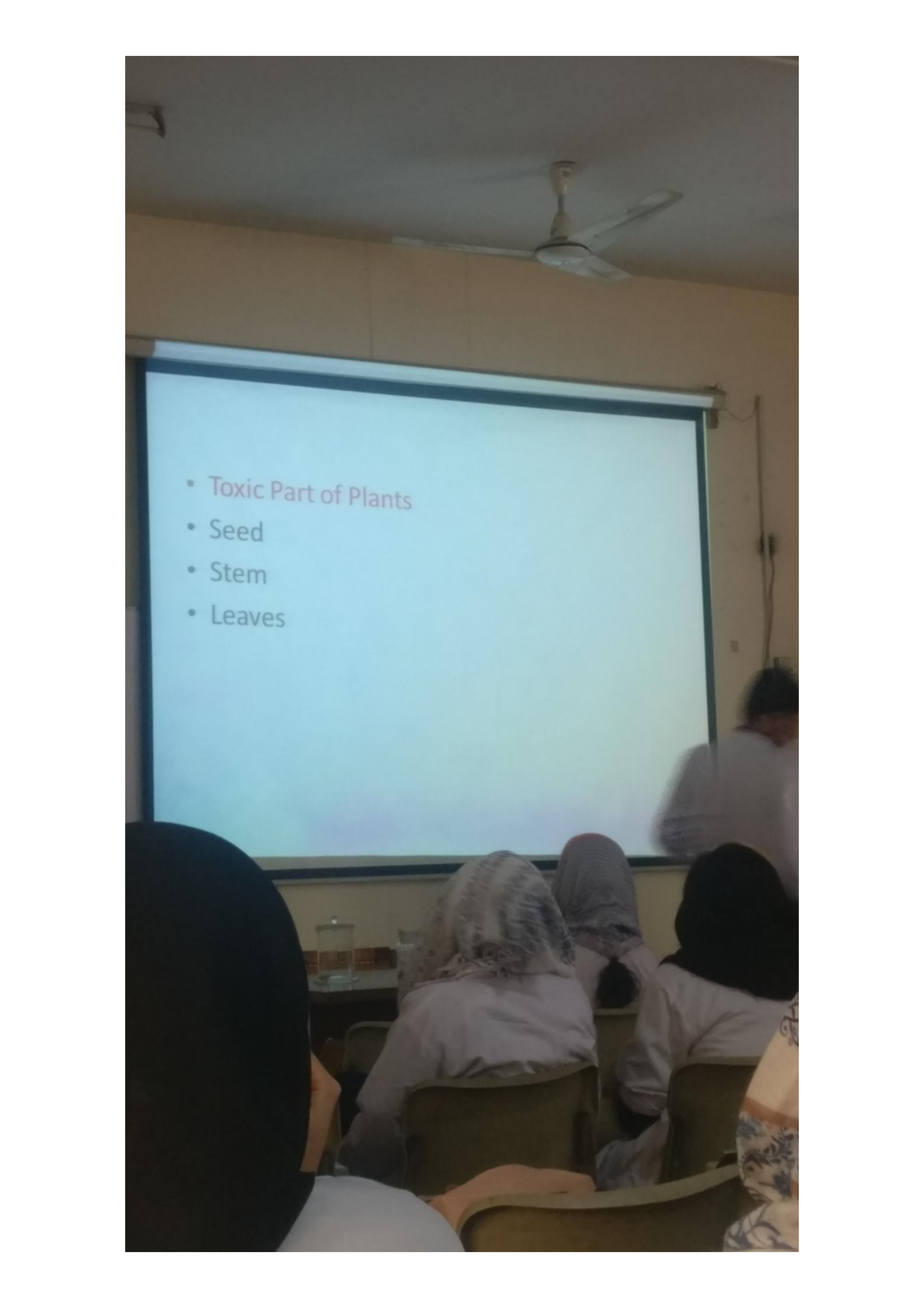
- 1. Accidental poisoning
- 2. Seeds are used for homicidal purpose
- 3. Used to procure criminal abortion
- 4. Cattle poison
- 5. Seed powder may be used to induce conjunctivitis for malingering
- 6. Small variety seeds may be confused with croton seeds.
- 7. Can cause anaphylactic type of hypersensitivity in humans

