

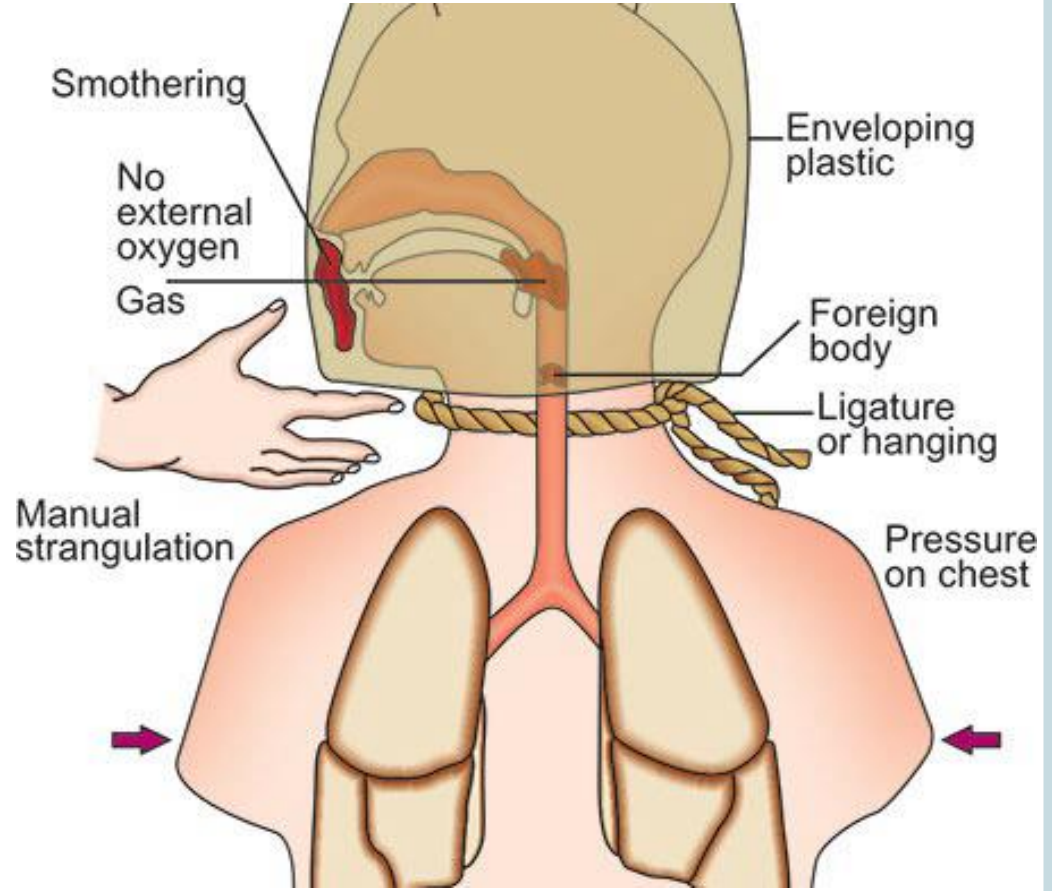
# ASPHYXIA



# VIOLENT ASPHYXIA

Types of Violent Asphyxia:

1. Smothering.
2. Choking.
3. Gagging.
4. Suffocation.
5. Throttling.
6. Strangulation.
7. Hanging.
8. Traumatic asphyxia.
9. Sexual asphyxia.



# 1. SMOTHERING



- A type of violent asphyxia due to manual obstruction of the external respiratory orifices (mouth and nostrils) usually by the hands or soft objects.

# CONDITIONS:



## Homicidal:

- Most commonly applied to old feeble persons, infants or unconscious victims who cannot resist.

## Accidental:

- Infants sleeping in prone position.
- It is common in alcoholics or epileptics who may fall or rollover in a mud or such other material.
- **Overlaying**: It is a form of accidental smothering of an infant by a nursing mother, sharing a bed with her child who may roll over during sleep and occlude the air passages.



# SMOTHERING POST- MORTEM PICTURE:



## A. General:

1. External & internal asphyxia signs.
2. Ventral hypostasis in cot death.
3. Signs of struggle or resistance (in homicide).

