

MINISTRY OF HEALTH OF UKRAINE
POLTAVA STATE MEDICAL UNIVERSITY
DEPARTMENT OF THE GENERAL SURGERY WITH PATIENT'S CARE

The closed damages of soft tissues, skull, chest and abdomen

Lecture for general surgery
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Poltava

Trauma

- **Trauma** is “the forgotten epidemic” & “the neglected disease of modern society”
- The 3rd most common cause of death overall.
- It is the leading cause of mortality and disability during the 1st. 4 decades of life.
- It kills and disable hundred of thousands of individuals annually.

Soft-tissue injuries

- ◆ Many activities can lead to soft-tissue damage of muscles, ligaments, and tendons. The result can be pain, swelling, bruising, and damage.

Soft-tissue injuries are classified as the following:

- ◆ Contusions (bruises)
- ◆ Sprains
- ◆ Ruptures
- ◆ Crush syndrome

Athletes and non-athletes share many similar soft-tissue injuries.

Contusion

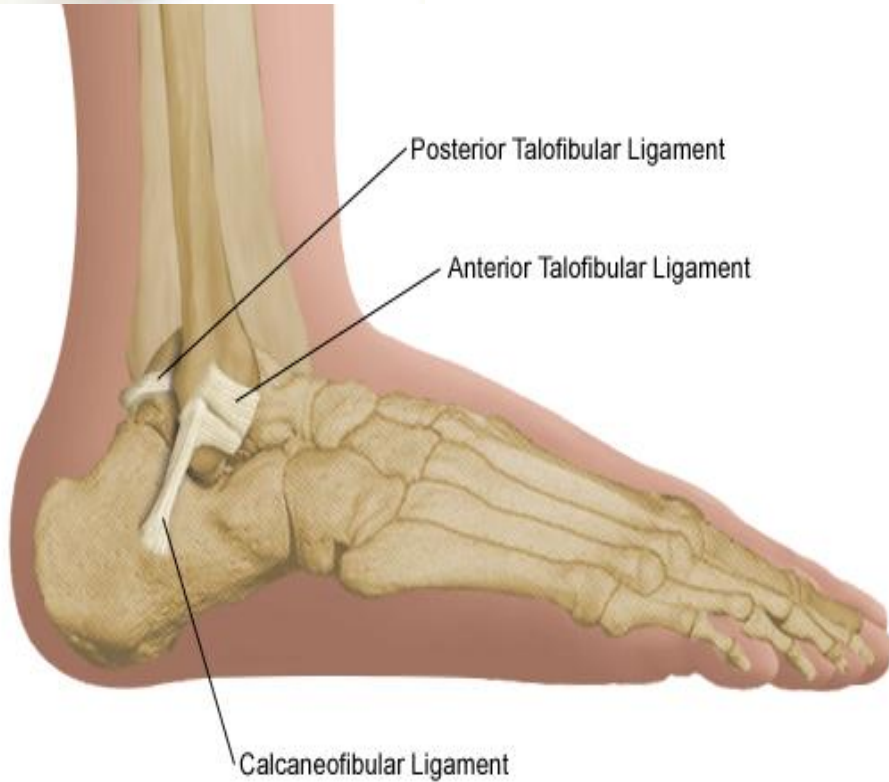


- ◆ A contusion (bruise) is an injury to the soft tissue often produced by a blunt force such as a kick, fall, or blow. The result will be pain, swelling, and discoloration.
- ◆ **Treatment** for contusions includes Rest, Ice, Compression, and Elevation (R.I.C.E.). More serious contusions may need to be examined by a X-rays.

Sprain



Ligaments Involved
in Ankle Sprains



- ◆ A sprain is an injury to a ligament and is often caused by a wrench or twist. Sprains often affect the ankles, knees, or wrists.
- ◆ The **treatment** for a sprain includes Rest, Ice, Compression, and Elevation (R.I.C.E.). If the ligament is torn, surgical repair may be necessary.



Rupture

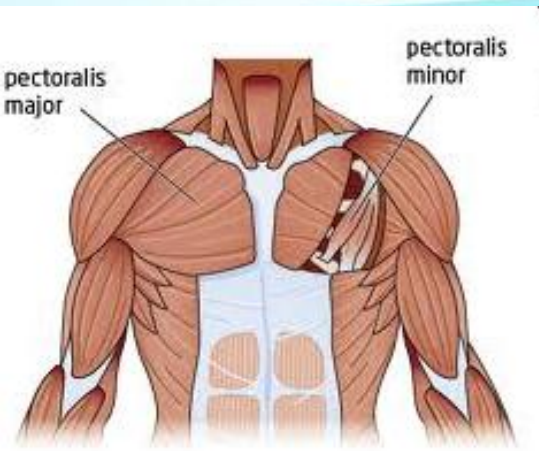
A tendon is the fibrous tissue that attaches muscle to bone in the human body. The forces applied to a large tendon may be more than five times the body weight. In some rare instances, tendons can snap or rupture.

Rapture can be following:

- ◆ **partial** - require of immobilization
- ◆ **complete** - treatment is only by surgery



Partial rapture



Example of the retracted appearance of a chronic sternal head pectoralis major tear.

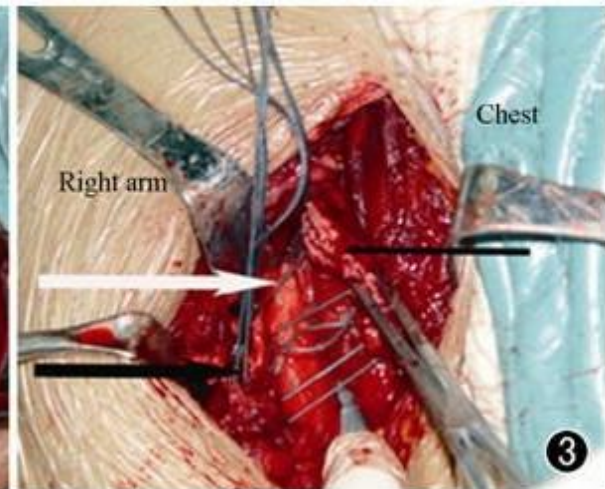
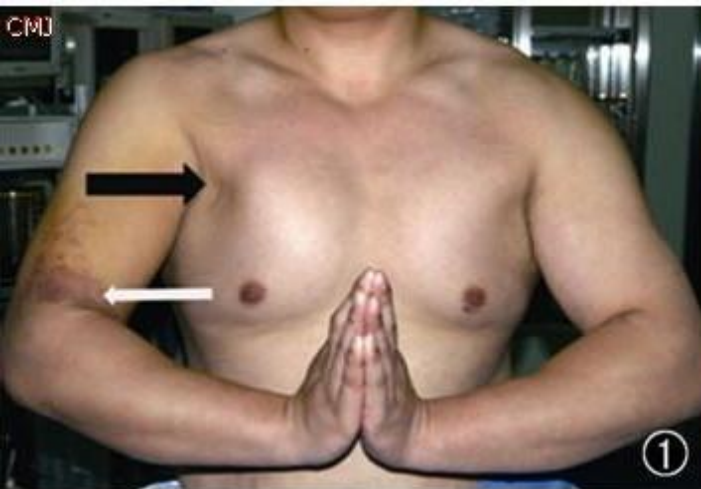


Figure 1. Rupture of pectoralis major muscle tendon (right side). Dark arrow: deficit of the pectoralis major. White arrow: ecchymosis.

Figure 2. Pectoralis major tendon rupture before suturing (right Side).

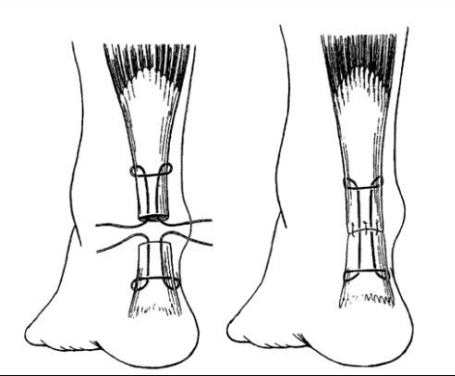
Figure 3. Surgical technique: suture the muscle to the tendon directly (right side). Thin dark arrow: the tendon of pectoralis major. Dark arrow: insertion of pectoralis major. White arrow: biceps tendon.

distal bicep partial rupture.

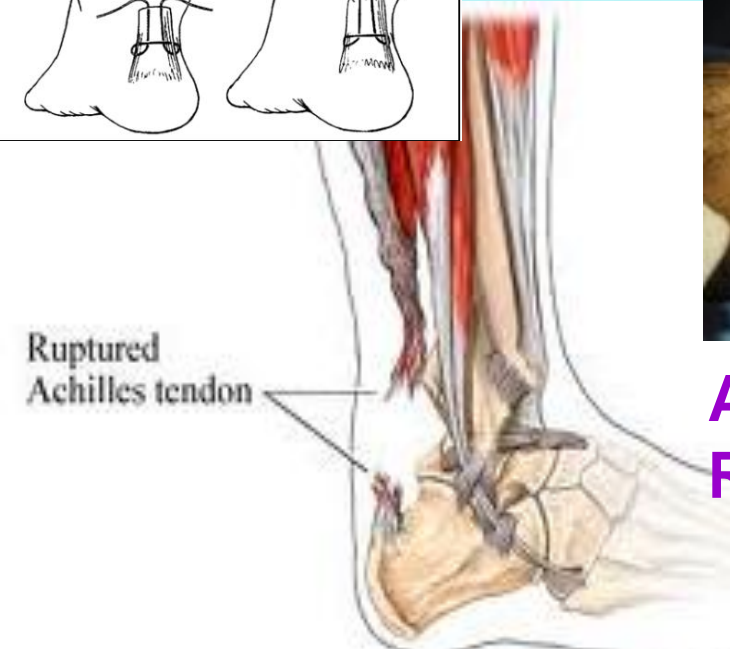


Biceps femoris long head partial rupture

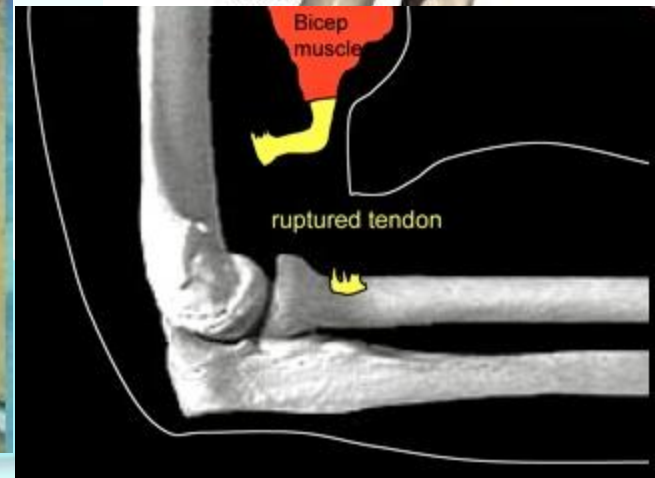
Complete ruptures



Achilles Tendon Rupture



Distal Biceps Tendon Rupture



Distal Biceps Ruptures

PATELLAR TENDON RUPTURES



Lateral View of **Normal** Knee with Intact Patellar Tendon.

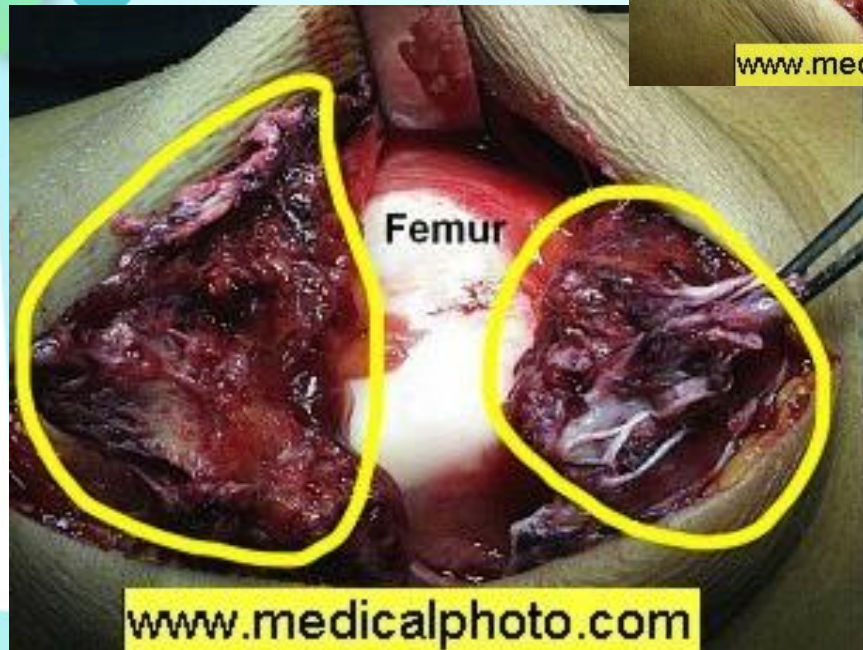


Lateral View of **Ruptured** Patellar Tendon.



Surgical View of Ruptured Patellar Tendon (Yellow Circle).

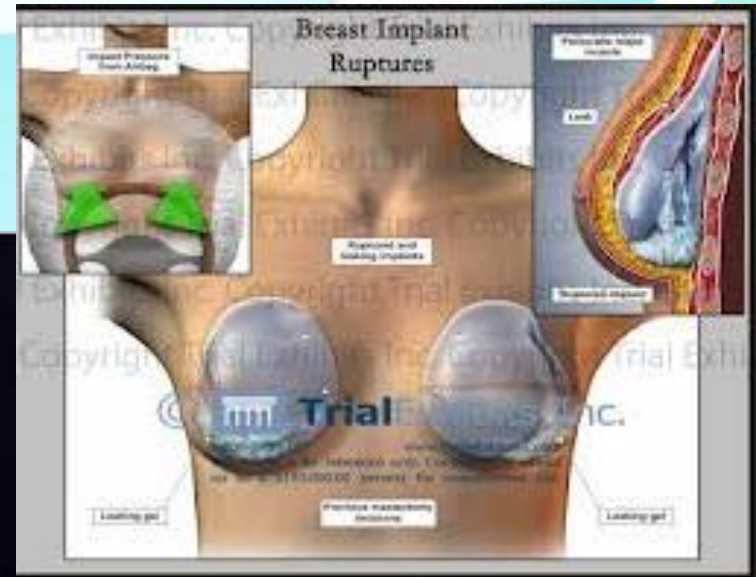
Cont...