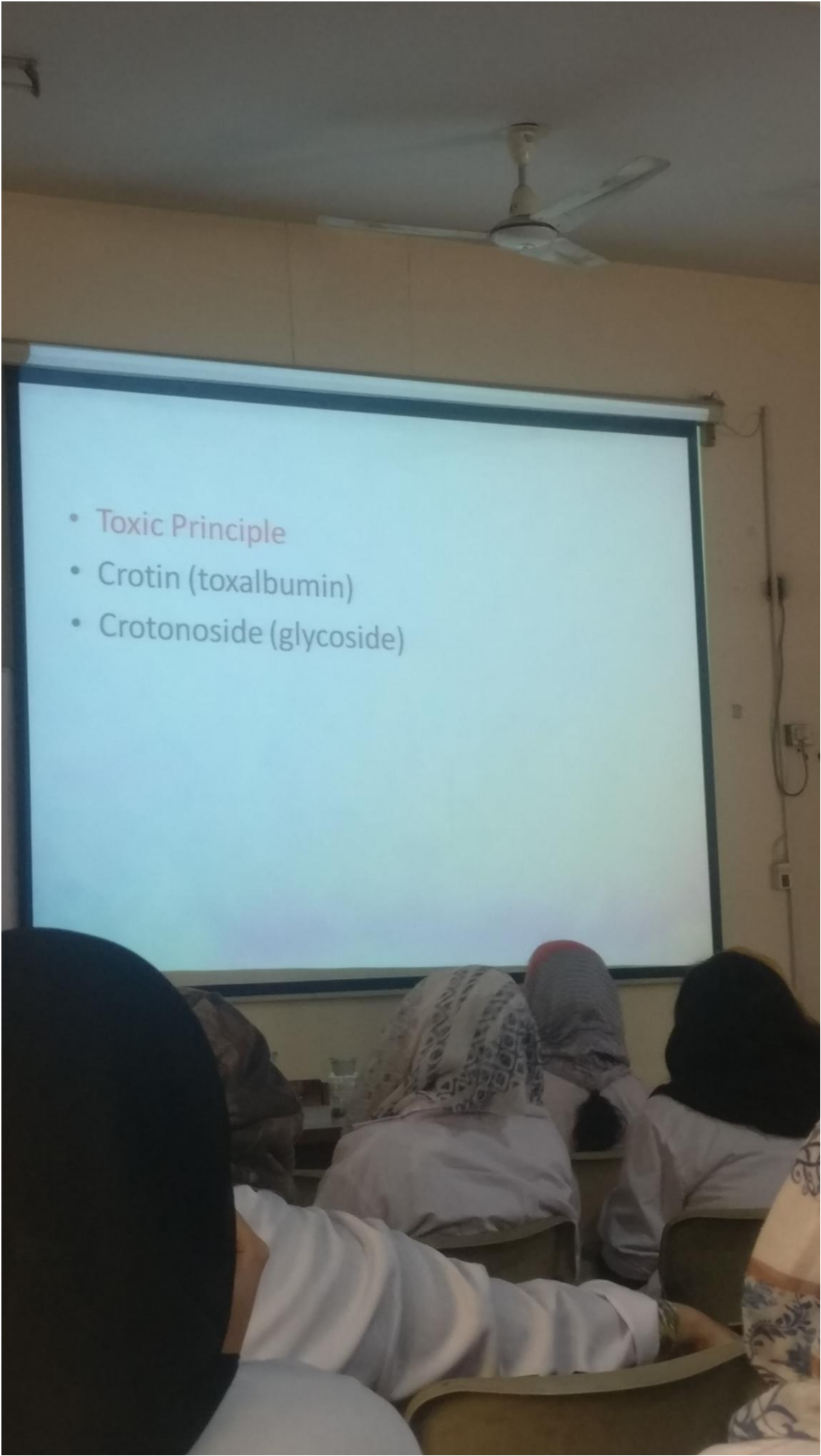
Croton

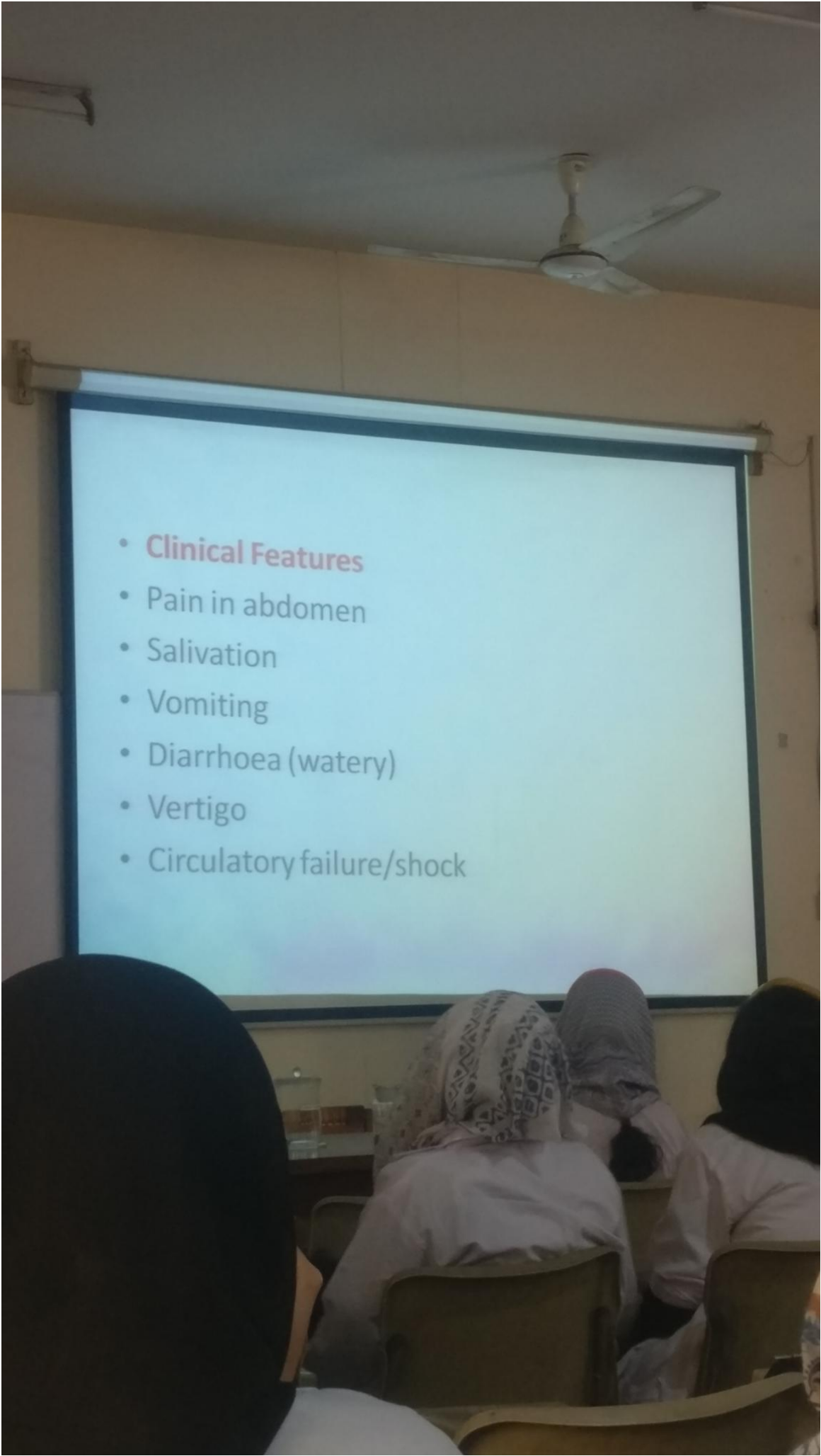
- Botanical name: Croton tiglium
- Common name: Nepala, Jamalgota, croton
- **Features**
- Croton plant has elliptical leaves with metallic green in color. Croton seeds are oval, non-glossy, and 1 to 2 cm long, dark brown or brownish-gray in color . The seed contains toxic principle.

