strangulation

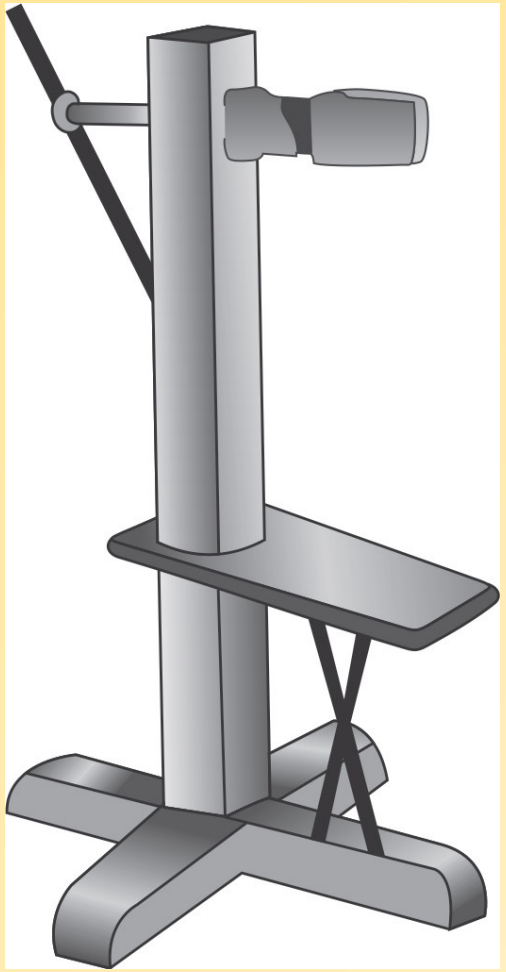
Definition: It is a form of violent asphyxial death caused by constriction of air passage at the **neck** by means of a ligature or by any means other than suspension of the body.

Classification

- **Ligature strangulation:** When ligature material is used to compress the neck.
- **Manual strangulation or throttling:** When human fingers, palms or hands are used to compress the neck.
- **Mugging:** Strangulation caused by holding the neck of the victim in the bend of elbow or knee of the assailant. It is an attack, usually from behind, and may leave no external or internal injury mark. It is also known as ***chokehold***. This hold is not permitted in wrestling, because of its danger.
- **Bansdola:** A bamboo or stick is placed across the back of the neck and another across the front. Both the ends are tied with a rope due to which the victim is squeezed to death. When a foot or knee is placed across the front of throat and pressed while the victim is lying on ground, same condition will follow. If a stick or foot is used, a bruise is seen in the center, across the trachea corresponding to the width of the object used.

Garroting: Strangulation is caused by compression of the neck by a ligature which is quickly tightened by twisting it with a lever (rod, stick or ruler) known as *Spanish windlass,* which results in sudden loss of consciousness and collapse .

Garroting as a mode of execution was practiced in Spain, Portugal and Turkey. An iron collar was tightened by a screw for strangulation.



Ligature strangulation

Cause of death

- *Asphyxia* due to elevation of the larynx and tongue
- closing the airway at pharyngeal level.
- *Cerebral anoxia* due to venous congestion.
- *Vagal inhibition.*
- Rarely, *fracture dislocation* of cervical vertebrae.

Postmortem findings

External Findings

1. **Face**

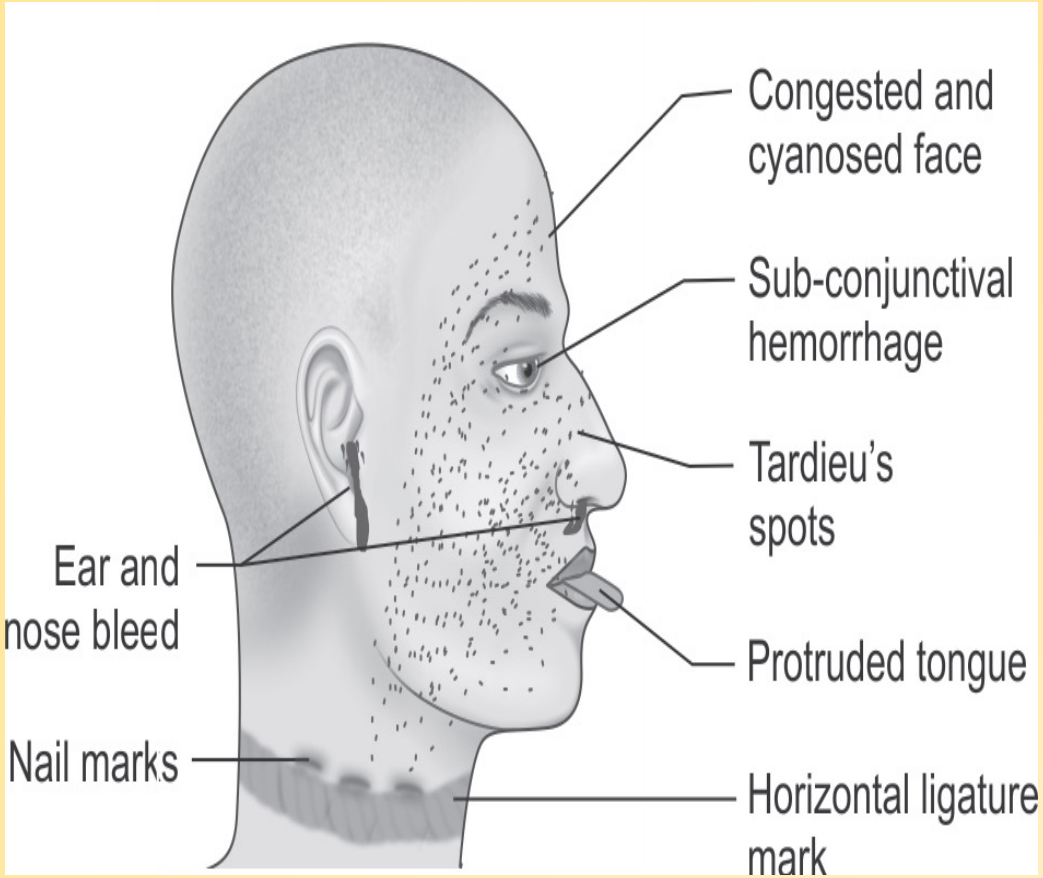
i. Face is congested, swollen and cyanosed. Petechial spots are present on the forehead, temples, eyelids and conjunctiva; **more abundant** than in hanging.