Surgical View of **Ruptured** Patellar Tendon (Yellow Circle) with Tendon Ends Retracted to Expose the Femur.

Surgical View of **Repaired** Patellar Tendon (Yellow Circle) with Sutures Visible.

Silicone Breast Implant Ruptures



Multiple disc ruptures at C5–C6. No neck injuries were found at autopsy.

Crush syndrome

- ◆ **Crush syndrome** (traumatic toxicosis; the syndrome of prolonged compression) is a condition typically caused by prolonged compression of the soft tissues of the limb, resulting in ischaemic necrosis of muscles, intoxication with the products of necrotic disintegration with subsequent hepatic and renal failures.



Buildings damaged in the 1999 Marmara earthquake

Crush Injuries:

- ◆ Damage to soft tissue and internal organs.
- ◆ May cause painful, swollen, deformed extremity.
- ◆ External bleeding may be minimal or absent.
- ◆ Internal bleeding may be severe.
- ◆ Tamponade (restrict) - patient may crash when object causing the crush injury is lifted from the patient.





Crush Injuries

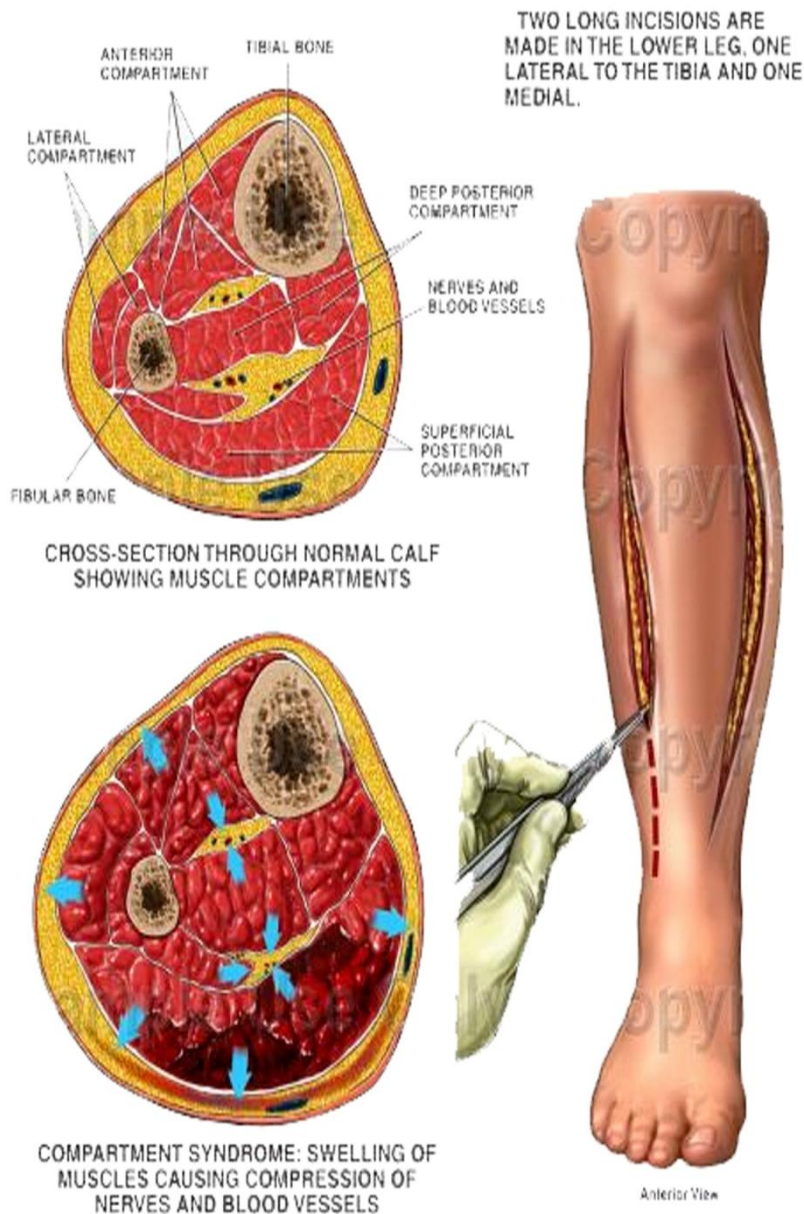
- ◆ An injury to the underlying soft tissues and bones
- ◆ Caused by a body part being crushed between two solid objects



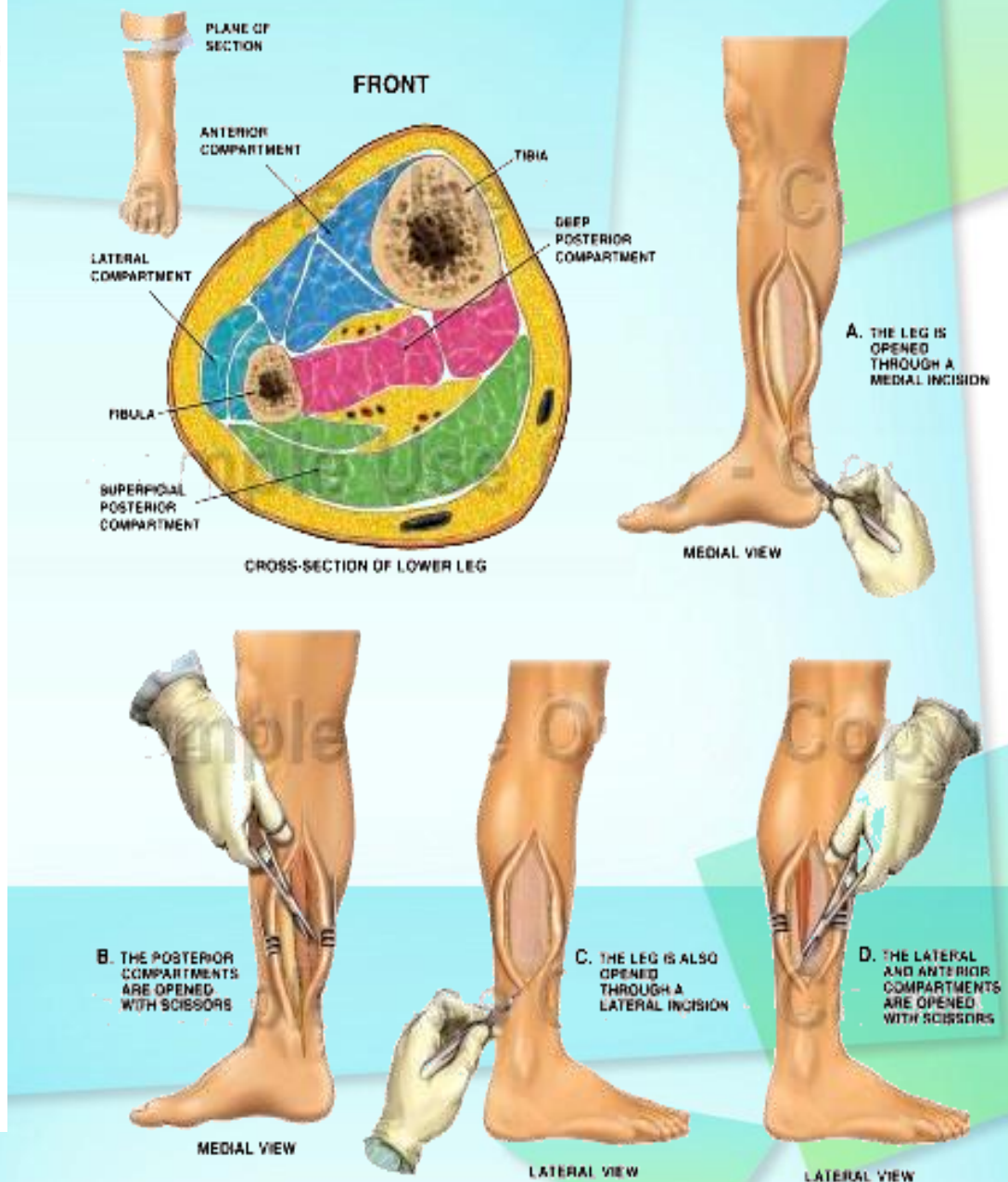
Crush Injuries

- ◆ May lead to compartment syndrome
- ◆ May lead to rupture of internal organs
- ◆ External appearance may not represent level of internal damage.
 - ◆ Grotesque injuries may not be primary problem.
- ◆ Body's first responses to vessel injury is localized vasoconstriction.
 - ◆ If vessels are damaged, they may not be able to constrict.
 - ◆ Crush injuries often result in difficult-to-control hemorrhage.

Compartment Syndrome with Fasciotomy Procedure



Compartment Syndrome with Four Compartment Fasciotomy Procedure

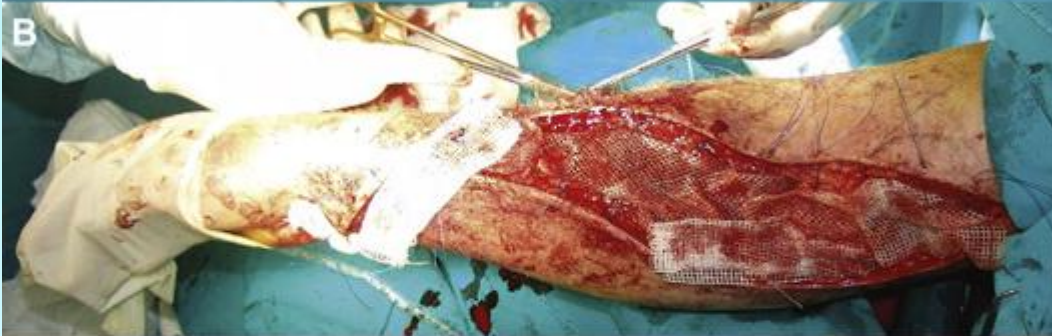




Upper limb edema and the difference in perimeters.



Urine in rhabdomyolysis, dark brown without red blood cells.



Fasciotomies in the anterior side of the forearm and the wounds classified as candidates for second intention healing.

CLOSED TRAUMA OF BRAIN

- ◆ Concussion of the brain
- ◆ Contusion of the brain
- ◆ Compression of the brain



Concussion

A concussion is a type of traumatic brain injury that is caused by a blow to the head or body, a fall, or another injury that jars or shakes the brain inside the skull.

A concussion is any type of traumatic brain injury that causes temporary dysfunction of the brain.

Physical examination

- ◆ lose consciousness
- ◆ Headache
- ◆ Fuzzy or blurry vision
- ◆ Nausea and vomiting
- ◆ Dizziness
- ◆ Sensitivity to light or noise
- ◆ Balance problems
- ◆ Feeling tired or having no energy

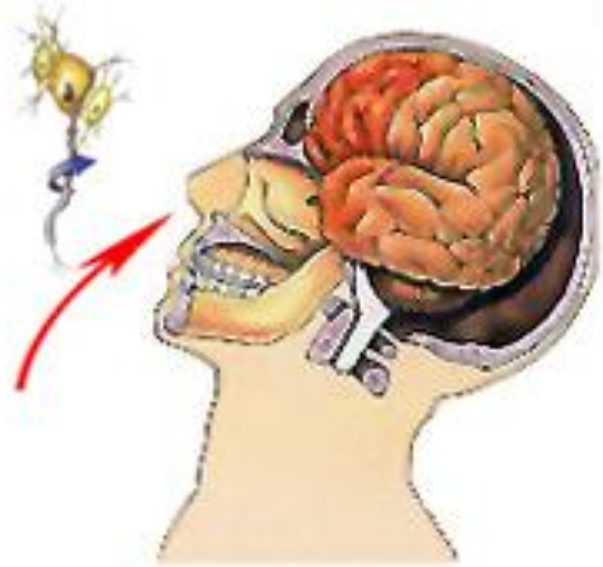


How a Concussion Occurs

Before impact



Initial impact: Coup



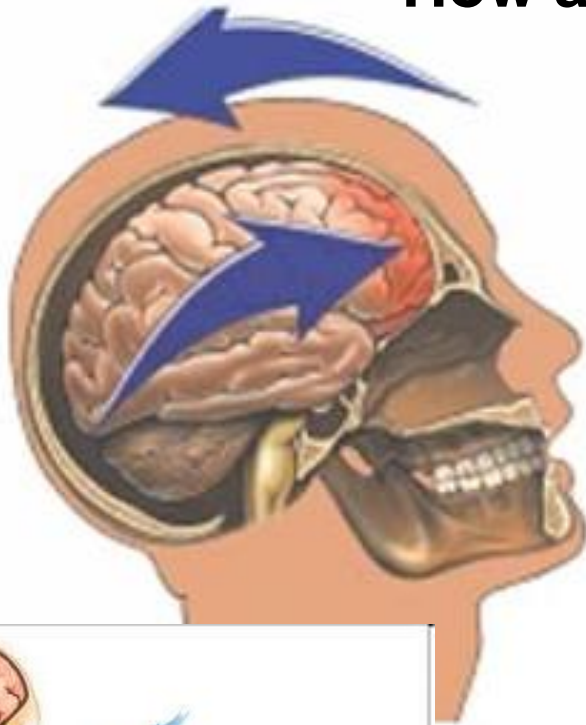
Secondary impact: Contre-coup



Post-injury



How a Concussion Occurs



The head strikes a hard object creating a concussion-type injury



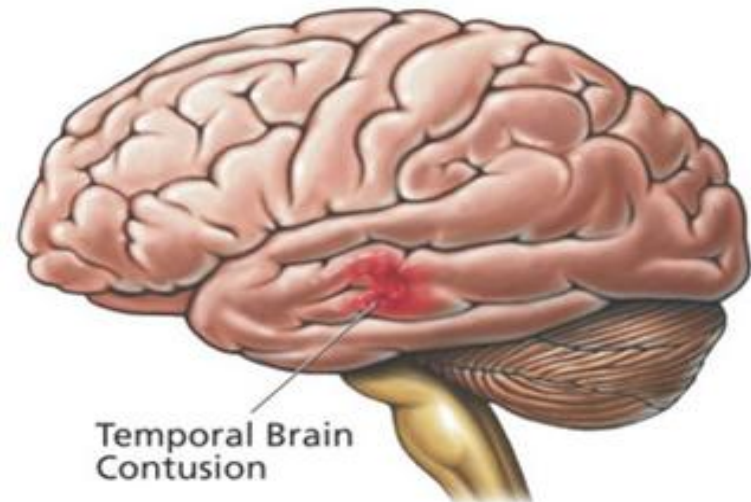
Treatment

1. Prevent Swelling and Further Injury
 - Have the person stop activity and rest.
 - Apply ice wrapped in a washcloth.
2. Treat Symptoms
 - For pain, take over-the-counter acetaminophen (Tylenol). Aspirin or ibuprofen (Advil, Motrin) may make bruising worse.