CROTON SEEDS

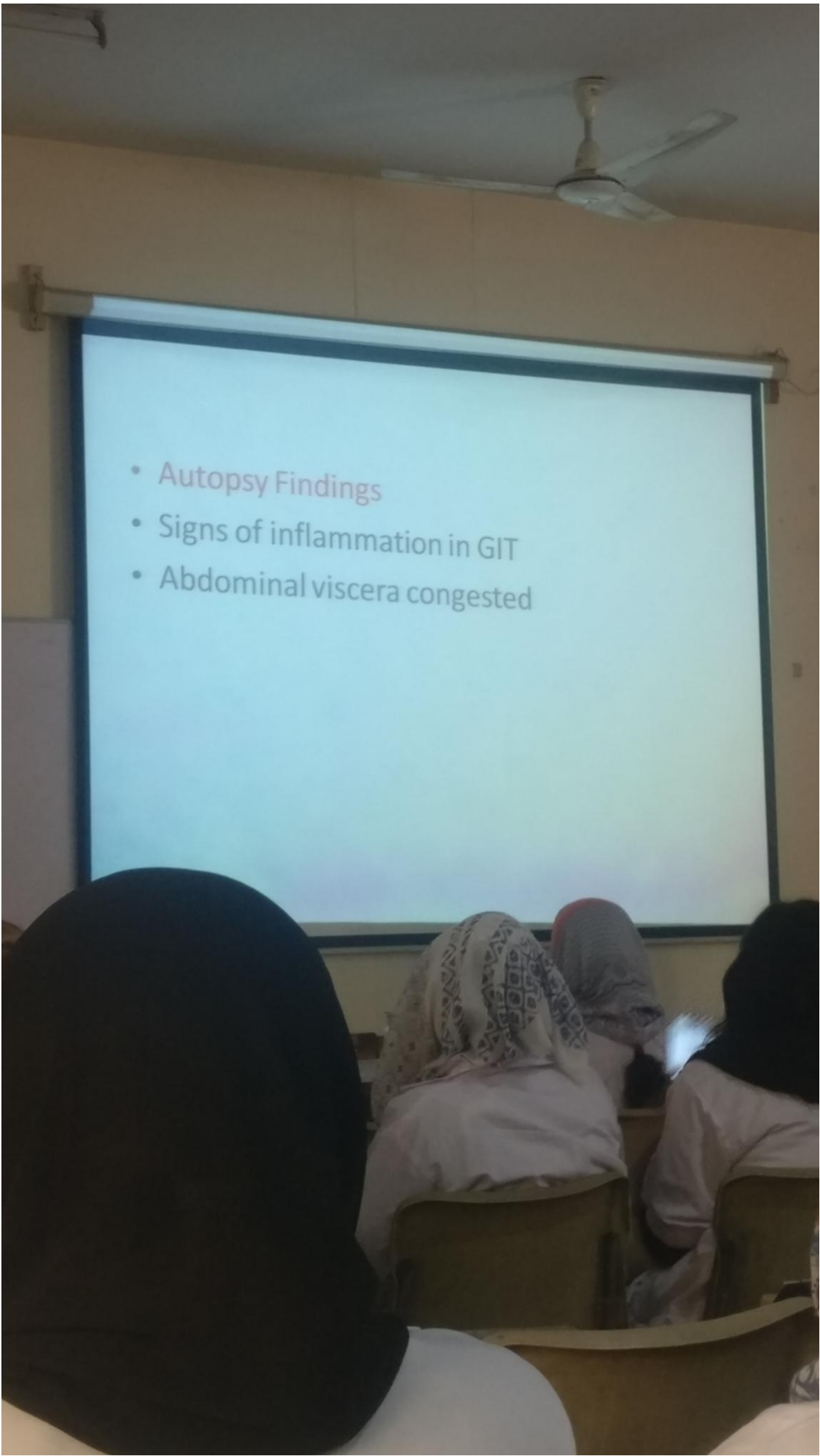


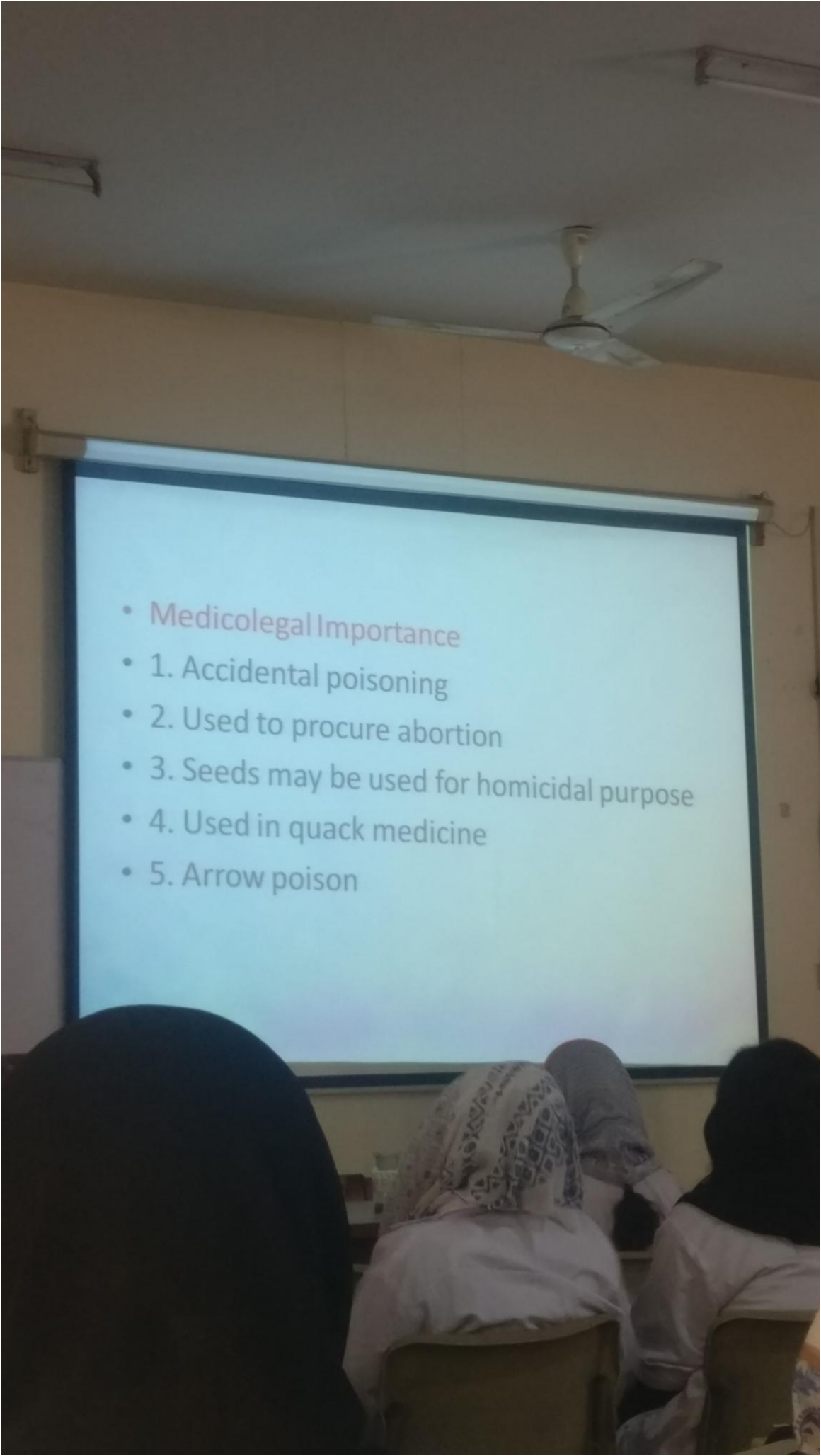
- 
- Toxic Part of Plants
 - Seed
 - Stem
 - Leaves

- 
- Toxic Principle
 - Crotin (toxalbumin)
 - Crotonoside (glycoside)

- 
- **Clinical Features**
 - Pain in abdomen
 - Salivation
 - Vomiting
 - Diarrhoea (watery)
 - Vertigo
 - Circulatory failure/shock

- Management
- Gastric lavage
- Symptomatic
- Fatal dose: 4 seeds have cause death
- Fatal dose: 4 to 6 hours

- 
- Autopsy Findings
 - Signs of inflammation in GIT
 - Abdominal viscera congested

- 
- **Medicolegal Importance**
 - 1. Accidental poisoning
 - 2. Used to procure abortion
 - 3. Seeds may be used for homicidal purpose
 - 4. Used in quack medicine
 - 5. Arrow poison

HEAD INJURY

- **Definition**
- *A morbid state resulting from gross or subtle structural changes in the scalp, skull and/ or the contents of the skull, produced by mechanical force*

Classification

- A) Depending on the state of dura, head injuries are classified as
 - 1. **Closed head injury**: Here the dura remains intact, irrespective of whether skull is fractured or not.
 - 2. **Open head injury**: Here the dura is open i.e. torn.
- The dura may be torn by Penetrating injury Bone fragment or As a consequence of skull fracture