ii. **Eyes** are prominent, wide open, conjunctiva congested, pupils dilated and subconjunctival hemorrhages are present.

iii. Lips, fingernails and ear lobules are cyanosed; postmortem staining marked on the skin above the ligature.

iv. **Tongue** is swollen, dark colored, may protrude out of mouth, and bitten by teeth.

v. Bloodstained frothy fluid and mucus may escape from mouth and nostrils.



2. **Neck**

Ligature mark (‘furrow’)

- Ligature mark is a well-defined groove, which is slightly depressed and of same width as that of ligature material. Groove may be narrow at parts due to folding of ligature.
- The furrow is usually *horizontally placed* across the middle or lower part of neck, at or below the level of thyroid cartilage. The mark is transverse, circular and continuous.
- Mark, though completely encircling the neck horizontally, is more prominent on the front and sides, than on the back of the neck (as the underneath skin is thick).
- The base of the furrow is usually red, accompanied with congested or ecchymosed margins. Base may show imprint pattern of the ligature material used.
- It may be very indistinct or altogether absent, if the ligature was soft and broad, and was removed soon after death, and may need to be examined under UV light.
- Sometimes, a narrow cord or electric wire may be used, the so called ‘*cheese cutter method*’, the ligature mark may appear deeply embedded, and on removal, a deep groove may be seen in the skin.
- Mark may be oblique as in hanging, if the victim has been dragged by a cord, after being strangled in a recumbent posture.

Internal Findings

Neck

i. Bruising of the subcutaneous tissue and muscles of neck, especially underneath the ligature and knot. There may be bruising or laceration of the sheath of carotid arteries.

ii. Injury of hyoid bone is not commonly noticed, because the level of constriction is well below, and traction on the thyrohyoid ligament is negligible.

iii. Fracture of thyroid cartilage, one or both the superior horns may be seen.

iv. Subcapsular and interstitial thyroid hemorrhages are common.

v. Fracture of cricoid cartilage is less common.

vi. Rings of trachea may sustain fracture when considerable force is applied.

vii. Bruising of the root of the tongue and floor of the mouth may occur.

viii. Lymphoid follicles at the base of the tongue and the palatine tonsils are congested.

ix. Mucous membrane of the pharynx, pyriform sinuses, epiglottis and larynx usually show areas of hemorrhagic infiltration.

x. Larynx, trachea and bronchi are congested, and contain frothy, often bloodstained mucus.

xi. Fracture/dislocation of cervical vertebrae is not common, may occur in infants if associated with twisting of the neck.

Other Findings

- i. **Lungs** are congested, edematous with numerous subpleural petechial hemorrhages.
- ii. **Brain** is congested with petechiae in white matter.
- iii. All other organs are congested

Q. Whether death was caused by strangulation?

- General asphyxial features of death are present.

The findings in the head and neck are strongly presumptive of strangulation, which is confirmed by ligature mark on the neck.

- In absence of ligature mark in neck or deeper injury, it will be difficult to form an opinion, except from circumstantial evidence.
- The mere presence of cord or ligature around the neck of a dead body does not confirm the diagnosis, for it may be put around the neck for a malicious purpose.
- Strangulation by ligature has to be differentiated from hanging.

Q. Whether the strangulation was suicidal, homicidal or accidental?

Suicidal strangulation

- Suicide by strangulation is rare. The victims employ various methods of tightening the ligature, but the person can apply a single or double knot before consciousness is lost.
- In suicidal strangulation, signs of venous congestion are very well-developed above the ligature and are especially prominent at the root of tongue.
- The ligature should be found *in situ*; body should not show any signs of violence or marks of struggle. Laryngeal fractures are rare, and injuries are mild and often confined to the single ligature mark around the neck.
- Detailed examination of the scene and of the deceased person, along with circumstances leading to the death should be investigated.