Contusion of the brain

◆ Simply explained, a brain contusion is a bruise of the brain tissue. Just like bruises that occur on other parts of the body, a brain contusion is caused by small blood vessel leaks. Because they involve structural brain damage, contusions are **more serious than concussions.**



Temporal Brain
Contusion

Lateral or Side View

Symptoms of brain contusions may include:

- ◆ unconscious following the injury
- ◆ Memory loss
- ◆ *Attention problems*
- ◆ Emotional disturbances
- ◆ *Difficulty with motor coordination*
- ◆ Numbness
- ◆ *Loss of ability to understand or express speech*
- ◆ headache, dizziness, vertigo
- ◆ nausea, vomiting,
- ◆ *changes in vision.*
- ◆ Symptoms of a concussion may also be present.



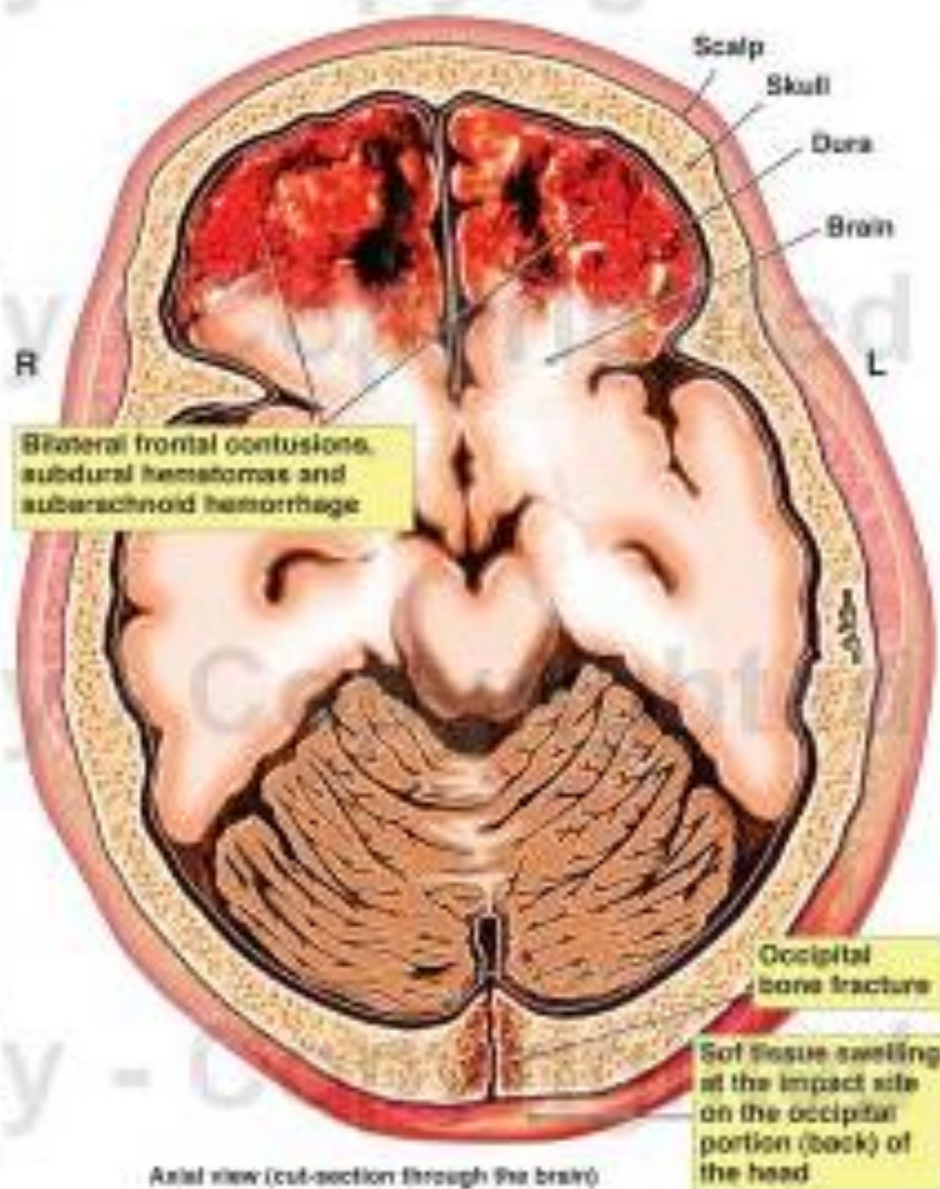


Other signs and symptoms (showed organic change)

- ◆ include scalp wound,
- ◆ hemiparesis,
- ◆ labored breathing,
- ◆ unequal pupils,
- ◆ drowsiness,
- ◆ confusion,
- ◆ disorientation,
- ◆ agitation, or violence when conscious,
- ◆ temporary aphasia, and unilateral numbness after regaining consciousness.

Bilateral Frontal Contusions

CT scan print



How Are Brain Contusions Different from Brain Concussions?

◆ ***How they are alike:***

- * Both are due to head trauma.
- * Both are common.
- * Both are serious.

◆ ***Differences***

- * Contusions are localized, while concussions are widespread.
- * Contusions are macroscopic, while concussions are microscopic.

Diagnoses

Among the tests that diagnose cerebral contusion are:

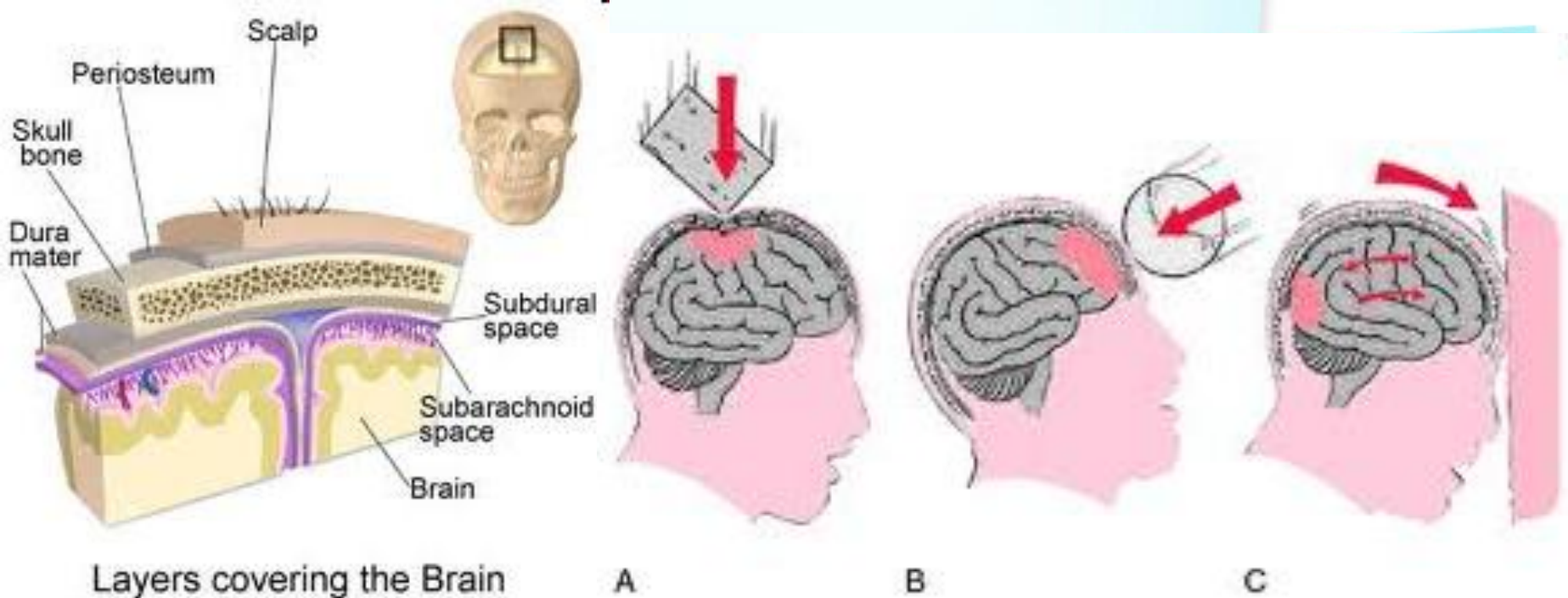
- ◆ 1) **skull x-rays** to rule out fractures, which is also helpful in showing a shift in brain tissue;
- ◆ 2) **cerebral angiography**, which outlines vasculature; and
- ◆ 3) **computed tomography**, which shows ischemic or necrotic tissue and subdural, epidural, and intracerebral hematoma.

Treatment of contusion

- ◆ Intracranial hemorrhage may require a craniotomy to locate and control bleeding and to aspirate blood. Epidural and subdural hematomas are usually drained by aspiration through burr holes in the skull. Increased ICP may be controlled with mannitol, I.V. steroids, or diuretics, but **emergency surgery is usually required.**

Compression of the brain

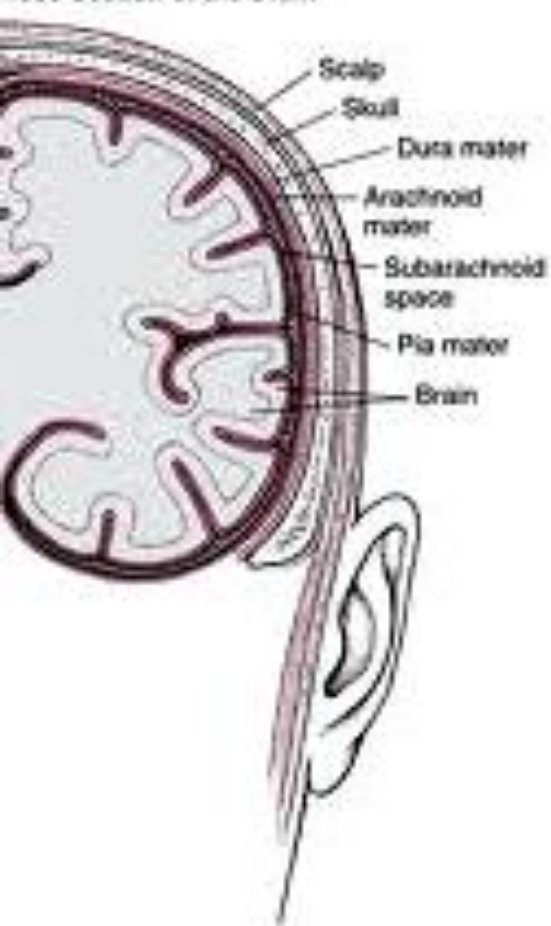
- ◆ **Compression of the brain** – a condition called cerebral compression – is very serious and almost invariably requires surgery. Cerebral compression occurs when there is a build-up of pressure on the brain. This pressure may be due to one of several different causes, such as an accumulation of blood within the skull or swelling of injured brain tissues.
- ◆ Cerebral compression is usually caused by a head injury. However, it can also be due to other causes, such as stroke, infection, or a brain tumour.
- ◆ The condition may develop immediately after a head injury, or it may appear a few hours or even days later. For this reason, you should always try to find out whether the casualty has a recent history of a head injury.



Some mechanisms of head injury. Head injury results from penetration or impact. **A**, A direct injury (blow to skull) may fracture the skull. Contusion and laceration of the brain may result from fractures. Depressed portions of the skull may compress or penetrate brain tissue. **B**, In the absence of skull fracture, a blow to the skull may cause the brain to move enough to tear some of the veins going from the cortical surface to the dura. Subsequently, subdural hematoma may develop. Note the areas of cerebral contusion (shaded in red). **C**, Rebound of the cranial contents may result in an area of injury opposite the point of impact. Such an injury is called a contrecoup injury. In addition to the three injuries depicted, secondary phenomena may result from the injury and cause additional brain dysfunction or damage. For example, ischemia, especially cerebral edema, may occur, elevating intracranial pressure.

- ◆ **Compression** of the brain takes place in cases of bleeding into skull cavity or the growth of a tumor in skull cavity. We shall discuss only the first case. The most frequent cause of brain compression is traumas of a. meningea media or its branches.
- ◆ **We distinguish the following kinds of hematomas:** epidural, subdural, subarachnoidal, intraventricular, intracerebral.
- ◆ Clinical symptoms in cases of brain· compression don't appear at once, they appear in some hours or days - **this time is called "lucid interval"**. The symptoms start when the amount of blood in skull becomes 30-40 ml (in intraventricular hematoma - less - 3-5 ml). Just after trauma the patient may loss consciousness but then it appears, headache disappears but later it . increases & may become excruciating. At the same time giddiness, nausea, vomiting appears. Respiration becomes more frequent, pulse becomes rarer, BP may be unstable. Consciousness is inhibited (up to coma).