## B. Local:

1. Pallor around the mouth & nostril.
2. Semilunar nail abrasions & bruises at external respiratory orifices.
3. Bruises & contusion in the inner aspect of the lips, cheeks and gum.

## 2. CHOKING



- A type of violent asphyxia due to blockage of the internal respiratory passages, at level of pharynx, larynx or trachea. By a foreign object.
- Mechanisms of deaths:
- 1. airway obstructed by foreign body which may be (partial or completed) by laryngospasm or increased mucous secretion, with appearance of external and internal signs of asphyxia.
- 2. rapid silent death from vasovagal cardiac arrest (Reflex cardiac inhibition).

# CONDITIONS:

1- Pathological: angioneurotic edema of the glottis

2- Accidental:

- Inhalation of irritant fumes.
- Inhalation of dust and sand with resulting edema of the glottis or occlusion of the respiratory orifices.
- Accidental swallowed vomits or extracted teeth or blood clot after tonsillectomy.
- Falling back of the tongue in comatose patients.
- **Café coronary:** Choking occurs suddenly while eating. The obstructing foreign body will wedge into laryngopharynx & stimulate vagal nerve endings resulting in reflex cardiac arrest.

3- Homicidal: Rare; often occurs in infanticide by packing the infant pharynx with a piece of cotton or tissue.



(a)



(b)



# CHOKING POST- MORTEM PICTURE:



- A. General: External & internal signs of asphyxia
- B. Local: Foreign body in air passages.
- C. epileptic, tongue may show bite marks or bruising.