Homicidal strangulation: Strangulation should be assumed to be homicidal, until the contrary is proved.

Many of the victims are women, and frequently, strangulation in them is associated with sexual intercourse.

Homicide is suspected when:

- There are two or more firm knots, each on separate turns of the ligature.
- Abrasions and fingernail marks are seen.
- The clothing of the victim is torn or disarranged, indicating that a struggle has taken place.
- The ligature when removed is loose.

Sometimes, homicidal strangulation is feigned by an individual to bring a false charge against his enemy.

Hysterical women sometimes feign it, without any obvious motive.

Accidental strangulation

- Accidental strangling may occur in uterus, when the movement of fetus causes the umbilical cord to encircle the neck.
- Children may get entangled in ropes during play or strangled in their cots.
- Persons under the influence of alcohol, epileptics and imbeciles may be strangled either by a tight scarf or collar or necktie.

Incaprettamento is a homicidal ligature strangulation used by the Italian mafia. While the victim is in the prone position, he/ she is bound by one end of a rope, creating a slipknot around the throat, while the other end is used to tie the limbs behind the back. The death is caused by self-strangulation, since it is impossible to maintain the legs in this forced position.

Accidental ligature strangulation may occur in the **'long-scarf syndrome'** in which a clothing around the victim's neck (scarf or '*chunni/dupatta*') becomes entangled, usually in a stationary or moving mechanical device (e.g. rickshaw or scooter wheel), and the clothing becomes increasingly constricted owing to the continued action of the machine.

Pseudo or False Strangulation Groove

. Sometimes, marks are seen on the neck of dead infants or children. Infants have short neck, and these marks are produced from folds in the skin due to bending of the head.

. They are also seen in decomposed bodies with tight collars, buttoned shirt at the neck or a necklace around the neck.

Throttling or Manual Strangulation

Definition: Asphyxia produced by compression of the neck by human hands.

Cause of death

i. *Asphyxia* from obstruction of respiration.

ii. *Cerebral anoxia* from interference with cerebral circulation.

iii. *Vagal inhibition* from pressure on carotid nerve plexus consisting of fibers of vagus, sympathetic and glossopharyngeal nerves.

About half of the deaths are due to vagal inhibition.

Pressure must be applied for 2 minutes (min) or more to cause death.

Postmortem findings

. **The external signs** are abrasions and bruises on the front and sides of the neck, and are commonly at each side of the laryngeal prominence and just below the jaw-line.

The injuries may extend onto the upper part of the sternal area.

. When pressure is prolonged, the classical signs of asphyxia may be seen—cyanosis, edema and congestion of the face, PETECIAL spot in the eyes and face, and sometimes bleeding from nose and ears.

. The tips of the fingers produce bruises. They may be oval or round and 1.5–2 cm in size (may be more in case of continued bleeding).

Presence and extent of fingertip bruising and nail scratch abrasions will depend upon:

i. Relative position of victim and assailant.

ii. Manner of grasping of neck, whether from front, back or sides.

iii. Amount of pressure exerted.

iv. Whether single or both hands have been used.

v. Sex, age, condition of vessels, and nutrition of individual.

vi. Condition of nails of assailant.

Important to note that:

. Bruises made by tips of thumbs are more prominent than with other fingers.

. Multiple abrasions on the neck may also result from use of victim's hands in an effort to dislodge the assailant's grip.

These curvilinear marks commonly lie close to areas of bruising and are often horizontally orientated. If these are from the assailant, they are usually vertical .

External Findings

i. **If the assailant uses single hand from front:**

Thumb will be applied on one side and other fingers on opposite side of neck. A grip from right hand produces a bruising due to bulb of pressing thumb over the cornue of hyoid/thyroid on anterolateral surface of right side of victim's neck and several fingertip bruising marks and overlying nail scratch abrasions over left side; being directed obliquely downwards and outwards, usually one below the other.