Cross Section of the Brain



Epidural Hematoma



Bleeding between the dura mater and the skull

Subdural Hematoma



Bleeding between the arachnoid mater and the dura mater

Intracranial hematomas are accumulations of blood within the brain or between the brain and the skull.

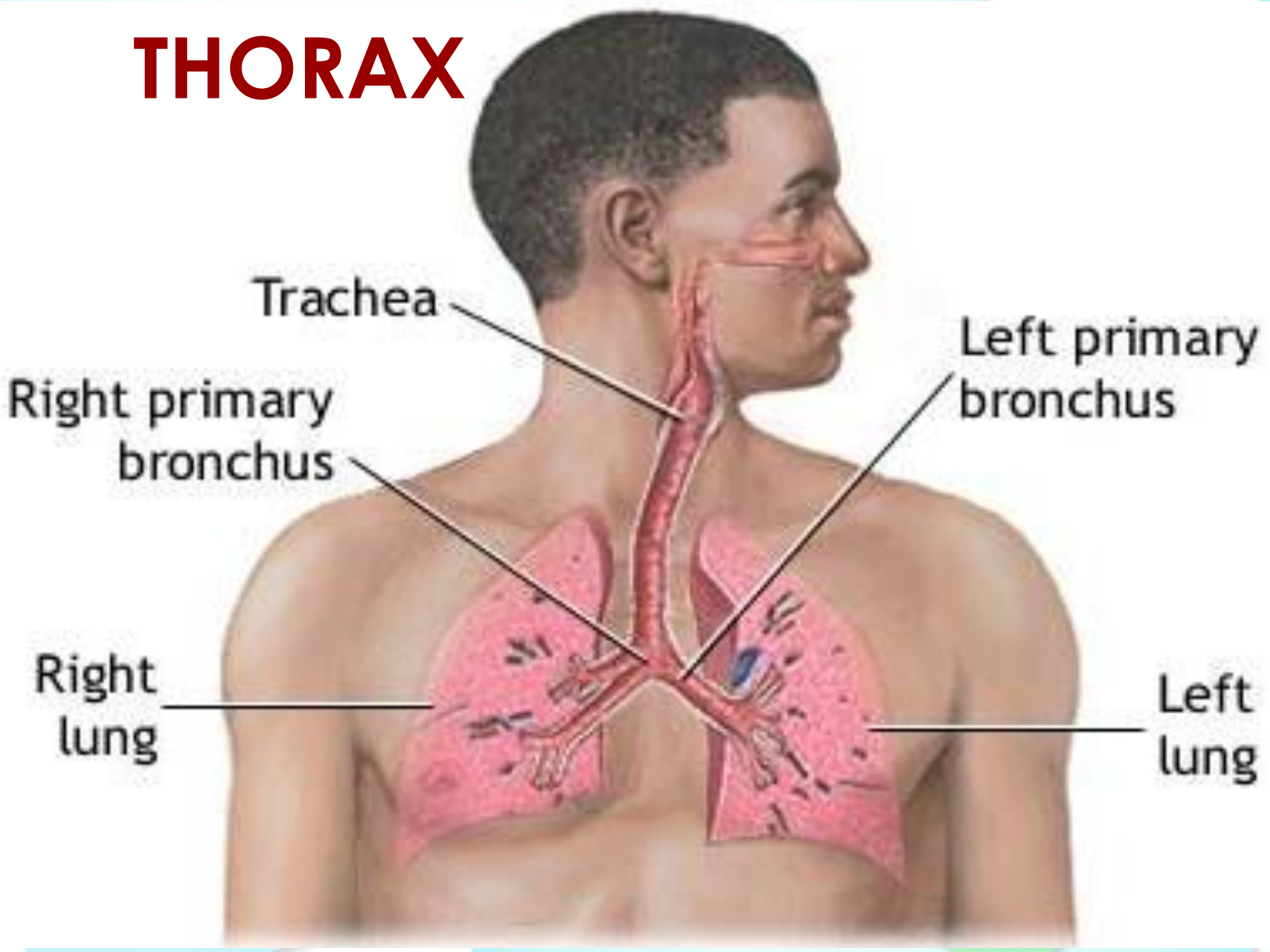
Intracranial hematomas include **Epidural hematomas**, which form between the skull and the outer layer (dura mater) of tissue covering the brain (meninges)

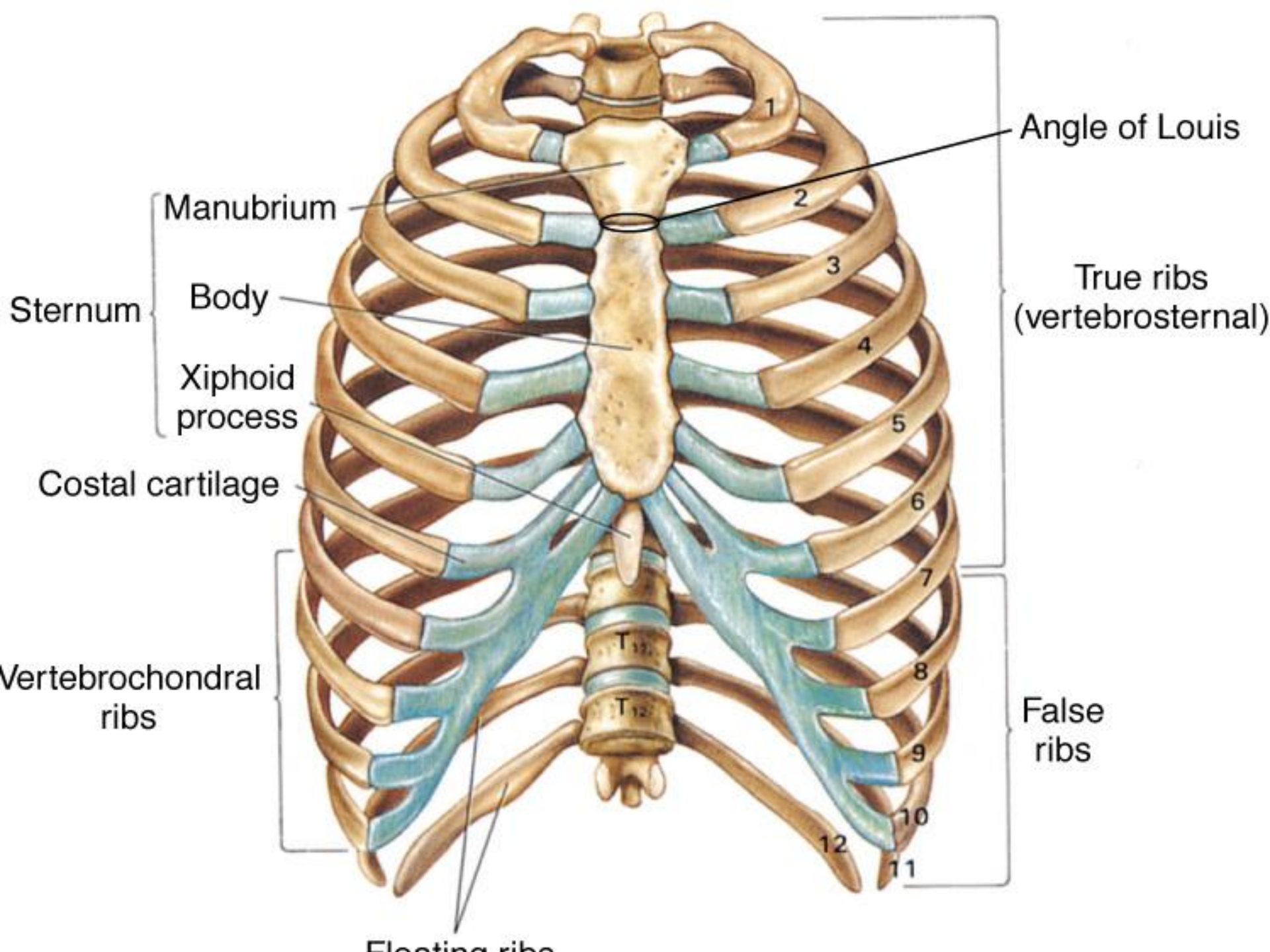
Subdural hematomas, which form between the outer layer and the middle layer (arachnoid mater—
Biology of the Nervous System: Brain)

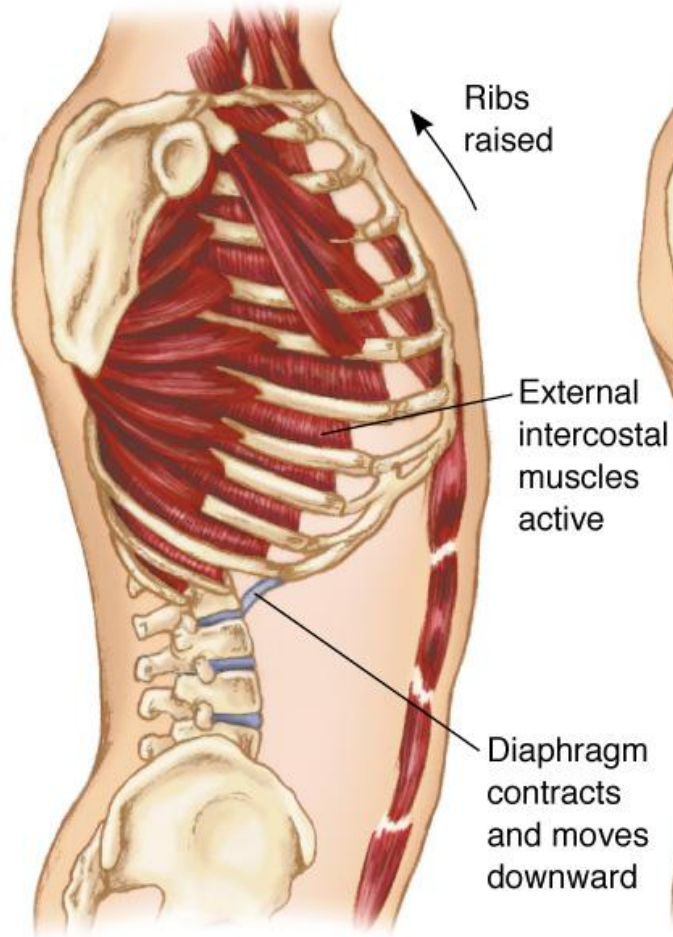
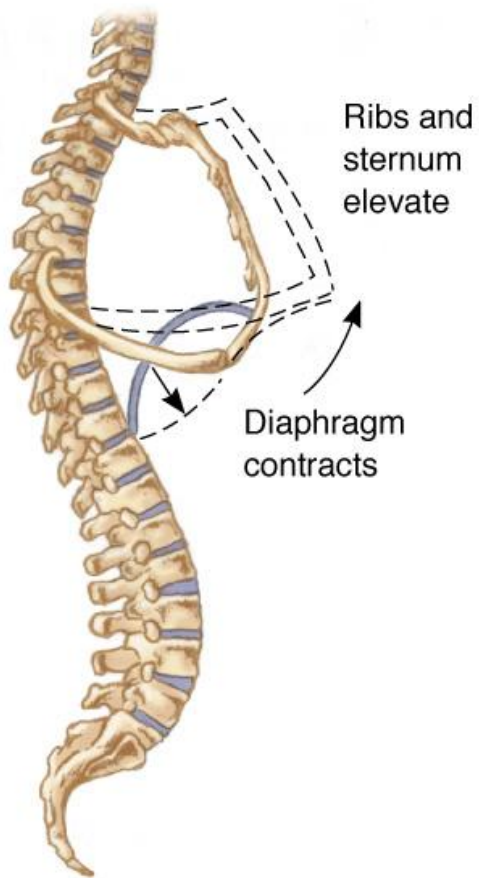
Intracerebral hematomas, which form within the brain

- ◆ On the side of hematoma the dilation of the pupil is observed, on the opposite side- motion reflexes disappear (up to paralysis), If the aid will not be rendered the patient may die due to compression of vital functions centers. In case of 70-80 ml of blood in skull cavity wedging of trunk of brain into *foramen occipitale magnum* takes place & this situation is incompatible with the life.
- ◆ Duration & degree of manifestation of lucid interval depends on presence of absence of brain contusion.
- ◆ **The treatment** is surgical: trepanation of skull & removing hematoma.

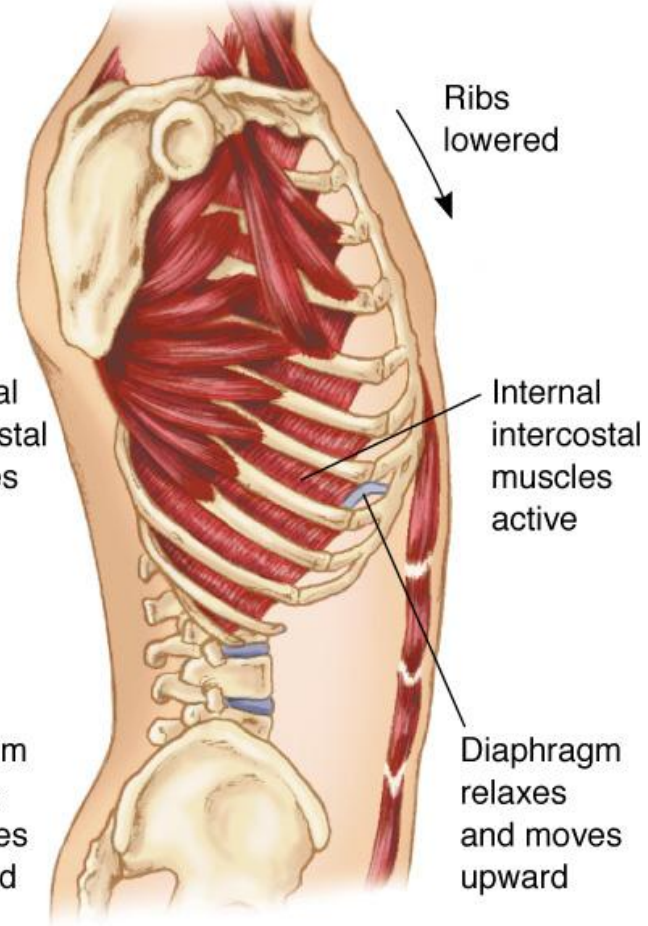
THORAX







Inspiration



Expiration

Classifications of Chest Injuries

- ◆ **Skeletal injury**
- ◆ **Pulmonary injury**
 - Closed (Simple) Pneumothorax
 - Open Pneumothorax
 - Tension Pneumothorax
 - haemotorax
- ◆ **Heart and great vessel injury**
- ◆ **Diaphragmatic injury**

Subcutaneous emphysema

- ◆ It's one from other sing of chest trauma, sometimes abbreviated SCE or SE and also called tissue emphysema, or Sub Q air, occurs when gas or air is present in the subcutaneous layer of the skin.