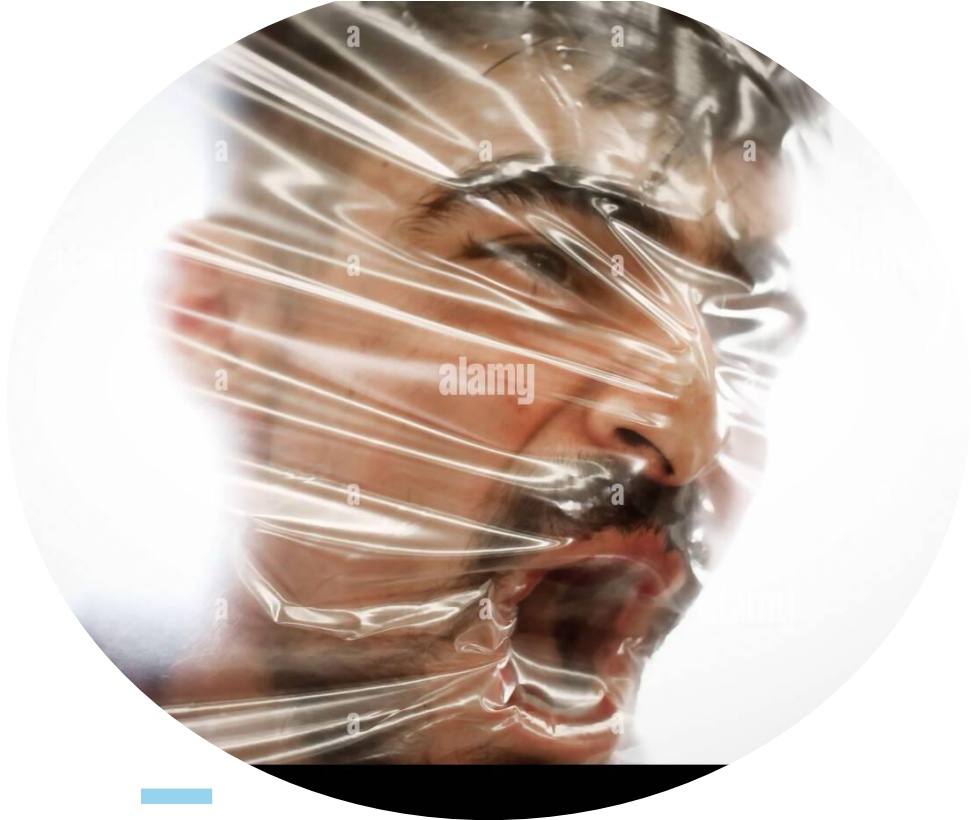


### 3. GAGGING



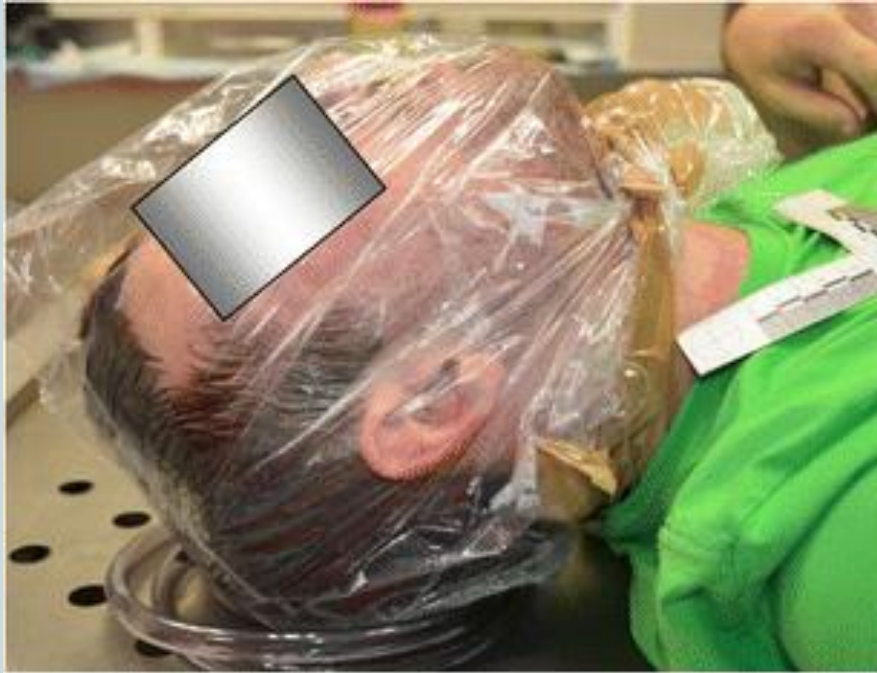
- Fabric or adhesive tape is used to occlude the mouth, in this case the nasal opening remains patent, air can enter, but later blocked by mucus and/or edema may lead to death.

## 4. SUFFOCATION



- It is a general term used to indicate death caused by reduction of the oxygen concentration in the atmosphere. Or from obstruction of the external air passage.
- Mechanism of death:
  1. Hypoxia
  2. reflex cardiac inhibition.

# CONDITIONS:



- Plastic bag suffocation: It may occur accidentally in children or deliberately in adults as a suicidal act. It may also be homicidal.
- The plastic bag becomes electrically charged and adheres to the face, aided by condensation. It is a common method of suicide among the elderly and debilitated individuals.

# SUFFOCATION POST-MORTEM PICTURE:



- A. The classical signs of asphyxia are almost always absent.
- B. It is very rare to find any petechial hemorrhages, as these are mainly due to venous obstruction, which is absent in suffocation.
- C. Congestion and cyanosis are often absent and the autopsy findings are essentially negative.



## 5. THROTTLING

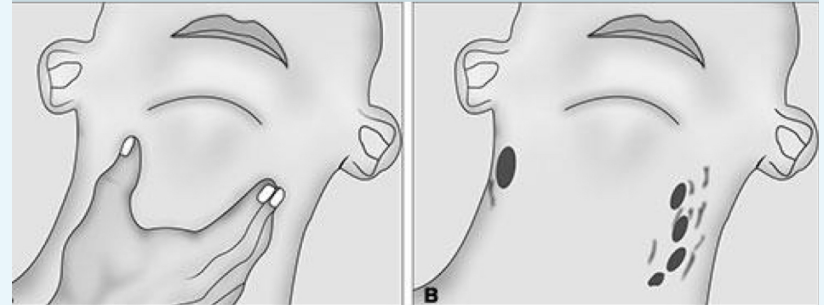


- A type of violent asphyxia in which the neck is constricted forcibly by the hands (performed by one or both hands from front or back).
- Pressure must be applied for at least 2 minutes to cause death
- **Mugging** is application of pressure to the neck by the arm
- Mechanism of death:
  1. Mechanical anoxia (chief cause).
  2. Reflex cardiac inhibition.
  3. Cerebral anemia (compressor carotid artery).
  4. Delayed edema of glottis.