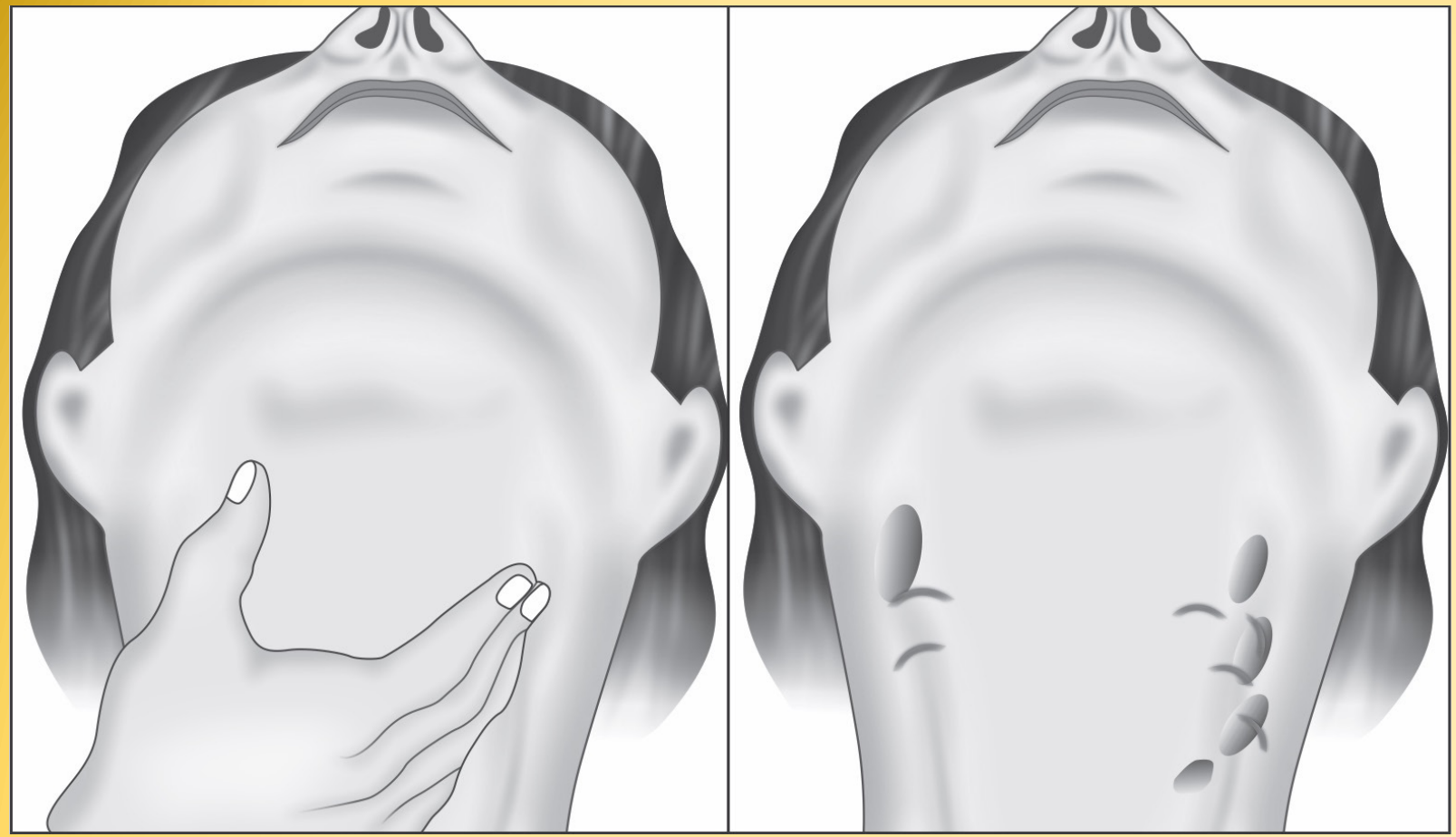
Concavities of nail markings and their direction will indicate the relative position of victim and assailant.

If the assailant uses both hands: When both hands are used,
evidence of pressure of thumb mark of one hand and finger marks of other hand are usually found on either side of throat. In case of grip from behind,
the pressure is applied all around the neck, but some areas of bruising will be more prominent than others, because of pressing fingertips.

. Because of struggle and resistance, marks of bruising and abrasions may be found over the face, nostrils, lips, chin, cheeks, forehead and lower jaw of the victim.

These can also be caused in an effort to stop the victim from shouting or crying for help.

. It is, therefore, important to examine the nails of the victim and fingernail scrapings of the alleged assailant when possible,
so that these can be compared with tissue type of the victim.



Internal Findings

i. Extravasation of blood in subcutaneous tissues underneath the external marks of bruising and abrasions is the *most significant internal sign*.

ii. Tear/laceration of platysma or sternomastoid muscles may be seen.

iii. Tongue may be bruised/lacerated, may protrude out and bitten by teeth.

iv. Hemorrhages, varying from pinpoint ecchymosis to extensive extravasation may be found in mucous membrane of larynx, epiglottis, pharynx and peritonsillar region.

v. *Inward compression fracture of hyoid bone* is the most **diagnostic finding of throttling**

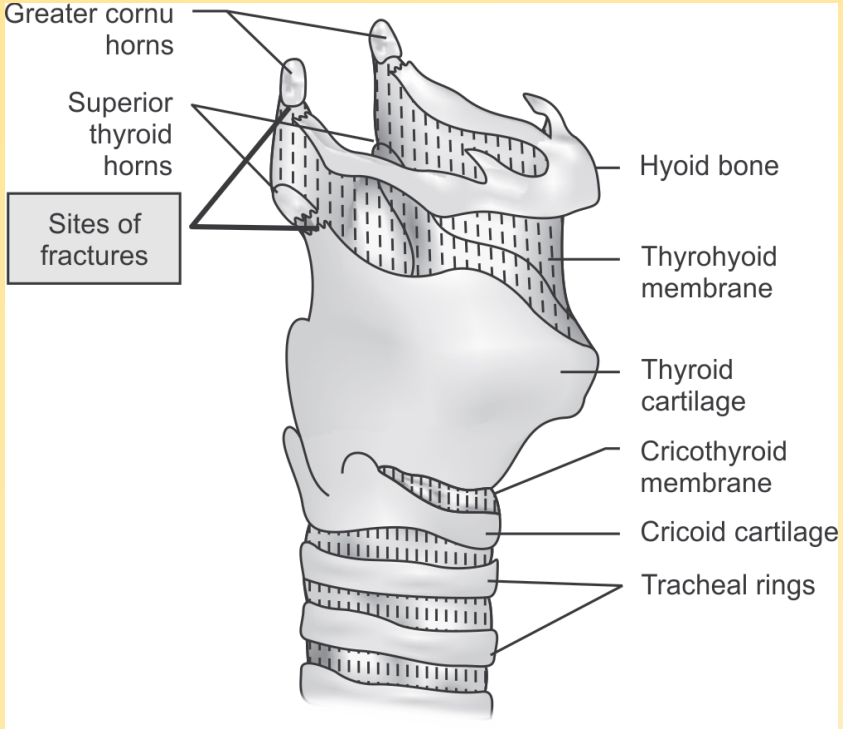
vi. Fracture of superior horns of thyroid cartilage is common, though both horns do not get fractured simultaneously.