◆ pneumomediastinum



Subcutaneous
emphysema of the
scrotum
(pneumoscrotum) due
to traumatic
pneumothorax

Skeletal injury of chest

◆ Clavicular fractures

- ◆ Clavicle the most commonly fractured bone
- ◆ Isolated fracture of the clavicle seldom a significant injury

◆ Rib Fractures, Multiple Rib Fractures

Atelectasis

Hypoventilation

Inadequate cough

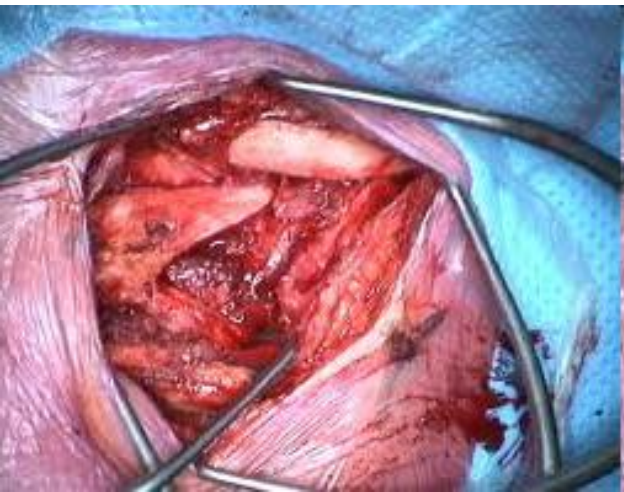
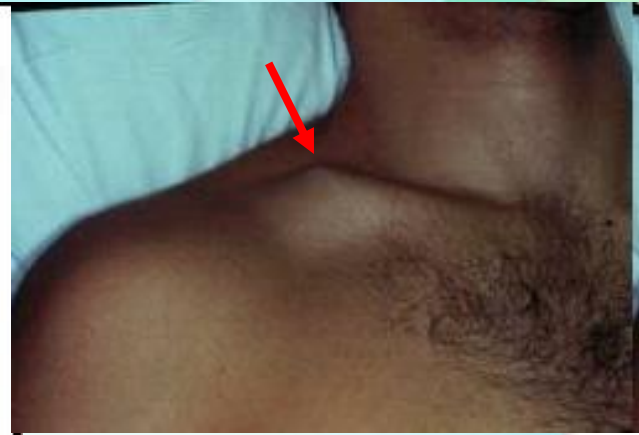
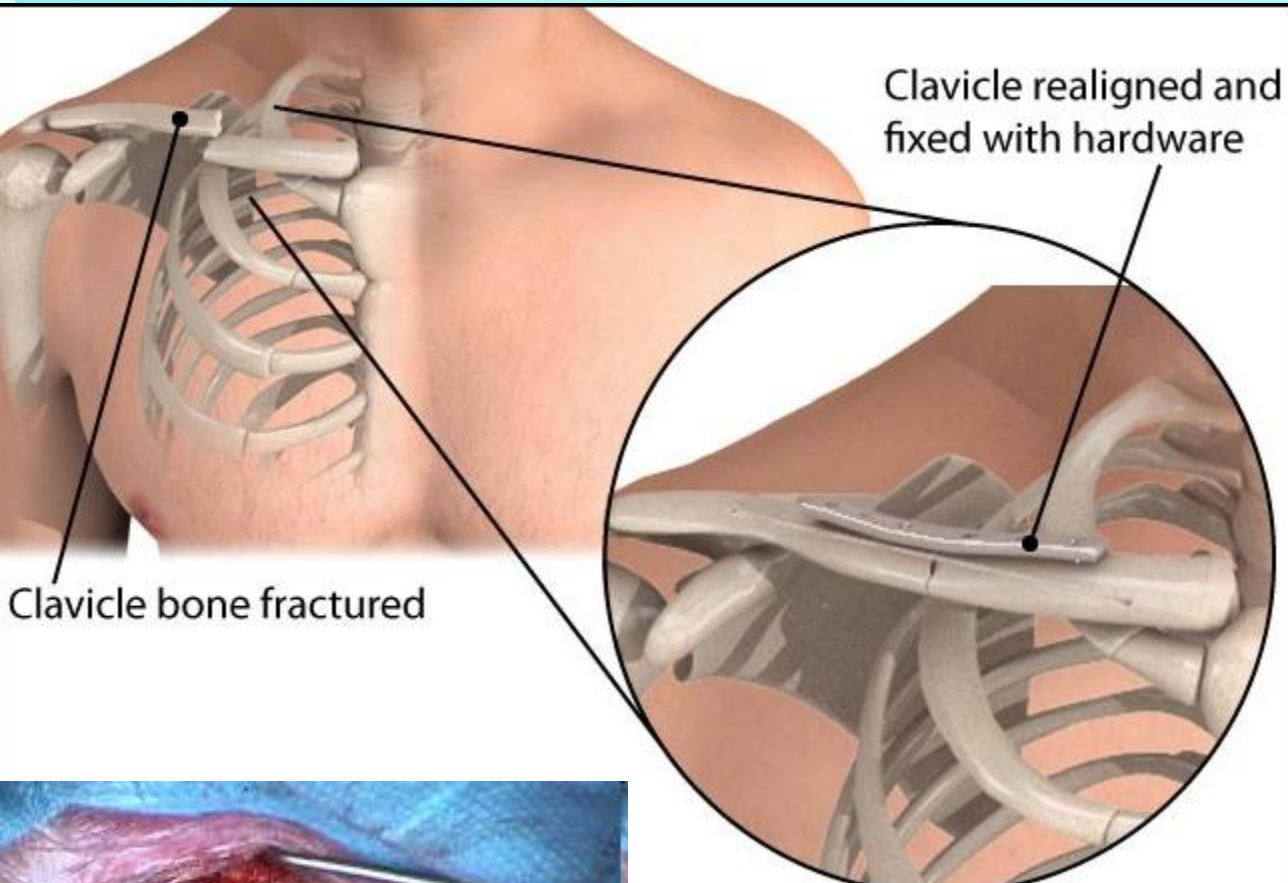
Pneumonia

◆ Flail Chest

◆ Sternum Fractures



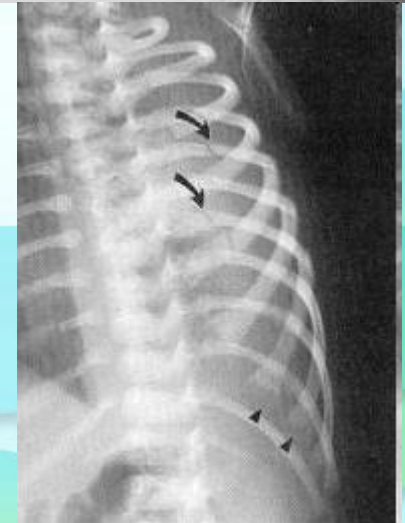
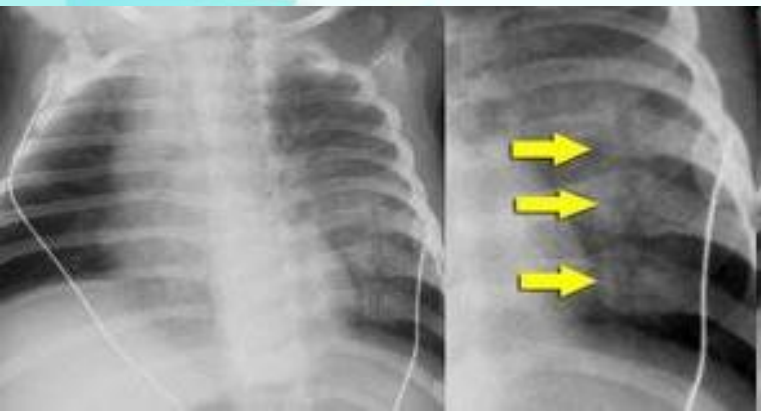
Clavicular fractures



Rib Fractures

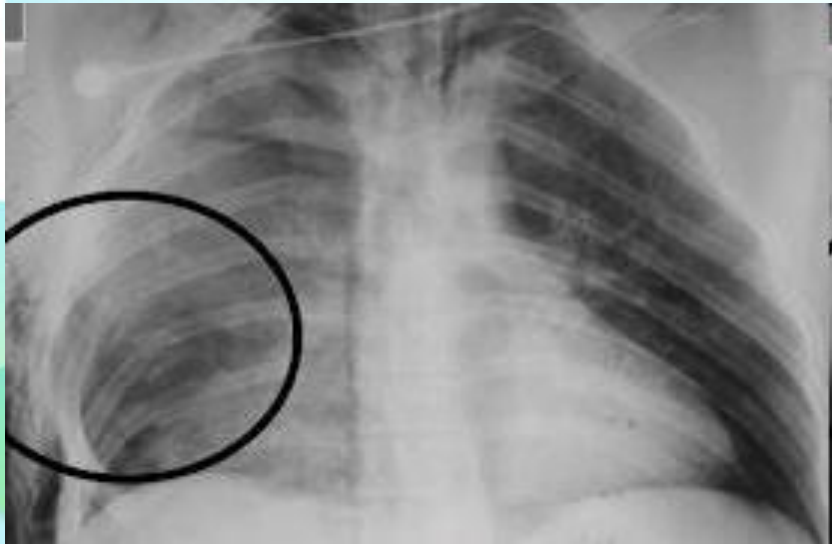
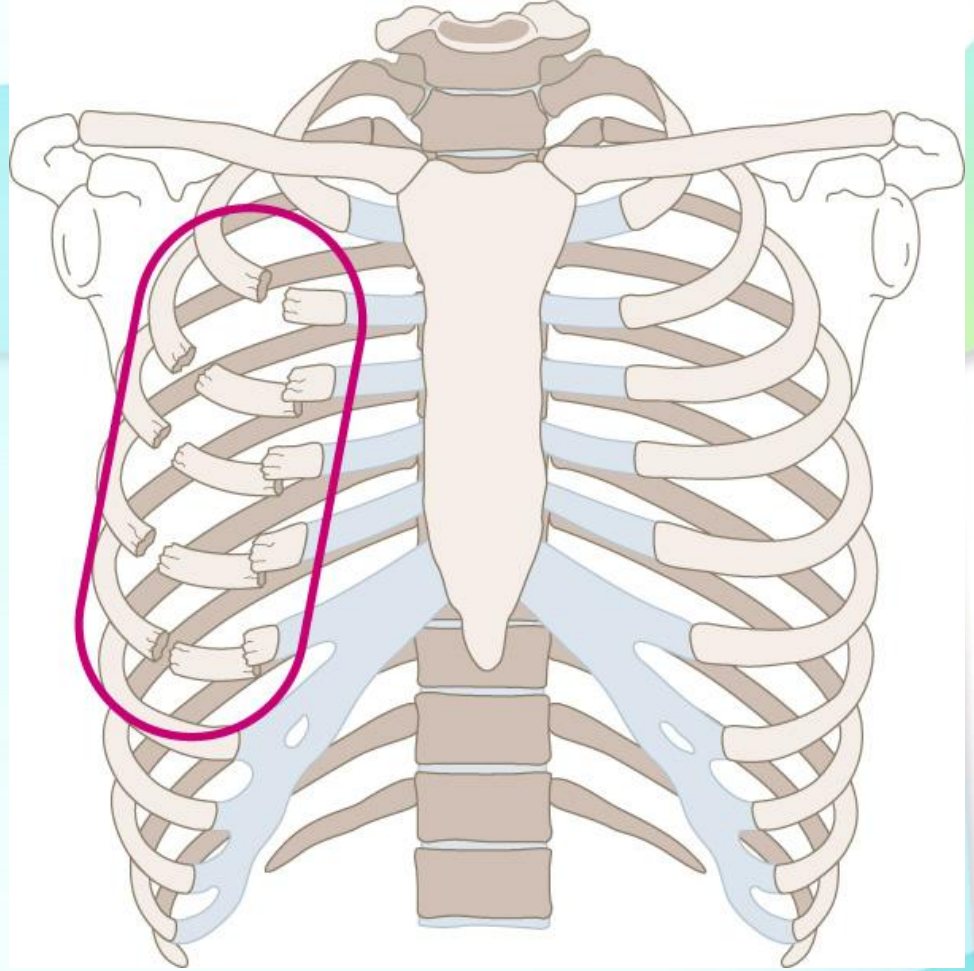


A rib fracture is a break in a rib bone.