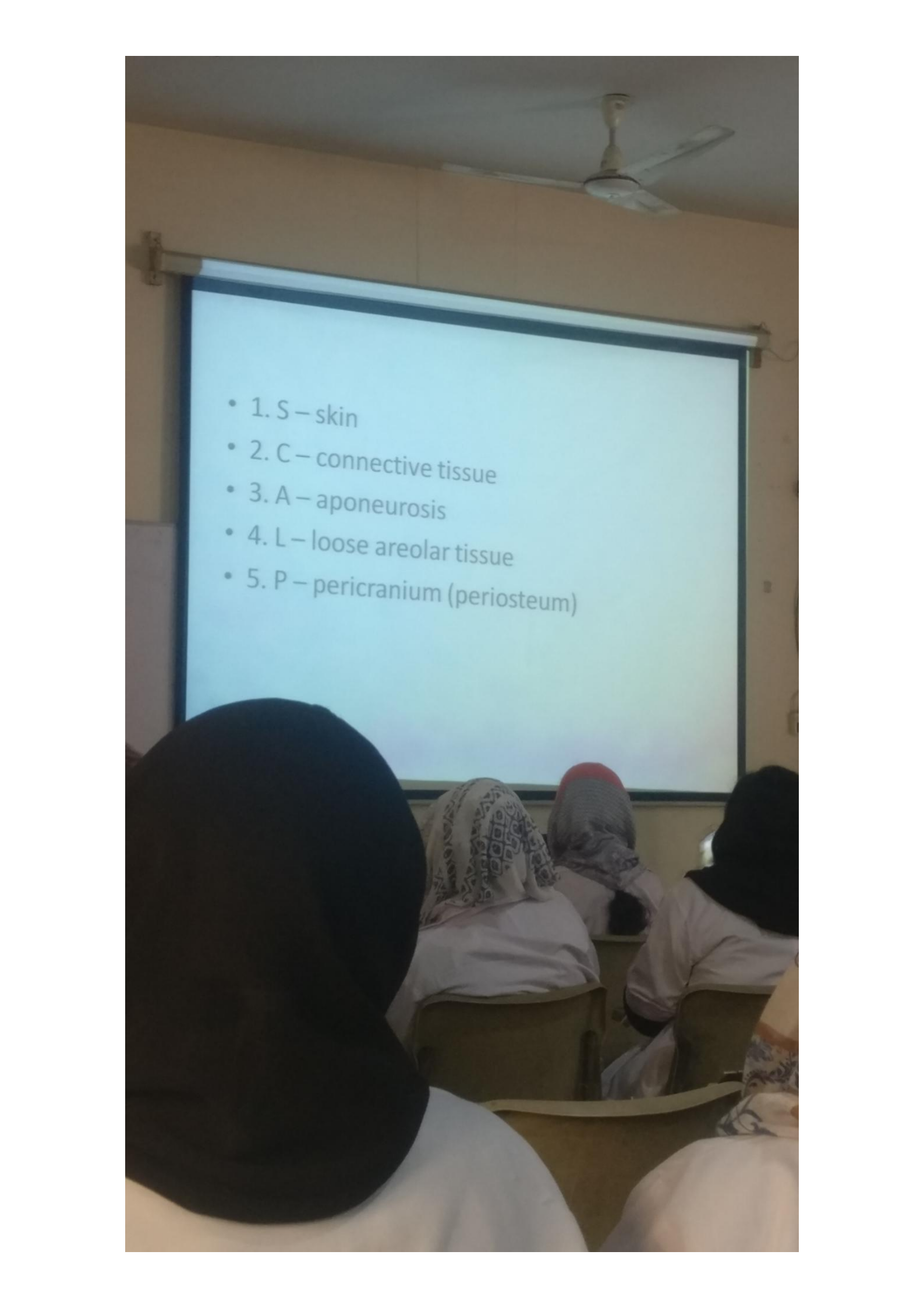
- B) Depending on duration of unconsciousness and Glasgow coma scale

Classification of head injury

Type	Duration of unconsciousness	Glasgow coma scale
Minor or mild head injury	< 30 minutes	13-15
Moderate head injury	> 30 min and < 6 hours	9-12
Severe head injury	> 6 hours	8 or less

SCALP INJURIES

- Scalp is covering of head and extends from the eye brow anteriorly to superior-nuchal line posteriorly and laterally from one temporal line to the other. Scalp is composed of:

- 
- 1. S – skin
 - 2. C – connective tissue
 - 3. A – aponeurosis
 - 4. L – loose areolar tissue
 - 5. P – pericranium (periosteum)

- Following sort of injuries may be present over scalp
- 1. Abrasion
- 2. Contusion
- 3. Laceration – may be confused with incised wound. Types of scalp laceration are:
 - – Linear
 - – Y-shaped
 - – Stellate
 - – Cruciate
 - – Penetrating
 - – Crescent etc.
- 4. Incised wounds
- 5. Avulsion
- 6. Puncture wounds