Fractures of the superior horn of thyroid cartilage are not limited to fatal neck compression. Direct blunt trauma (e.g. motor vehicle impact or fall from height), resuscitation and poor autopsy technique can lead to this injury.

vii. Ribs may be fractured, if murderer, knees on the chest of the victim.

viii. There may be laceration of carotid sheath and tear of inner coat of carotid artery.

ix. Cricoid is usually not fractured



Medico-legal Questions

Q. Whether death was due to throttling?

Diagnostic signs are:

i. Bruising and abrasions on face and neck with or without rupture of neck muscles.

ii. Engorgement of tissues at and above the level of compression.

iii. Fracture of thyroid cartilages and hyoid bone.

iv. General signs of asphyxia.

v. Fracture of cricoid is almost pathognomic of throttling.

Q. Whether throttling was suicidal, homicidal or accidental?

- **Self-throttling** is impossible, because as soon as unconsciousness supervenes, the hand will relax and the grip will be released.
- **Homicidal throttling:** *Common mode of homicide* as the hand is immediately available, and method of choice in infants.

Victims are usually infants, children or women (associated with sexual assault). In adults, signs of struggle are usually present, but if throat is seized firmly and compressed, victim cannot struggle.

Adults can be throttled when under the influence of drugs/drinks or stunned or taken unaware.

If contusions and fingernail abrasions are present on neck, the presumption must be of homicide.

- **Accidental throttling:** Sudden application of one or both hands on a person's throat as demonstration of affection, in joke or as a part of physiological experiment may cause death due to vagal inhibition.

Q. How much force an assailant could have used?

. If there is damage to neck structures, it indicates use of considerable force and is indicative of intent to injure, if not to kill.

. It there is fracture of hyoid bone/larynx, it indicates use of appreciable force and is homicidal in nature.

. Minor damage or absence of damage to the neck structures can kill, e.g. karate blow If only slight changes are seen in neck structures, a guarded opinion should be given about the probable degree of force used.

The amount of force required to compress neck structures is estimated as— jugular vein: 2 kg, carotid artery: 5 kg, trachea: 9 kg and vertebral artery: 30 kg. This implies that venous flow is decreased before arterial and airway obstruction occurs. For fractures of thyroid cartilage lamina: 14.3 kg and cricoid cartilage: 18.8 kg force is required.

Hyoid Bone Fractures

Fracture of the hyoid bone occurs in 50–70% of cases in subjects above 40 years of age and can be classified as:

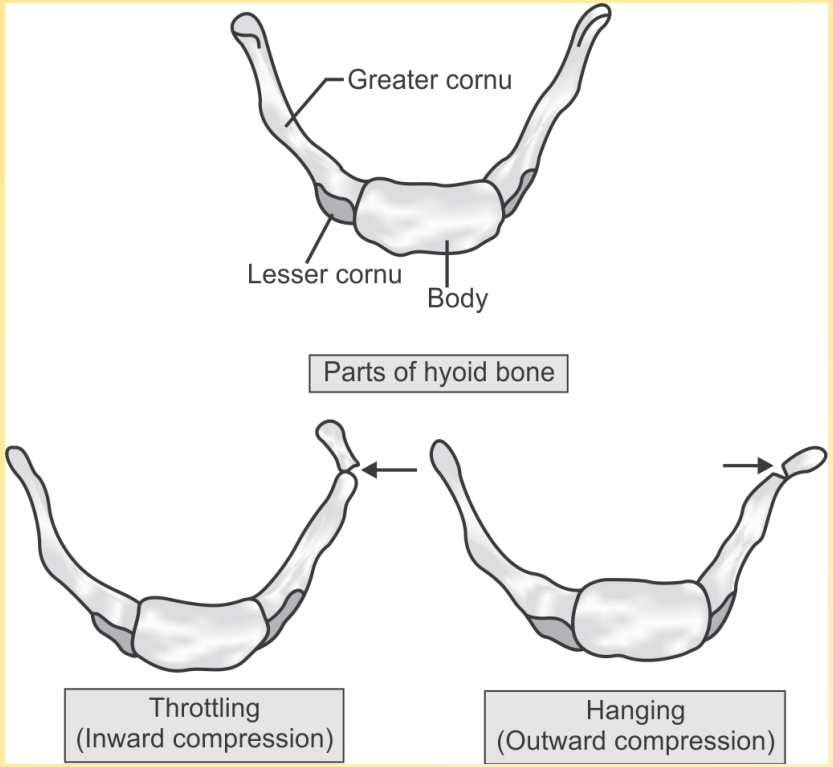
Inward (Side-Wise) Compression Fractures

. They are seen in cases of *throttling*, as the fingers of the grasping hand squeeze the throat, the greater cornu of hyoid are compressed inwards causing fracture of the bone with tear of its periosteum on the outer side and not on the inner side, Displacing the fragment inwards

. This type of fracture can occur on both sides.