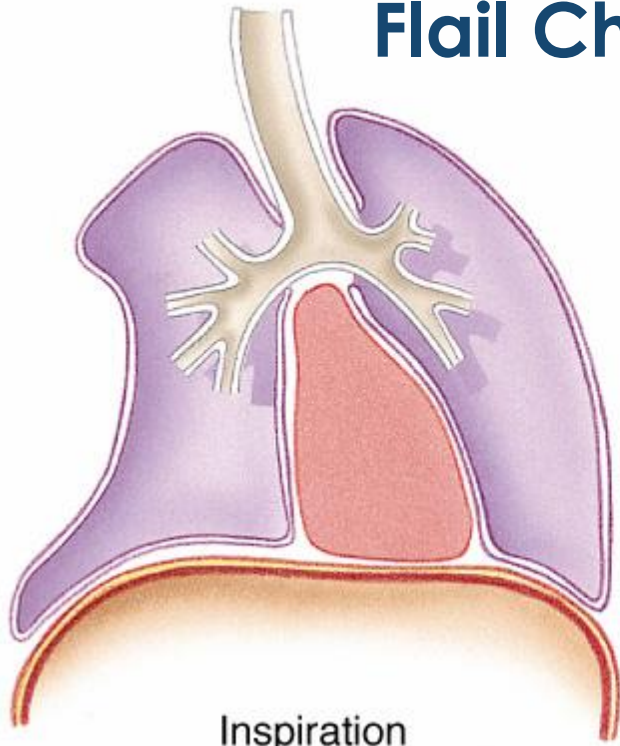


Flail Chest

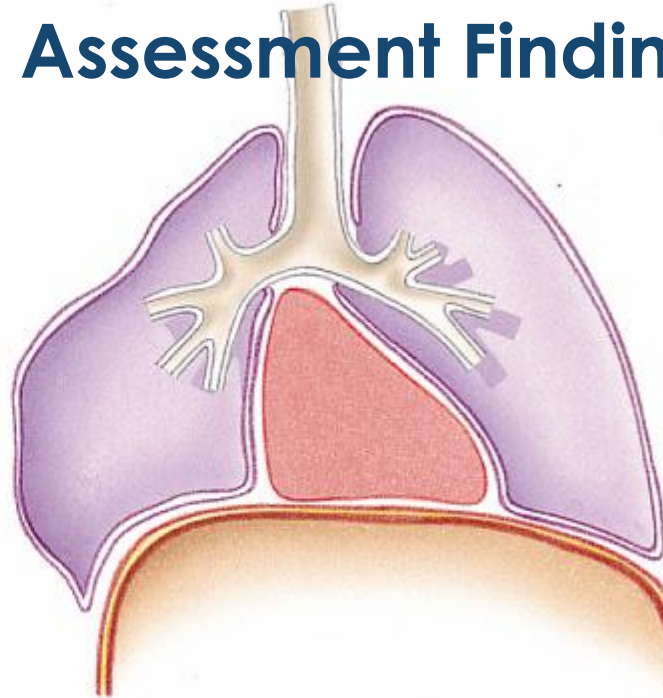
✳ Two or more adjacent ribs fractured in two or more places producing a free-floating segment of chest wall



Flail Chest Assessment Findings



Inspiration



Expiration



- ◆ Chest wall contusion
- ◆ Respiratory distress
- ◆ Paradoxical chest wall movement
- ◆ Pleuritic chest pain
- ◆ Crepitus

- ◆ Pain and splinting of affected side
- ◆ Tachypnea
- ◆ Tachycardia
- ◆ Possible bundle branch block on ECG

Flail Chest Management

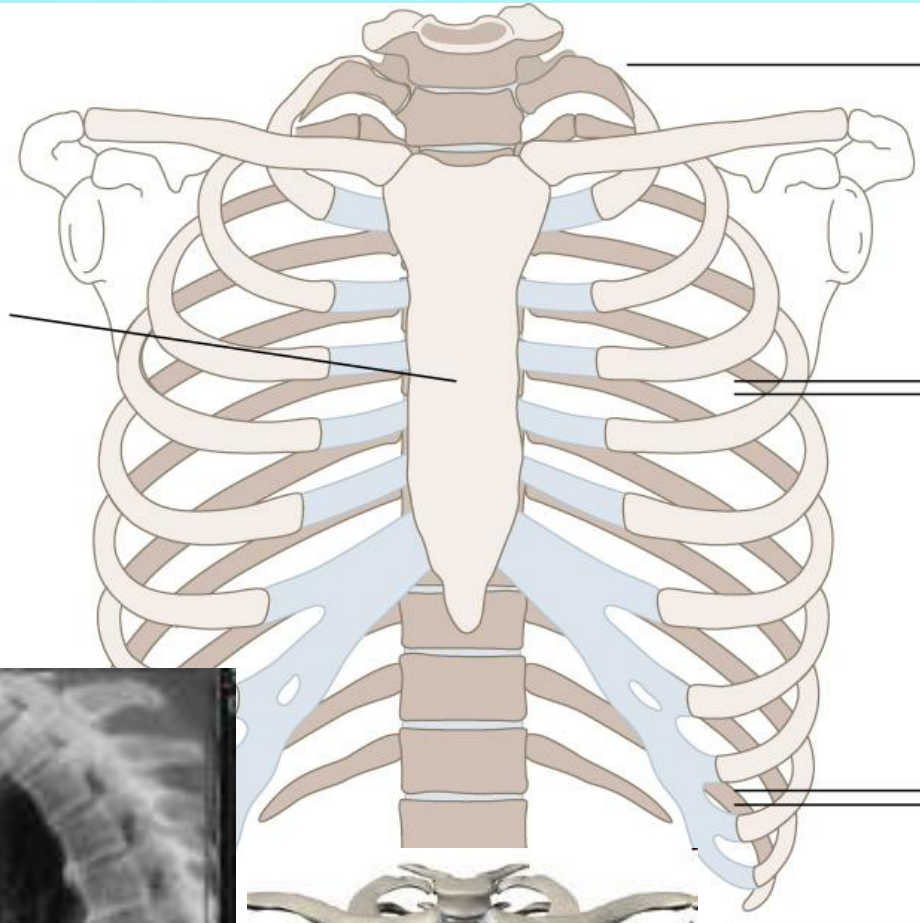
◆ Airway and ventilation

- ◆ High-concentration oxygen.**
- ◆ Positive-pressure ventilation may be needed.**
 - ◆ Reverses the mechanism of paradoxical chest wall movement**
 - ◆ Restores the tidal volume**
 - ◆ Reduces the pain of chest wall movement**
 - ◆ Assess for the development of a pneumothorax**
- ◆ Evaluate the need for endotracheal intubation.**
- ◆ Stabilize the flail segment (controversial).**

Sternal Fractures



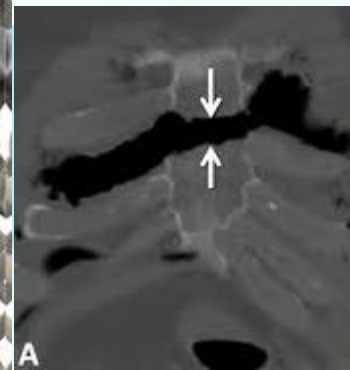
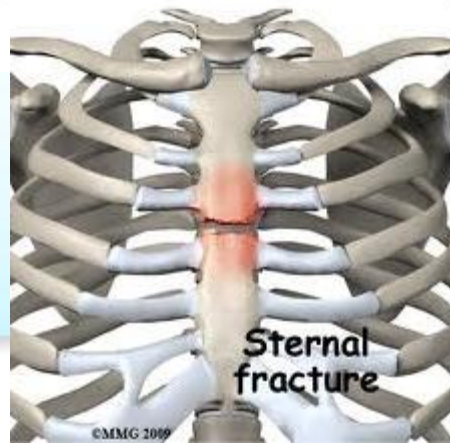
Great force is required for sternal fractures.



Ribs 1–3 are well protected by shoulder bones and muscles.

Ribs 4–9 are most frequently fractured.

Ribs 10–12 are relatively mobile and fracture less frequently.



Sternal Fractures

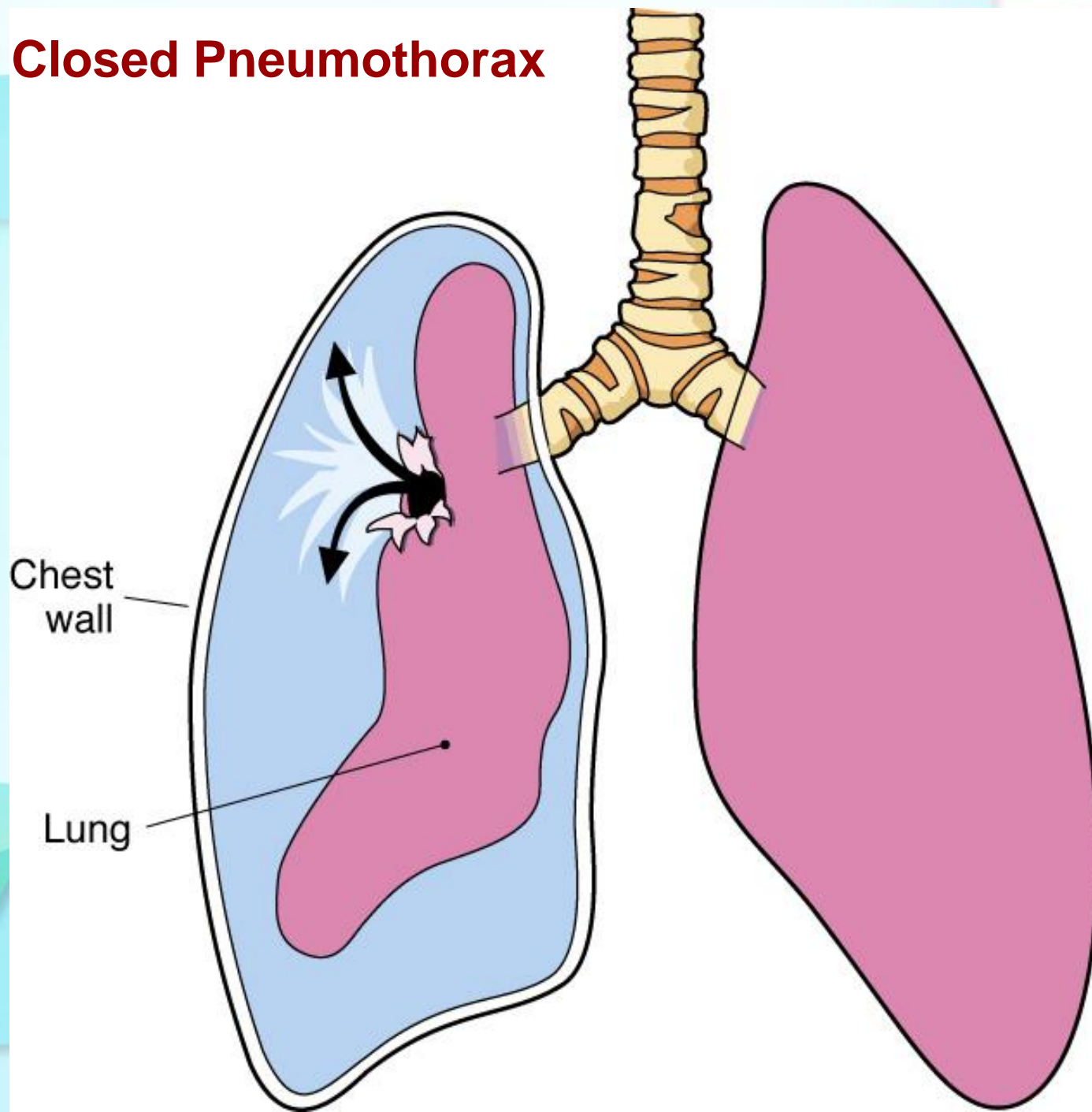
Management

- ◆ Airway and ventilation
 - ◆ High-concentration oxygen
- ◆ Circulation—restrict fluids if pulmonary contusion suspected
- ◆ Pharmacological—analgesics
- ◆ Nonpharmacological—allow chest wall self-splinting
- ◆ Transport considerations
 - ◆ Appropriate mode
 - ◆ Appropriate facility
- ◆ Psychological support/communication strategies

Closed (Simple) Pneumothorax

- ◆ May occur in the absence of rib fractures from:
 - ◆ A sudden increase in intrathoracic pressure generated when the chest wall is compressed against a closed glottis (the paper-bag effect)
 - ◆ Results in an increase in airway pressure and ruptured alveoli, which lead to a pneumothorax
- ◆ Small tears self-seal; larger ones may progress.
- ◆ The trachea may tug toward the affected side.
- ◆ Ventilation/perfusion mismatch (несоответствие).

Closed Pneumothorax



Closed Pneumothorax

Assessment Findings

- ◆ Tachypnea
- ◆ Tachycardia
- ◆ Respiratory distress
- ◆ Absent or decreased breath sounds on the affected side
- ◆ Hyperresonance
- ◆ Decreased chest wall movement
- ◆ Dyspnea
- ◆ Chest pain referred to the shoulder or arm on the affected side
- ◆ Slight pleuritic chest pain

Closed Pneumothorax

Management (1 of 2)

- ◆ Airway and ventilation
 - ◆ High-concentration oxygen.
 - ◆ Positive-pressure ventilation if necessary.
 - ◆ If respiration rate is <12 or >28 per minute, ventilatory assistance with a bag-valve mask may be indicated.