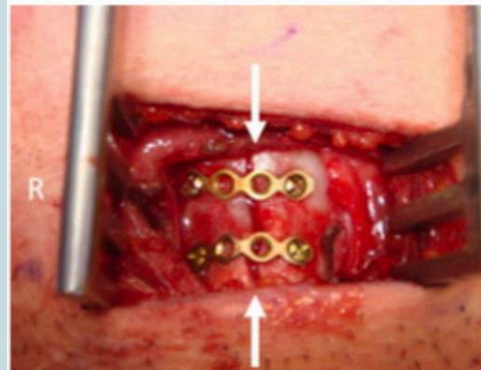
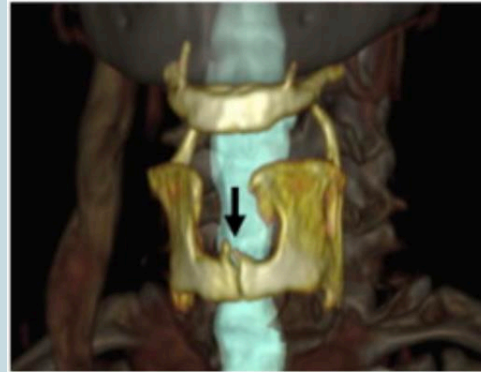
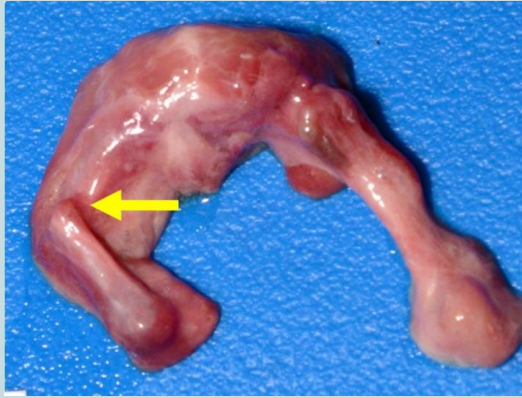
# CONDITIONS:



- Homicidal: It is a common mode of homicide of a man against a woman or less often a child by a man.



# THROTTLING POST- MORTEM PICTURE:



- General: External & internal signs of asphyxia
- Local:
  1. Semilunar nail abrasions & bruises on the front & sides of the neck.
  2. The most significant internal sign: extravasating of blood in subcutaneous tissue underneath the external marks.
  3. The most diagnostic finding: inward compression fracture of hyoid bone
  4. Damaged larynx and fracture or split of the thyroid cartilage.
  5. Fracture of cricoid cartilage.

## 5. STRANGULATION



- Definition: A type of violent asphyxia in which neck is constricted forcibly by a rope or any ligature (wire, electric cable, etc...) thus preventing air entry through respiratory passages.
- Conditions:
- 1- Homicidal: Most common.
- 2- Accidental:
  - Children playing with ropes
  - Strangulation of the fetus by the umbilical cord during labor.
  - Victim's clothing such as a necktie or scarf 'long-scarf syndrome' caught in moving machinery as a bicycle wheel