. A similar fracture may be seen at the joint between the greater cornu and body of hyoid.

Demonstration: If the body of hyoid is grasped in one hand, and the distal fragment between the finger and thumb of the other hand, the distal fragment can be easily bent in inward direction, but outward movement is limited to normal position only.



Anteroposterior Compression Fractures

. It is seen in *hanging*; due to anteroposterior compression, hyoid bone is driven directly backward, divergence of greater cornu is increased causing fracture with outward displacement of the posterior fragment.

As a result, periosteum on inner side of fracture is torn when the fragment can be easily moved outwards, but inner movement is limited to normal position only

. This type of fracture can also occur in the greater cornu at its junction with the body, and it may be bilateral.

. They are also seen in ligature strangulation, run over motor vehicle accident and blows on front of neck by any means, e.g. rods, foot or stick.

Avulsion or Traction or Tug Fracture

It occurs due to hyperextension of the neck or muscular overactivity, as a result of traction on thyrohyoid ligament either by downward or lateral compression or when direct pressure is exerted between hyoid and thyroid by pressing fingers.

The hyoid is drawn upwards and held rigid.

It may be noted that:

. Cartilaginous separations between the greater cornu and body, joints between lesser cornu and body, or the presence of incomplete bony union of hyoid parts should not be mistaken for fractures.

. A hyoid fracture should not be diagnosed as antemortem in origin, if there is no recent hemorrhage at alleged traumatized site.

Chronic alcoholics are predisposed to hyoid fracture.

Fractures of the hyoid can also be seen in natural deaths, presumably from intense muscle contractions during the agonal stages or following violent coughing.

suffocation

Definition: It is a form of asphyxia caused by mechanical obstruction to the passage of air into the respiratory tract *by means other than constriction of neck or drowning.*

Classification

i. Smothering

ii. Choking

iii. Gagging

iv. Overlying

v. Traumatic asphyxia

vi. Burking

i. Smothering

Definition: It is a form of asphyxia caused by mechanical occlusion of external air passages, i.e. The nose and mouth by hand, cloth, plastic bag or other material.

Postmortem findings

i. Abrasions and bruises around the mouth and nostrils. These may not be seen, if soft materials, like cloth or pillow has been used.

ii. Injuries on the inside of the lips from pressure of teeth are seen.

iii. PALLOR AROUNDTHE MOUTH AND NOSTRILS.

IV. Bruising of gums or sometimes tears of delicate tissues are seen.

These findings may be missed, unless looked for.

Medico-legal aspects

. Accidental smothering is common in alcoholics or epileptics who may fall or roll over in a heap of mud or such other material.

. After birth, an infant may die from smothering, if he is born with membranes covering the nose and mouth (*cul-de-sac*).

. Children may get smothered while playing with plastic bags over the face or head.

ii. Choking

Definition: It is a form of asphyxia caused by an obstruction within the air-passages by a foreign object, like coin, fruit seed, toffees, candies, fish or any other material.

In an epileptic attack, tongue may fall back on to posterior pharyngeal wall causing choking.

The phases of acute fatal airway obstruction are:

i. Penetration of the object into the airway.

ii. Obstruction of the airway.

iii. Failure to expel once the obstruction has occurred.

Mechanism: Initially, there is stridor, respiratory distress, coughing and the inability of the victim to speak. This is followed by a rapid, deep inhalation, which causes the foreign object to pass further down the airway. Laryngospasm occurs, followed by vagal stimulation, leading to arrhythmia, apnea and death.

Cause of death

i. Asphyxia.

ii. Vagal inhibition.

iii. Laryngeal spasm.

iv. Delayed death from pneumonia, lung abscess or bronchiectasis.

Postmortem findings

i. Signs of asphyxial death. Subconjunctival hemorrhages without cutaneous petechiae may be seen.

ii. Presence of food items or foreign body in respiratory tract. The food items are usually round and firm, yet pliable to allow molding in the airway.

iii. In an epileptic, tongue may show bite marks or bruising.

Medico-legal aspects

Most choking deaths are accidental; suicide and homicide are rare.

. Accidental choking deaths are common in children < 1 year of age. Ninety percent of choking deaths happen before the age of 5 years.

. Homicidal choking usually involves the aged,individuals debilitated by disease, alcohol or drugs, and infants. When objects are forced into the mouth, signs of a struggle, if the individual was conscious, may be noted. Perioral, teeth, tongue and other intraoral injuries can result.