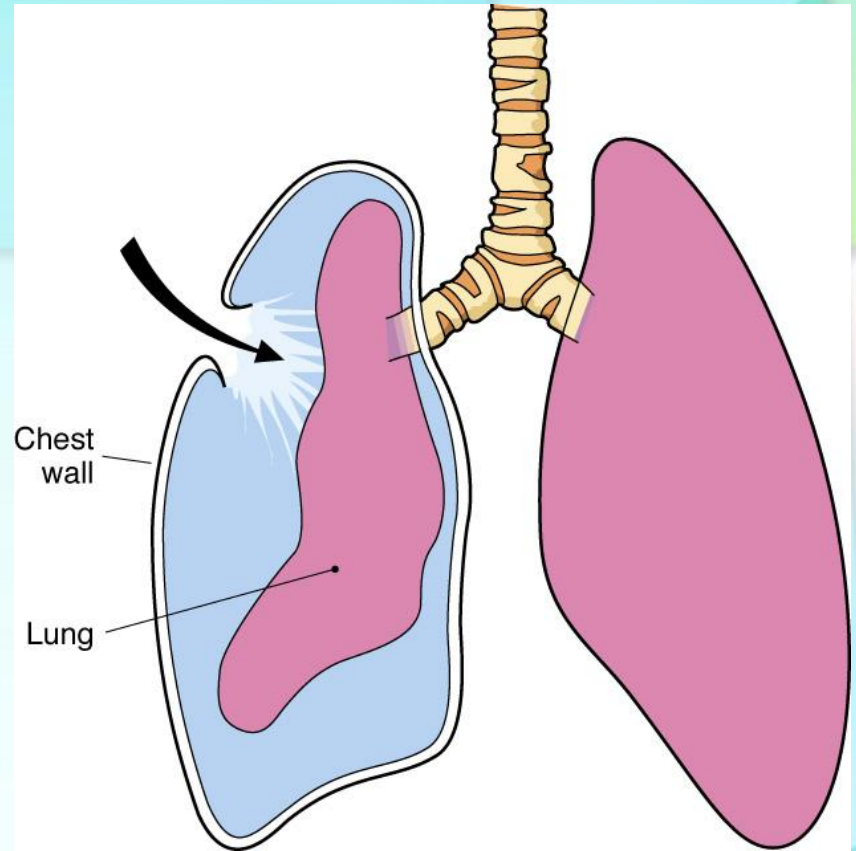
Closed Pneumothorax Management (2 of 2)

- ◆ Nonpharmacological
 - ◆ **Needle thoracostomy**
- ◆ Transport considerations
 - ◆ Position of comfort (usually partially sitting) unless contraindicated by possible spine injury
 - ◆ Appropriate mode
 - ◆ Appropriate facility

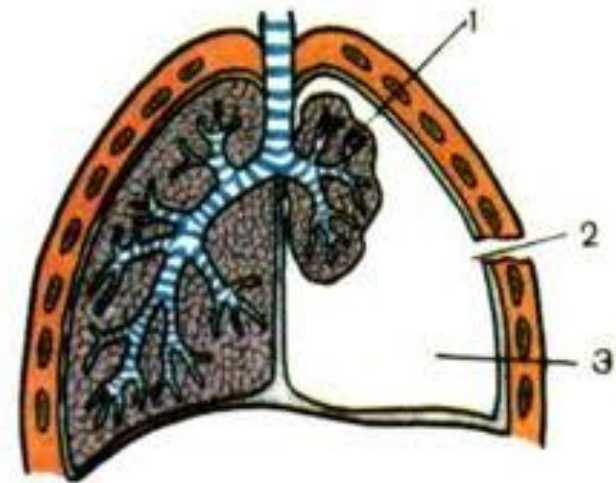
Open Pneumothorax

◆ Incidence

- ◆ Usually the result of penetrating trauma
 - ◆ Gunshot wounds
 - ◆ Knife wounds
 - ◆ Impaled objects
 - ◆ Motor vehicle collisions
 - ◆ Falls



- ◆ Severity is directly proportional to the size of the wound.
 - ◆ Profound hypoventilation can result.
 - ◆ Death is related to delayed management.



Open pneumothorax



semeiotica chirur

semeiotica chirurgica : <http://www-cdu>



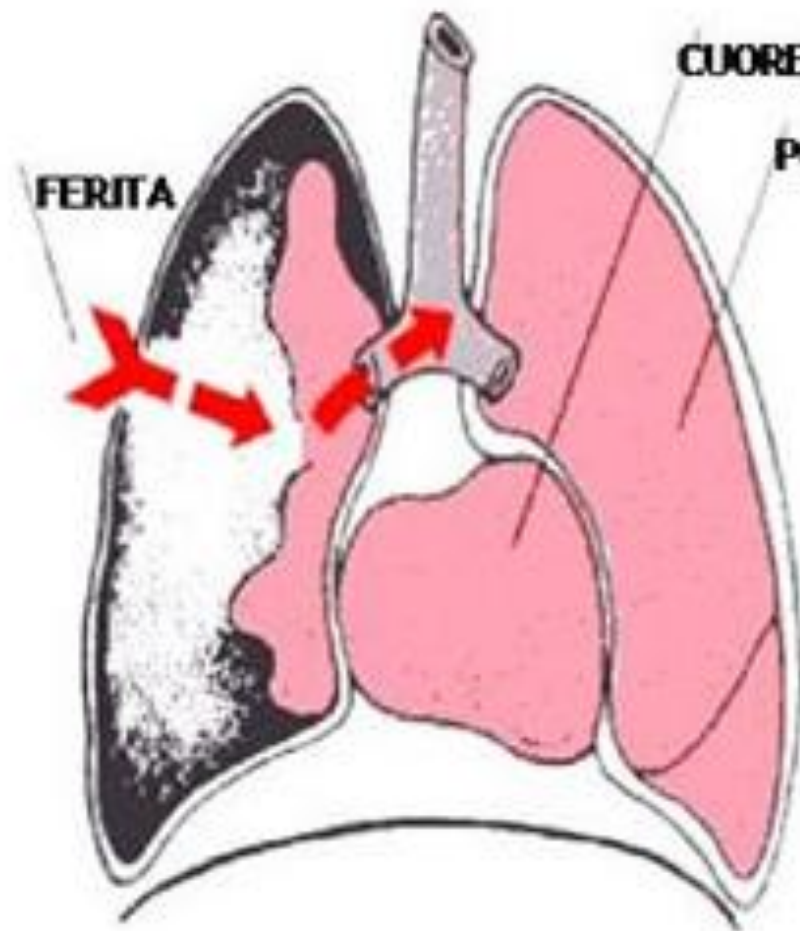
Don't forget the back!

semeiotica chirurg

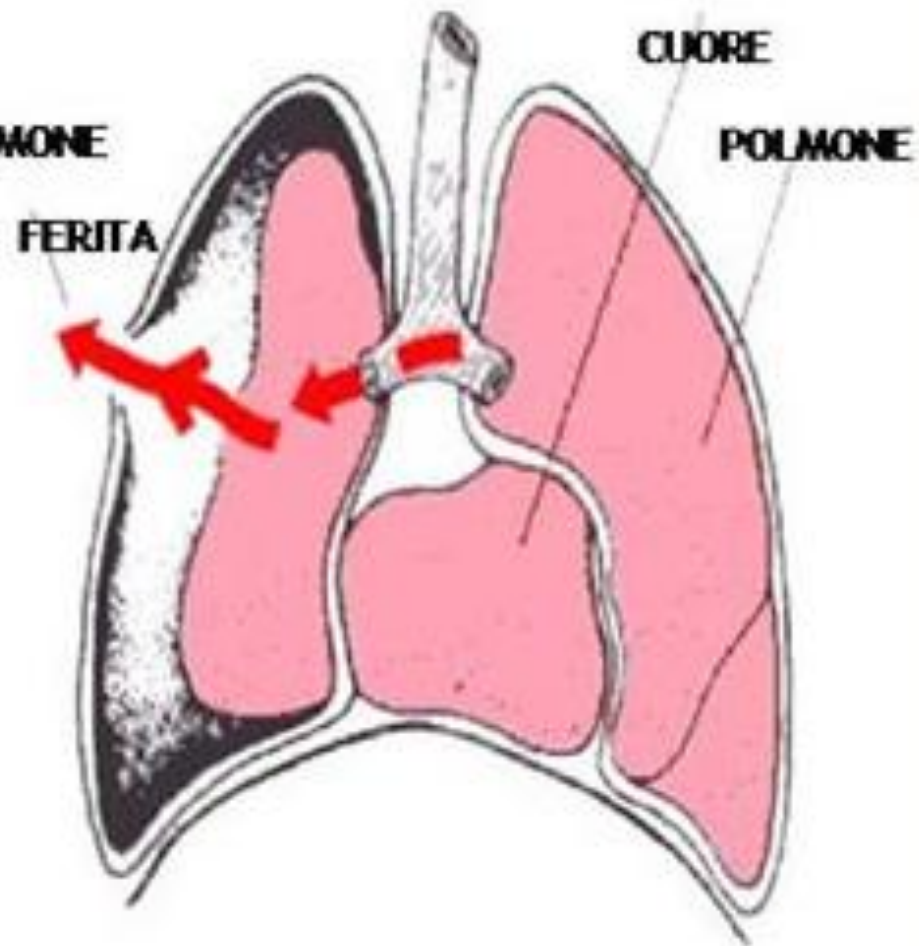
Multiple
stabbing: front

semeiotica chirurgica : <http://www.cdu>





INSPIRAZIONE



ESPIRAZIONE

To-and-fro air motion out of the defect

Open Pneumothorax

Pathophysiology (1 of 2)

- ◆ An open defect in the chest wall (>3 cm)
 - ◆ If the chest wound opening is greater than two-thirds the diameter of the trachea, air follows the path of least resistance through the chest wall with each inspiration.
 - ◆ As the air accumulates in the pleural space, the lung on the injured side collapses and begins to shift toward the uninjured side.

Open Pneumothorax

Pathophysiology (2 of 2)

- ◆ Very little air enters the tracheobronchial tree to be exchanged with intrapulmonary air on the affected side, which results in decreased alveolar ventilation and decreased perfusion.
- ◆ The normal side also is adversely affected because expired air may enter the lung on the collapsed side, only to be rebreathed into the functioning lung with the next ventilation.
- ◆ May result in severe ventilatory dysfunction, hypoxemia, and death unless rapidly recognized and corrected.

Open Pneumothorax

Assessment Findings

- ◆ To-and-fro air motion out of the defect
- ◆ A defect in the chest wall
- ◆ A penetrating injury to the chest that does not seal itself
- ◆ A sucking sound on inhalation
- ◆ Tachycardia
- ◆ Tachypnea
- ◆ Respiratory distress
- ◆ Subcutaneous emphysema
- ◆ Decreased breath sounds on the affected side

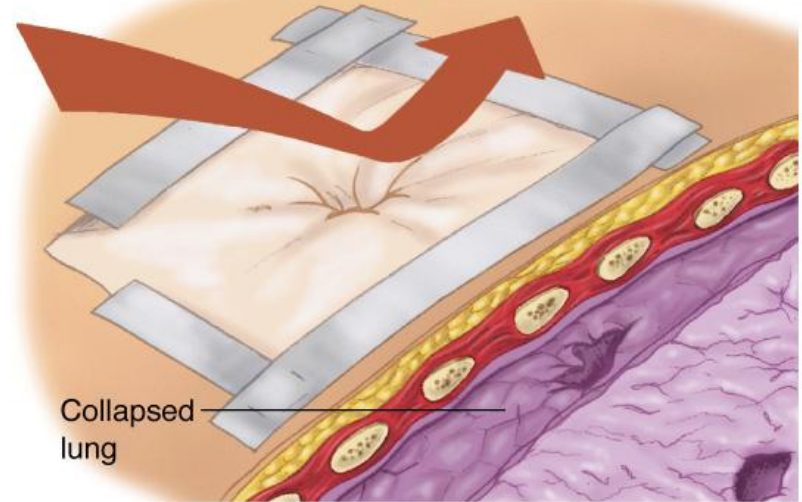
Open Pneumothorax Management (1 of 2)

- ◆ Airway and ventilation:
 - ◆ High-concentration oxygen.
 - ◆ Positive-pressure ventilation if necessary.
 - ◆ Assist ventilations with a bag-valve device and intubation as necessary.
 - ◆ Monitor for the development of a tension pneumothorax.
- ◆ Circulation—treat for shock with crystalloid infusion.

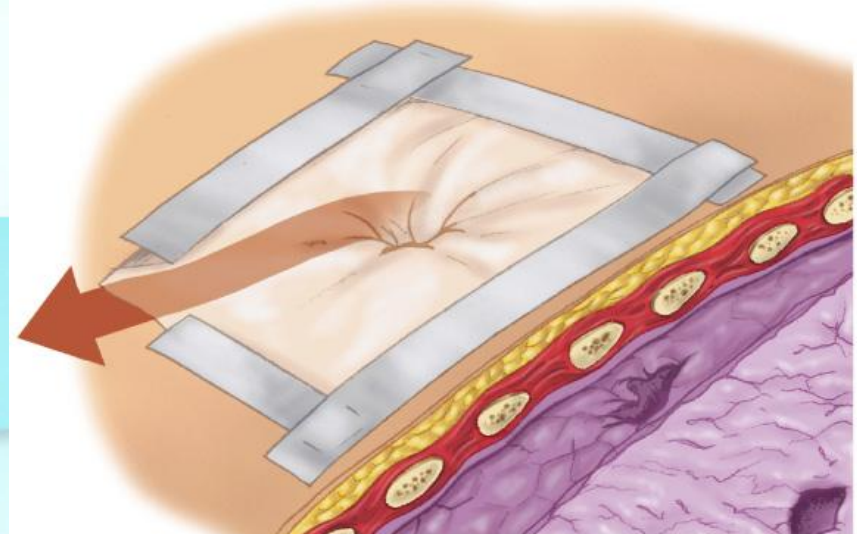
Open Pneumothorax Management (2 of 2)

- ◆ Nonpharmacological
 - ◆ Occlude the open wound—apply an **occlusive petroleum gauze dressing** (covered with sterile dressings) and secure it with tape.