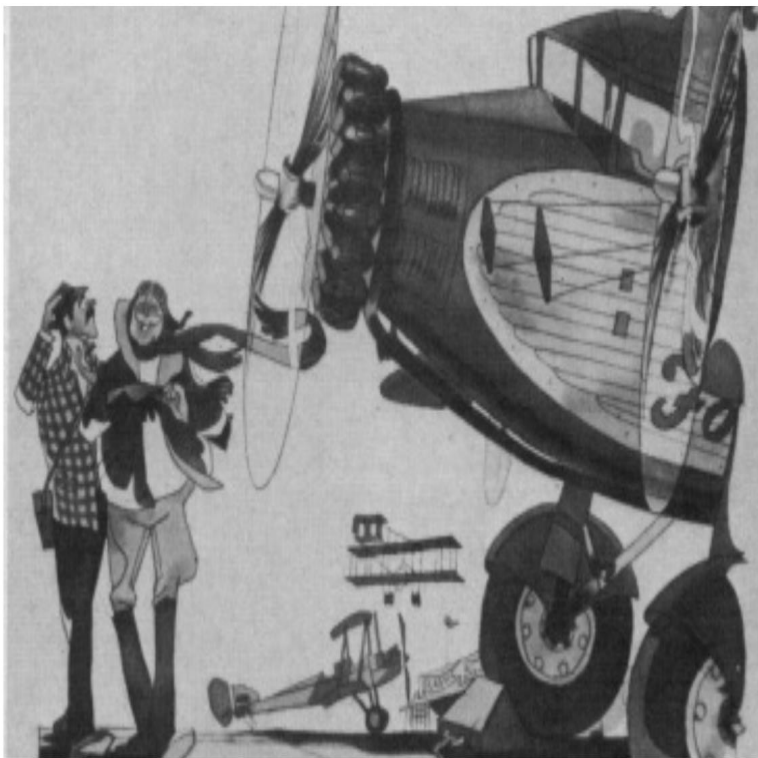


### 3- SUICIDAL:



- Rare but may be achieved by using:
  - Tourniquet mechanism (a solid object is applied to hold the rope then twisting it continuously)
  - Adhesive ligatures
  - Winding several firmly tightened turns of a rope around the neck before loss of consciousness.

Long-scarf syndrome



*Incaprettamento*



## **STRANGULATION POST-MORTEM PICTURE:**



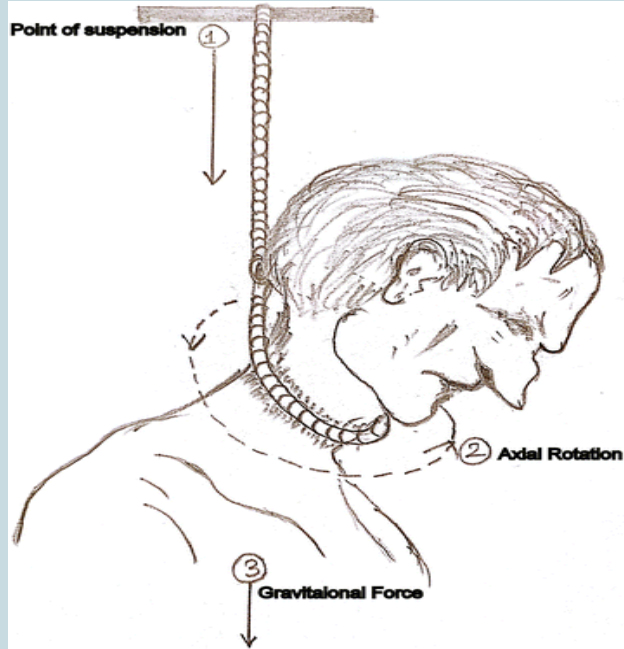
- A. General: External and internal signs of asphyxia.
- B. Local:
  - 1- Ligature mark: Formed of abrasions and contusions and surrounded by congestion, petechiae and hyperemia.
    - Takes the pattern and size of the ligature.
    - Well defined and deep if a wire or thin cord is used, diffuse and faint in case a soft fabric is used.
    - Transverse and located just below the laryngeal prominence.
    - Complete circle involving the whole circumference of the neck.
  - 2- There may be scratches and abrasions as a sign of resistance.
  - 3- Congestion and bruises of neck muscles.
  - 4- Fractures of the thyroid cartilage and the hyoid bone with inward displacement.

## **MECHANISM OF DEATH:**

- 1- Mechanical anoxia is the chief cause of death.
- 2- Reflex cardiac inhibition.
- 3- Delayed edema of the glottis.