. Suicidal choking is uncommon, and may occur in psychiatric patients and prisoner

Café-coronary

This is a condition of *accidental choking* where in a bolus of food produces complete obstruction of the larynx.

. It is called so, because it mimics a heart attack and is usually seen in an intoxicated restaurant patron.

. The term, ‘cafe coronary’, was coined by *Dr Roger Haugen* (Medical Examiner, Broward County, Florida) in 1963.

Causes

. *Predisposing factors* include a decreased protective airway reflex, resulting from aging, poor dentition, tendency to swallow food , alcohol consumption, and ingestion of large doses of tranquilizers and other CNS depressants impairing the gag reflex.

. Reflex cardiac arrest from ‘vagal inhibition’ as a consequence of stimulation of laryngeal nerve endings.

Clinical findings: Victim who was apparently healthy, collapses suddenly turning blue while eating at a dining table.

Treatment (for choking)

i. If there is difficulty in breathing and cyanosis, give first aid by application of pressure on the abdomen (Heimlich maneuver) till the patient recovers or loses consciousness.

ii. A blow on the back or on the sternum may cause coughing and expel the foreign body.

iii. The victim is placed in a supine position and the mouth is opened to perform a finger sweep.

iv. If this is not successful, the foreign body should be removed from hypopharynx with the middle and index fingers or with forceps.

v. If the object cannot be removed, the person may need a tracheotomy/ cricothyrotomy

Postmortem Findings

Bolus of unchewed food or such material is found impacted in larynx or trachea. A litmus paper test of the bolus can be made to determine the acidity to as certain its origin (mouth or vomitus).

Medico-legal Aspects

It is a case of accidental death (asphyxia) as opposed to natural, so additional insurance claims can be made.

‘Creche coronary’: Choking occurring in children aged 1–3 years as they are more vulnerable because of their increased mobility, putting inappropriate small objects in their mouth or appreciate the size of a piece of food, small airways, inadequate dentition for chewing and weaker cough reflex.

gagging

Definition: Gagging is a form of asphyxia which results from pushing a gag (rolled up cloth or paper balls) into the mouth, sufficiently deep to block the pharynx.

It combines the features of smothering and choking.

Initially, the airway may be patent through nose, but collections of saliva, excessive mucus with edema of pharynx and nasal mucosa causes complete obstruction.

Postmortem findings

i. Same as choking.

ii. Injuries to nose and mouth with seepage of blood into the back of throat.

Medico-legal aspects

. Almost always homicidal, and the victim is usually an infant or an elderly person.

. Gagging is usually resorted to prevent the victim from shouting for help; death is usually unintended.

. Gags have been used to suppress screams by victims using a painful method of suicide (e.g. selfimmolation).

overlaying

Definition: Overlaying or compression suffocation results from compression of the chest, nose and mouth, so as to prevent breathing.

. 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.

. Ethanol intoxication or a medical condition can be a factor depressing an arousal response in the older bed-sharer.

Postmortem findings: Face, nose and chest of victim child may appear compressed and pale. Pressure marks from bedding or clothing may be seen on the victim, but these can happen postmortem. Usual findings of asphyxia will be seen along with intrathoracic petechiae.

Medico-legal aspects

. Purely accidental in nature.

. It may also be a case of infanticide.

. These cases are likely to be victims of sudden infant death syndrome (SIDS).

Traumatic or Crush Asphyxia / Perthes Syndrome

Definition: Asphyxia resulting from respiratory arrest due to mechanical fixation of chest, so that the normal movements of chest wall are prevented.

Causes

i. Due to house collapse, accidentally or in wars/ earthquake.

ii. Stampede by crowd, running in panic, e.g. Due to outbreak of fire in a movie hall/mall/public gathering.

iii. Run over by a vehicle or overturned vehicle (especially tractors).

iv. Collapse of wall inside a mine or trenches (cave-in), in bunkers of sand or grain.

v. When held between the buffers of two bogies of a train.

vi. Restraint of suspects by *hogtying* practiced in some States in the US by police.

Mechanism: The essential feature is fixation of the thorax by severe compression or external pressure that prevents respiratory movements. An individual can die in seconds if there is considerable weight, but usually at least 2–5 min elapse before death ensues.

Postmortem examination

External findings

Characteristic features seen are:

i. **Masque ecchymotique** refers to the classical appearance of:

a. Florid red or blue congestion of face and neck with variable involvement of the upper thorax, back and arms.

b. Deep cyanosis of face.

c. Numerous petechial hemorrhages or ecchymoses.

d. **Demarcation line:** Level of compression is indicated by a well-defined demarcating line between the discolored upper portion of body and the lower normal part.

ii. Areas of pallor seen at the level of collar of shirts, folds or creases in the garments.

iii. Facial edema.

iv. External blunt trauma injuries can be seen on the head, neck and chest along with mud or other foreign material.