1. Direct Force Fracture

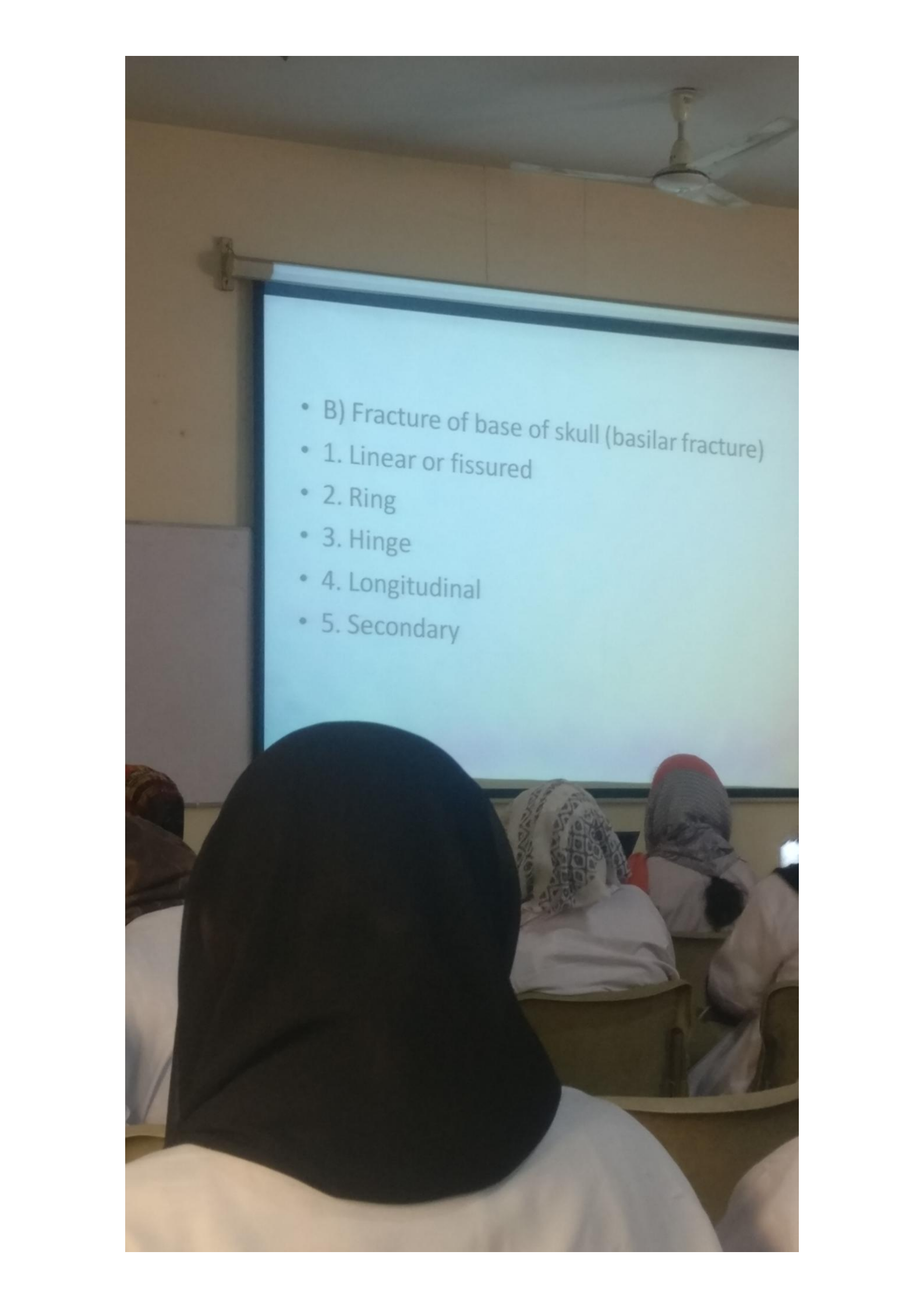
- Direct force fracture results from following mechanism
- 1. Fracture due to local deformation
- 2. Fracture due to general deformation

- A) Fracture due to local deformation
- If skull receives a focal force impact, then there is momentary distortion of the shape of skull. Due to continued force, the area under the point of impact tries to bend inward. The adult skull is incompressible. Due to incompressibility of skull and the inward bend caused by focal impact, the skull undergoes compensatory mechanism
- wherein there occurs bulging of other area. This is called as "struck hoop analogy".
- Now if the acting force over skull exceeds the limit of elasticity of skull, both the intruded (i.e. inward bend) and extruded (i.e. the bulging area) areas get fractured.
- The skull bones of infant are more elastic and may distort more than adult.
- When the focal impact is severe, depressed fracture may occur and may follow the actual shape of the impacting object.

- B) Fracture due to general deformation
- As per Rowbotham's hypothesis, skull behaves like an elastic sphere, thus:
 - 1. When skull is compressed in one plane, it bulges in other directions. For example if the skull is compressed laterally, the vertical and longitudinal diameters are increased and fracture may occur in these planes, if the bones are stretched beyond the limits of skull elasticity.
 - 2. Similarly, fracture may occur if the head is compressed between two external objects say for example between wood plank and wall or between wood log and the spinal column

- *Puppe's Rule*
- When two or more separate fracture occurs from successive impacts and meet each other, the later fracture will terminate in the earlier fracture. The termination of second fracture will interrupt the cranial distortion, which precedes fracturing.