## 6. HANGING



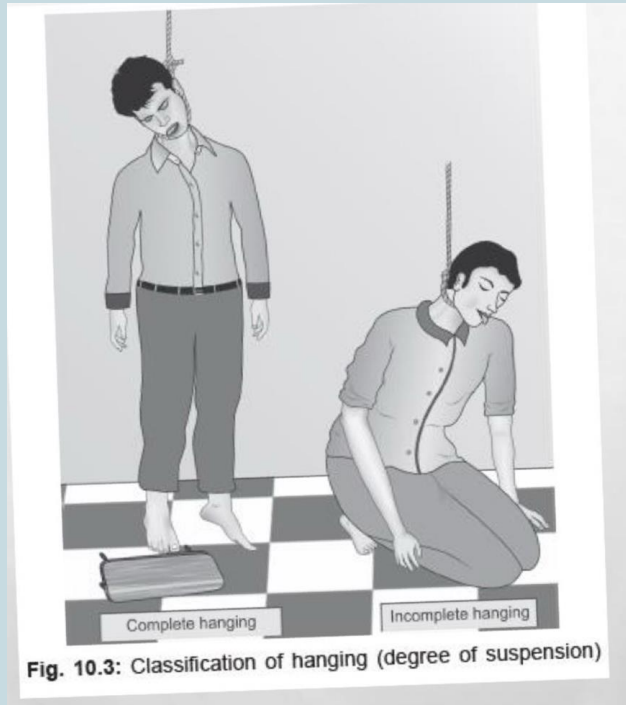
- Definition: It is a type of mechanical anoxia due to suspension of the body from the neck by a ligature. The constricting force is produced by the weight of the body.

# CONDITIONS:



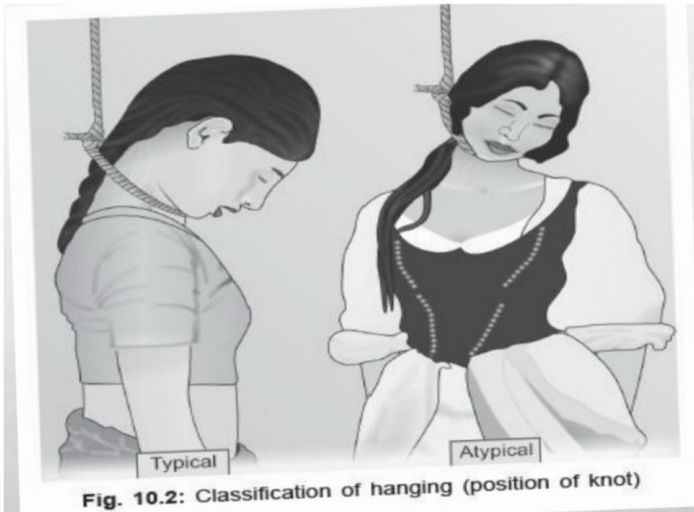
- 1- Suicidal: Self suspension hanging is the commonest form.
- 2- Accidental: Not common, occurs in children playing with ropes or falling men from scaffolding.
- 3- Homicidal: Very rare except in narcotized or unconscious victims.

# TYPES OF HANGING:



- Based on degree of suspension:
- Complete: if the body is freely suspended without touching the ground at any point.
- Incomplete: if any part of the body touches the ground; Almost always homicidal in nature.

## TYPES OF HANGING (KNOT POSITION):

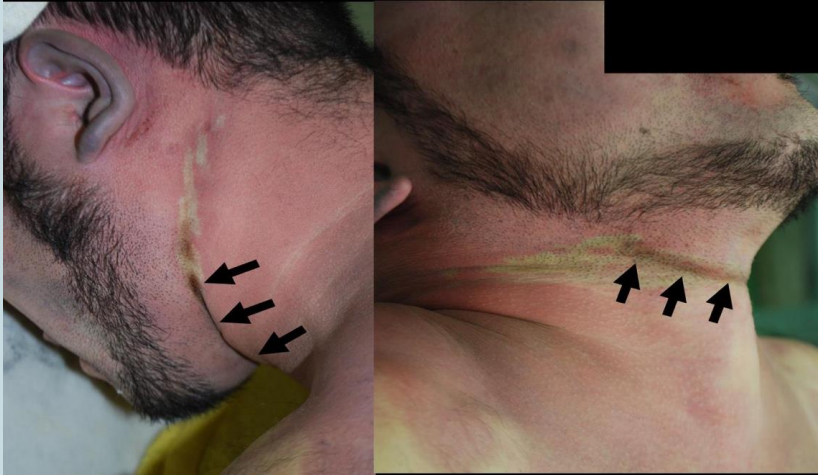


**Fig. 10.2:** Classification of hanging (position of knot)

- Typical hanging: Knot at the back of the neck.
- Atypical hanging: Knot anywhere other than the occiput.