Internal findings

- **Eyes: Purtscher's retinopathy** (retinal hemorrhages).
- **Face:** Nose, ear or pharyngeal petechiae/ecchymoses that may result in external bleeding—mimic a basal skull fracture.
- **Bones:** Rib and clavicle fractures are common; extremity and pelvic fractures may be seen.
- **Upper respiratory tract:** Edema, epiglottic and laryngeal petechiae.
- **Lungs:** Congested, heavy, subpleural petechiae; contusions/lacerations and hemo-/pneumothorax may be present.
- **Heart:** Right heart and veins above aorta may be distended, injuries are rare.
- **Abdomen:** Hepatic and splenic lacerations may be found.
- **CNS:** Edema and petechiae can be seen.

Medico-legal aspects

Mostly accidental, but fallen appliances or furniture particularly over children has been described as a means of homicide.

In survivors, discoloration disappears within a few weeks and does not undergo the color changes seen with the healing of bruises.

The color is not altered by the administration ofm oxygen. Petechiae disappear within days, but subconjunctival ecchymoses can

persist for weeks, eventually fading to yellow and disappearing.

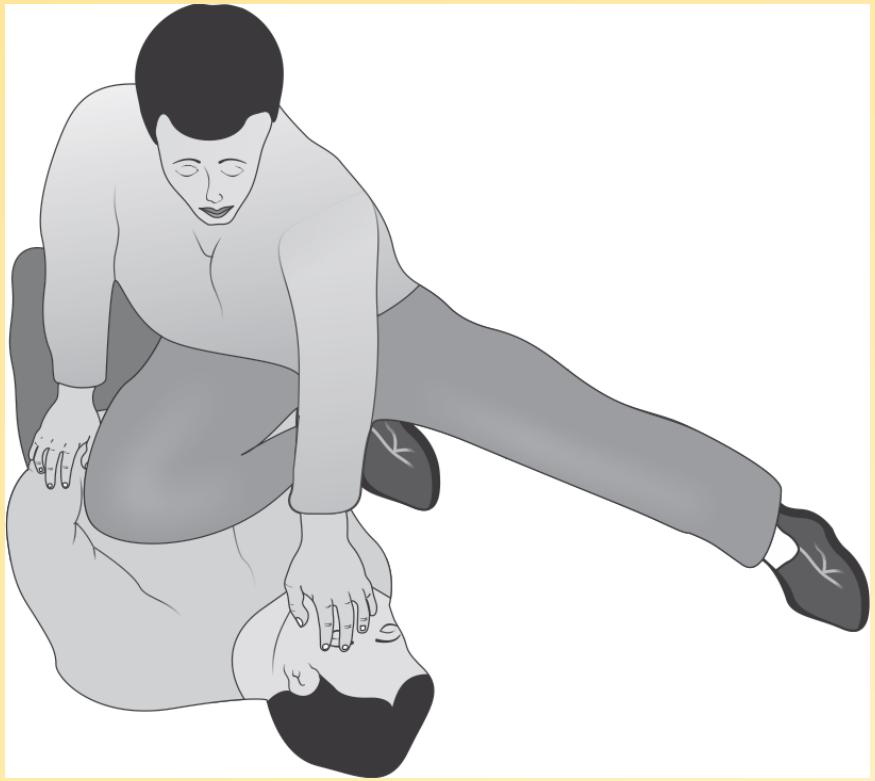
Mechanism of masque ecchymotique: Retrograde displacement of blood from superior vena cava into the subclavian veins and veins of the head and neck results from sudden compression of the chest or abdomen. Valves in the subclavian veins prevent the spread of hydrostatic force to the veins of upper limbs. But, the displacement of the blood into the valve-less veins of the head and neck causes rupture of distal capillaries. Therefore, face and neck of the victim are deeply cyanosed; eyes bloodshot and numerous petechiae over scalp, face, neck and shoulders are seen.

vi. Burking

. It is a combination of homicidal smothering and traumatic asphyxia.

. *William Burke* and *William Hare* killed 16 persons during 1927–28 in Scotland and sold their bodies to Dr Robert Knox for use as specimens in his anatomy classes in Edinburgh Medical School, in what became known as the case of the *Body Snatchers* (West Port murders).

 Method: A victim was invited to their house and given alcohol. When drunk, he was thrown on the ground. Burke would kneel or sit on the chest and close the nose and mouth with his hands, and Hare used to pull him around the room by the feet till he is dead.



Plastic bag asphyxia results from decreased oxygen concentration in the available inspired air, and physical obstruction of the mouth and nose. 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. It can also be seen in autoerotic asphyxia, drug misadventure—volatile inhalants (e.g. chloroform or propane), inhalation of volatile hydrocarbons (e.g.trichloroethane) or accidental deaths in children.

Wedging is a form of mechanical asphyxia in which the face, neck or thorax is compressed between two firm structures.
It is common in 3–6 months old children when they start to move to the corners of beds and cribs, but they do not have the muscle development to free themselves out of a wedged position.
They become wedged between the mattress and either the wall, bed frame, a piece of furniture, mesh or another mattress.

Confined space entrapment: It occurs when there is inadequate oxygen in the enclosed space due to consumption or displacement by other gases. The mechanism of death is usually attributed to asphyxia from oxygen deprivation. Injuries identified at autopsy and damage to the inside of the structure indicate struggle to exit the Cabinet. There are no specific autopsy findings or significant natural disease processes, and toxicology studies are negative