- **Skull Fracture**
- Types of skull fractures are
- A) Fracture of vault of skull
- 1. Linear or fissured
- 2. Depressed (signature)
- 3. Comminuted [Mosaic (spider web)] 4. Pond or indented
- 5. Gutter
- 6. Diastatic or sutural
- 7. Perforating
- 8. Cut fracture

- 
- B) Fracture of base of skull (basilar fracture)
 - 1. Linear or fissured
 - 2. Ring
 - 3. Hinge
 - 4. Longitudinal
 - 5. Secondary

Complication of Skull Fracture

- 1. Injury to brain
- 2. Intracranial hemorrhage
- 3. Fracture of anterior cranial fossa may involve frontal, ethmoidal or sphenoidal air sinuses
- 4. Intracranial infections – meningitis/encephalitis
- 5. Cranial pneumatocele or pneumocranium
- 6. Cranial nerve injury
- 7. Traumatic epilepsy
- 8. CSF otorrhea
- 9. Coma
- 10. Cerebral edema
- 11. Increased intracranial pressure/tension
- 12. Death

- 2. *Skull Fracture Due to Indirect Violence*
- • Vault or base of skull may be fractured by indirect violence.
- The causative force applied may be away from skull but is transmitted to skull. The force may be applied to:
- 1. Force applied to chin: Blow on chin may cause fracture of glenoid fossa. Force applied below the mandible may be transmitted through the maxilla to the base of skull and fracture the cribriform plate.
- 2. Force applied to feet or buttock: For example in fall from height, the force is transmitted upwards through the spinal column and may produces ring fracture around basiocciput.

- **Linear Fracture (Fissured)**
- Linear fracture may involve outer or inner or both table of skull
- Common type
- Such fracture can be straight or curved
- In children or young person, the linear fracture may pass into a suture line and causes diastasis fracture.

- **Depressed Fracture**
- With severe local force application say for example hammer; the fracture bone is driven inward into cranial cavity. Thus also called as **signature fracture or fracture a la signature**, as the pattern resembles that of causative weapon

- **Comminuted Fracture**
- Here the bone is broken into pieces i.e. fragmentation of bones occurs. Non-displaced comminuted fracture resembles a spider web or mosaic pattern.

- **Pond Fracture**

- Here there is dent (dimple like) formation over the skull and the dent resembles like that of concave pond.
- This type occurs only in skull of infants
- Due to pliable bones of infant, the force applied produce depression without fracture. The depression of bone is comparable with distortion produced by squeezing a table-tennis ball or ping-pong ball

- **Gutter Fracture**

- Gutter fracture is formed when part of the thickness of skull bone is removed so as to form a gutter or furrow in the bone.
- They are caused when the weapon strikes the skull tangentially for example glancing bullet injury.

- .

- **Diastatic Fracture (Sutural Fracture)**
- Here the fracture occurs along the line of sutures of skull for example coronal suture fracture etc.
- Usually occurs in children and young adults because of non-fusion of sutures and results in separation of skull sutures

- **Perforating Fracture**
- Here the skull is perforated by a sharp pointed object or bullet.
- The fracture involves injury to outer and inner table of skull and shape and size may correspond to the dimensions of offending agent

- **Cut Fracture**

- These fracture are accompanied with sharp weapons like sword or chopper
- Fracture involves either outer table or both tables. If involved both tables, it will cause clean-cut gap corresponding with the thickness of blade. If involved outer table, it is labeled as partial cut fracture.

- **Ring Fracture**

- This is a fissured fracture that occurs round the foramen magnum in posterior cranial fossa.
- It occurs due to:
- Fall from height and person landing on the feet or buttock or
- Severe impact on the vertex that may drive the skull downwards on the spinal column

- **Hinge Fracture**
- It is a linear fracture that passes across the floor of middle cranial fossa, often following the petrous temporal or greater wing of sphenoid bone into pituitary fossa
- on both sides thus separating the base of skull into two halves Caused by heavy blow or impact on the side of the head.
- The fracture is also called as motorcyclist's fracture

Complication of Skull Fracture

- 1. Injury to brain
- 2. Intracranial hemorrhage
- 3. Fracture of anterior cranial fossa may involve frontal, ethmoidal or sphenoidal air sinuses
- 4. Intracranial infections – meningitis/encephalitis
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- 12. Death