## HANGING POST-MORTEM PICTURE:



- General:
  - 1- External and internal signs of asphyxia.
  - 2- Hypostasis in the lower parts of the body (lower limbs, hands, lower abdomen & genitalia).
  - 3- Engorged genital organs with ejaculation in males.
- Local:
  - 1- Ligature mark 'furrow':
    - Well-defined groove, slightly depressed. The base is red with congestion or ecchymosed margins.
    - Incomplete circle (absent at point of suspension in fixed knots).
    - Asymmetrical: deepest opposite the point of suspension.
    - Oblique and high up in the neck.
  - 2- Dribbling of saliva due to submandibular gland pressure.
  - 3- Neck muscles show bruises and lacerations.
  - 4- Carotid arteries show transverse intimal rupture.
  - 5- Outward fracture of hyoid bone or thyroid cartilage posterior horn.

# LIGATURE MARK COMPARISON (STRANGULATION VS HANGING):

Ligature mark	Strangulation	Hanging
1- Site	Low below larynx	High above larynx
2- Shape	Complete circle	Incomplete circle (except running noose/ double turns).
3- Direction	Transverse	Oblique
4-Compression	Symmetrical	Asymmetrical

- 1- Site: Low below larynx (Strangulation) vs High above larynx (Hanging)
- 2- Shape: Complete circle vs Incomplete circle (except running noose)
- 3- Direction: Transverse vs Oblique
- 4- Compression: Symmetrical vs Asymmetrical

# DIFFERENTIATION: ANTEMORTEM AND POSTMORTEM HANGING

Differentiation 10.1: Antemortem and postmortem hanging

S.No.	Feature	Antemortem hanging	Postmortem hanging
1.	Salivary dribbling mark	Present	Absent
2.	Fecal/urinary stains	May be present	Absent
3.	Ligature mark <ul style="list-style-type: none"> <li>• Direction</li> <li>• Continuity</li> <li>• Level in the neck</li> <li>• Parchmentization</li> <li>• Vital reaction</li> </ul>	Oblique Non-continuous Above thyroid Present Present	Circular Continuous At or below thyroid Absent Absent
4.	Knot	Single, simple, on one side of neck	Multiple, granny or reef type on occiput/chin
5.	PM staining <ul style="list-style-type: none"> <li>• Above ligature mark</li> <li>• In lower limbs</li> <li>• Glove-stockings like</li> </ul>	Present Present Present	Absent Absent Absent
6.	Evidence of injury <ul style="list-style-type: none"> <li>• Self-inflicted</li> <li>• Struggle</li> <li>• Tear of carotid artery intima</li> <li>• Imprint abrasion</li> </ul>	Present Absent Present Present	Absent Present Absent May/may not be present
7.	Elongation of neck	Present	Absent
8.	Cyanosis	Deeply positive	Absent or faintly present
9.	Emphysematous bullae on lungs	Absent	Present
10.	Point of suspension	Compatible with self-suspension	Not so
11.	Histochemistry of ligature mark	Increased serotonin and histamine	Not so

## MECHANISM OF DEATH:



- 1- Cerebral anemia: Most common, due to carotid stretch and narrowing causing rapid unconsciousness.
- 2- Reflex cardiac inhibition: Due to pressure on carotid sinus.
- 3- Mechanical asphyxia: Backward displacement of the tongue.
- 4- Tearing of the medulla: From fracture dislocation of cervical vertebrae.
  - Common with judicial hanging due to long drop (>2 meters)
  - Fracture dislocation most common between C2-C3.

## 7. TRAUMATIC (CRUSH) ASPHYXIA



- Definition: A type of mechanical asphyxia due to fixation of the chest and abdomen by external mechanical compression preventing respiratory movements.
- Conditions:
- 1- Accidental: Commonest causes:
  - Run-over traffic accidents.
  - Falling houses.
  - Crushing in crowds.

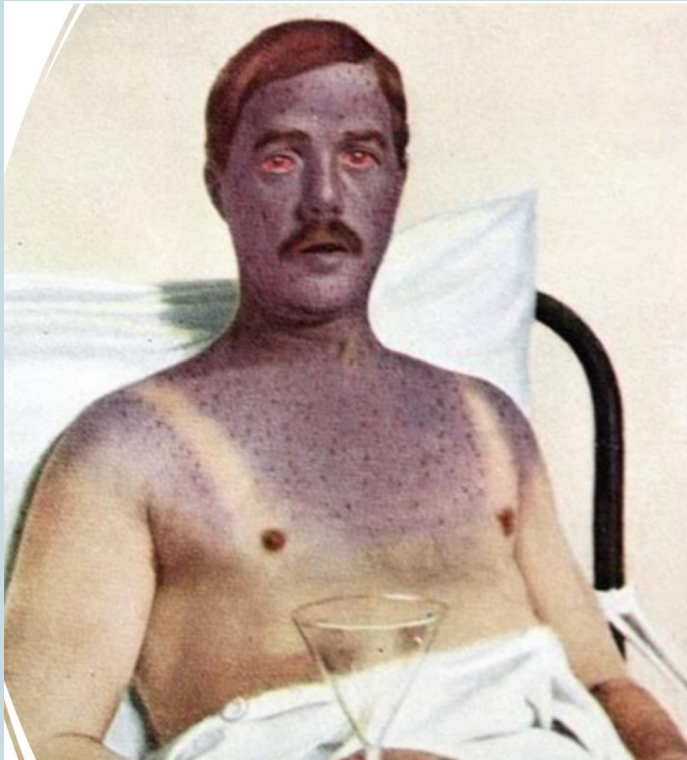


## 2- HOMICIDAL:



- Historical killing method 'Burking'.  
Mechanism of death:
- - 1- Mechanical asphyxia.
  - 2- Injury of vital organs.

## TRAUMATIC POST-MORTEM PICTURE:



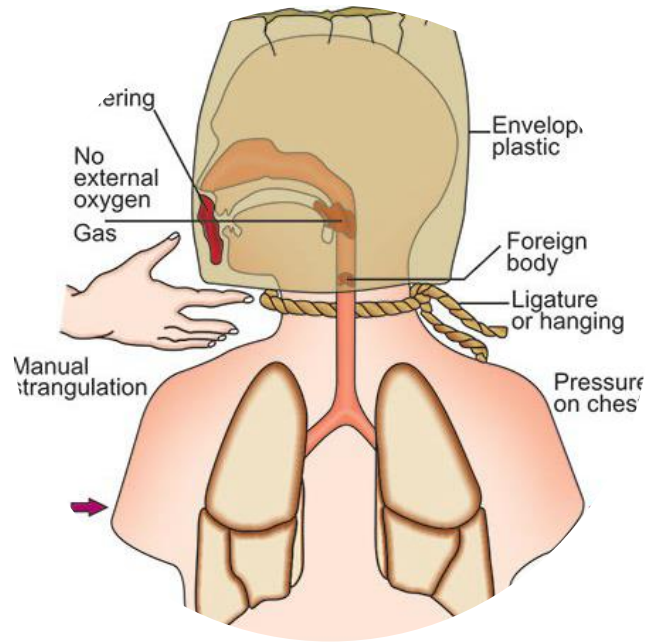
- 1- Most classic: Blue congestion of face, neck, and chest with pallor at compression sites.
- 2- Conjunctivae congested and hemorrhagic.
- 3- Local bruises and abrasions.
- 4- Internally, lungs are dark/heavy with petechial hemorrhages (Tardieu spots).
- 5- Other injuries: Rib fractures, sternum fracture, or rupture of heart/lungs.

## **8. SEXUAL ASPHYXIA**

- Death in sexual asphyxia is accidental self-induced; that happens suddenly during attempts of inducing hypoxia in order to reduce the blood supply to the brain; which appear to produce auto erotic hallucinations in some persons during the course of solitary sexual activity.

The condition is more common in males of any age. It usually occurs in isolated closed places. There may be evidence of transvestism, exhibitionism, mirrors, cameras, pornographic materials.

Many forms of violent asphyxias are applied as; smothering, strangulation, hanging or suffocation.



# THANK YOU

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