On inspiration, dressing seals wound, preventing air entry



Expiration allows trapped air to escape through untaped section of dressing



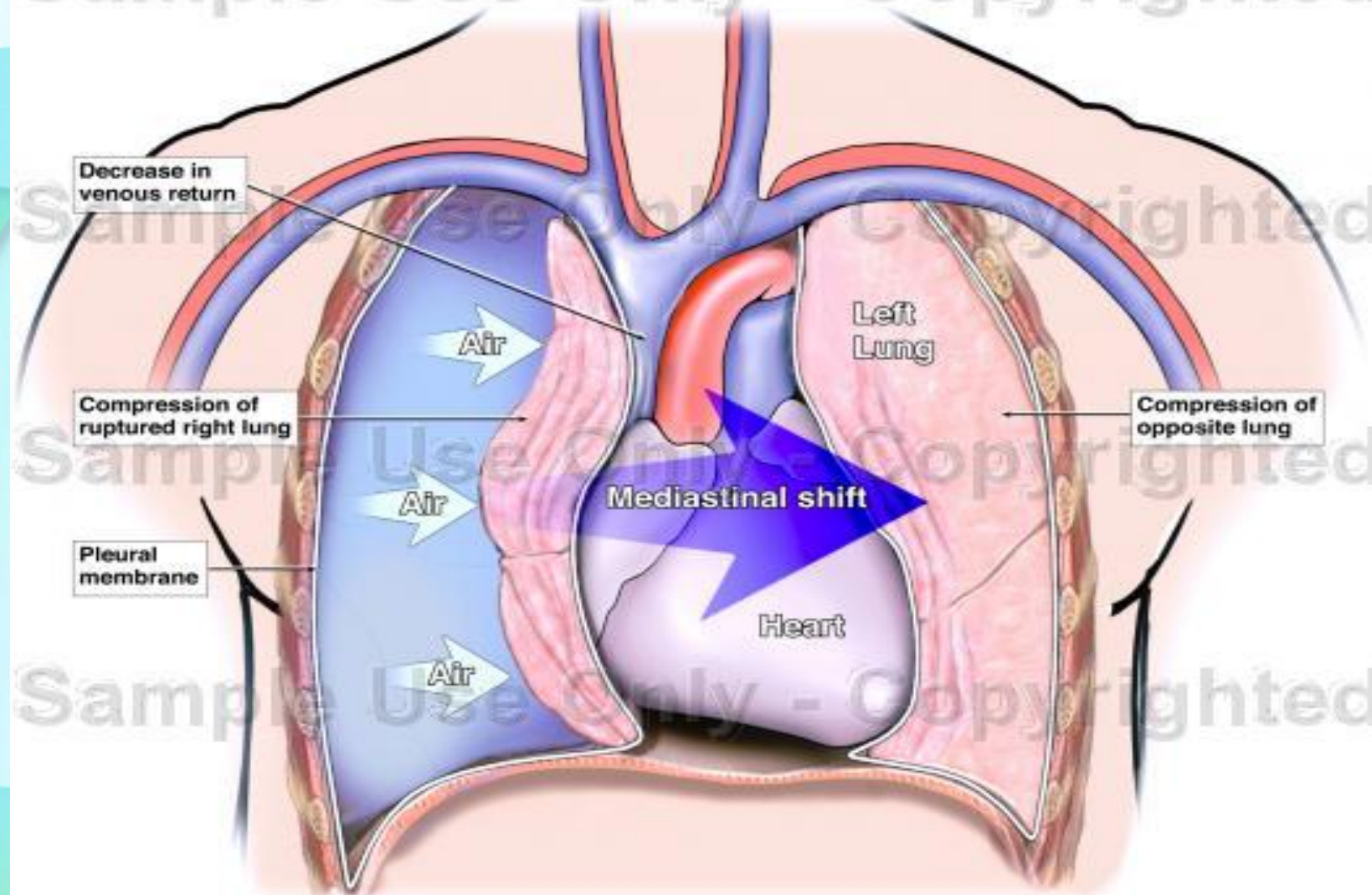
Tension Pneumothorax

- ◆ Associated Injuries
 - ◆ A penetrating injury to the chest
 - ◆ Blunt trauma
 - ◆ Penetration by a rib fracture
 - ◆ Many other mechanisms of injury
- ◆ Occurs when air enters the pleural space from a lung injury or through the chest wall without a means of exit.
- ◆ When air is allowed to leak into the pleural space during inspiration and becomes trapped during exhalation, an increase in the pleural pressure results.

Tension Pneumothorax Pathophysiology

- ◆ Increased pleural pressure produces **mediastinal shift**.
- ◆ Mediastinal shift results in:
 - ◆ Compression of the uninjured lung
 - ◆ Kinking of the superior and inferior vena cava, decreasing venous return to the heart, and subsequently decreasing cardiac output

Tension Pneumothorax



In a tension pneumothorax, air from a ruptured lung enters the pleural cavity without a means of escape. As air pressure builds up, the affected lung is compressed and all of the mediastinal tissues are displaced to the opposite side of the chest.

Tension Pneumothorax Assessment Findings

- ◆ Extreme anxiety
- ◆ Cyanosis
- ◆ Increasing dyspnea
- ◆ Difficult ventilations while being assisted
- ◆ Tracheal deviation (a late sign)
- ◆ Hypotension
- ◆ Tachycardia
- ◆ Diminished or absent breath sounds on the injured side
- ◆ Tachypnea
- ◆ Respiratory distress
- ◆ Bulging of the intercostal muscles
- ◆ Subcutaneous emphysema
- ◆ Jugular venous distention (unless hypovolemic)
- ◆ Unequal expansion of the chest (tension does not fall with respiration)
- ◆ Hyperresonance to percussion

Identification is the most difficult aspect of field care in a tension pneumothorax.

Tension Pneumothorax

Physical Findings

Apprehension,
agitation

Increasing cyanosis,
air hunger
(ventilation severely
impaired)

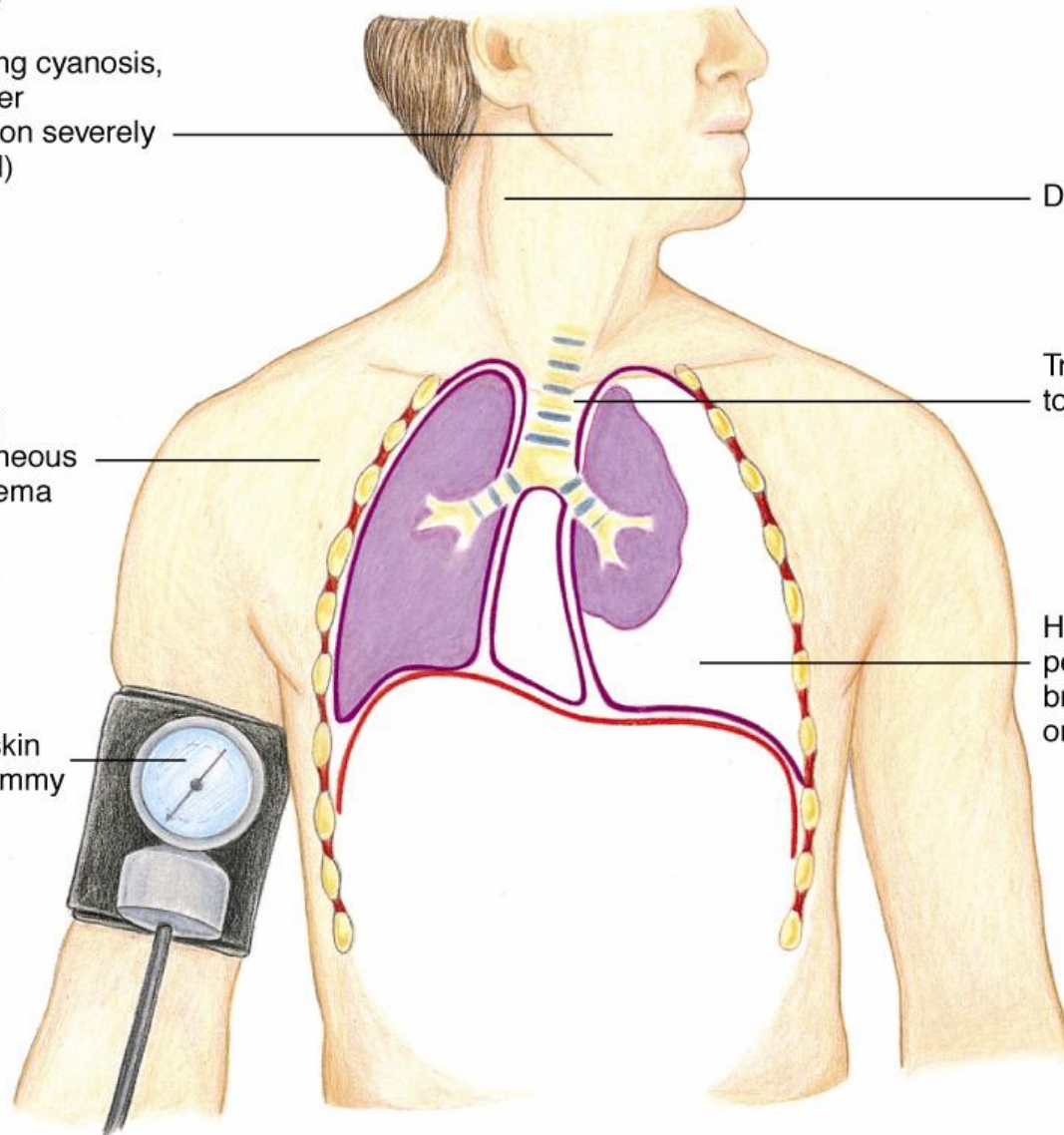
Distended neck veins

Tracheal displacement
toward uninjured side

Possible
subcutaneous
emphysema

Hyperresonant
percussion note;
breath sounds ↓
or absent

Shock; skin
cold, clammy





Chest wall asymmetry
Tension Pneumothorax



semeiotica

Subcutaneous Emphysema
Pneumothorax

Tension Pneumothorax Management (1 of 5)

- ◆ Emergency care is directed at reducing the pressure in the pleural space.
- ◆ Airway and ventilation:
 - ◆ High-concentration oxygen
 - ◆ Positive pressure ventilation if necessary
- ◆ Circulation—relieve the tension pneumothorax to improve cardiac output.

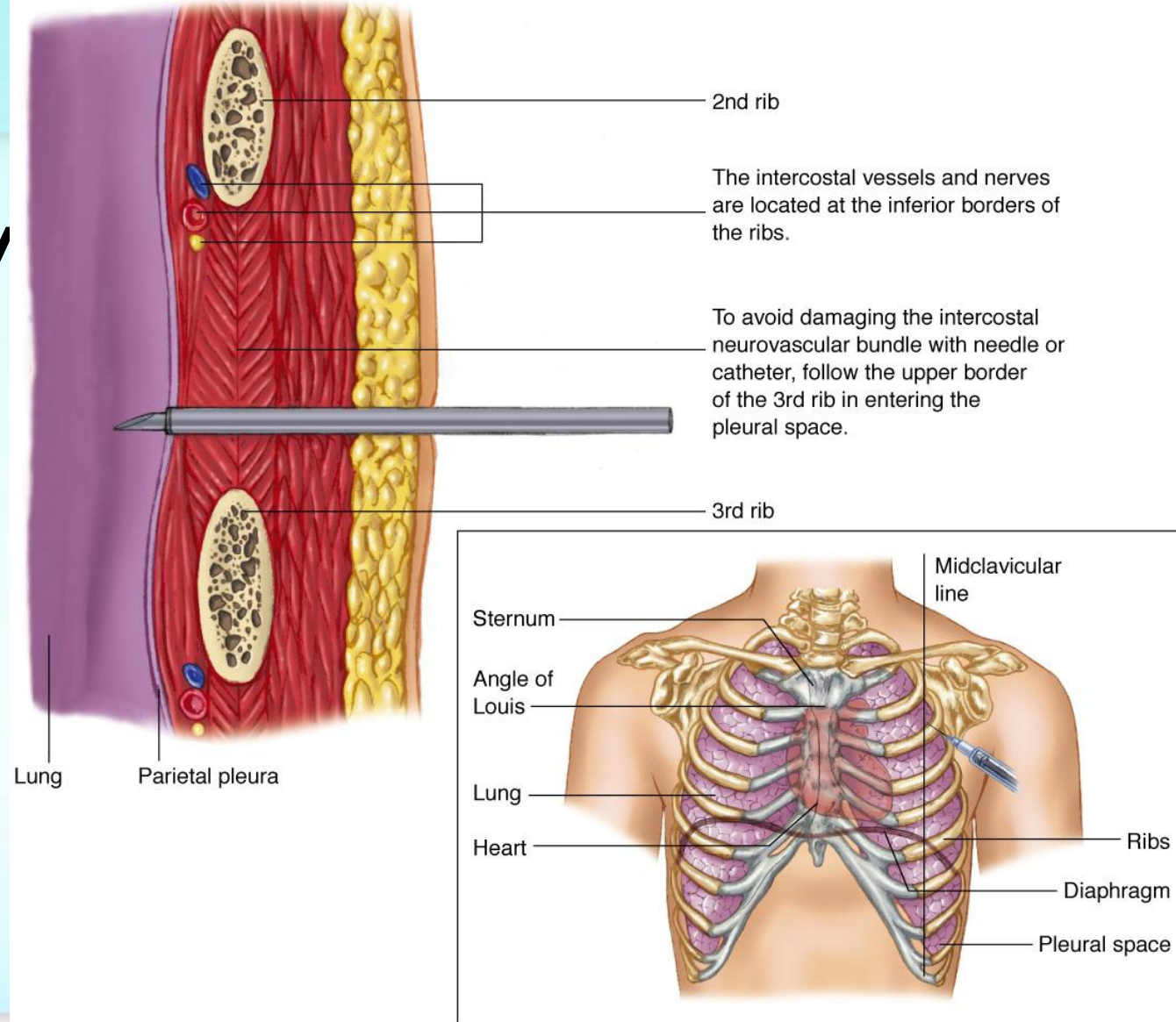
Tension Pneumothorax Management (2 of 5)

- ◆ Nonpharmacological
 - ◆ Occlude open wound
 - ◆ Needle thoracostomy
 - ◆ Tube thoracostomy—in-hospital management

Pleural decompression should only be employed if the patient demonstrates significant dyspnea and distinct signs and symptoms of tension pneumothorax.

Tension Pneumothorax Management (3 of 5)

Needle thoracostomy



Tension Pneumothorax Management (4 of 5)

- ◆ Tension pneumothorax associated with penetrating trauma
 - ◆ May occur when an open pneumothorax has been sealed with an occlusive dressing.
 - ◆ Pressure may be relieved by momentarily removing the dressing (air escapes with an audible release of air).

After the pressure is released, the wound should be resealed.

Tension Pneumothorax Management

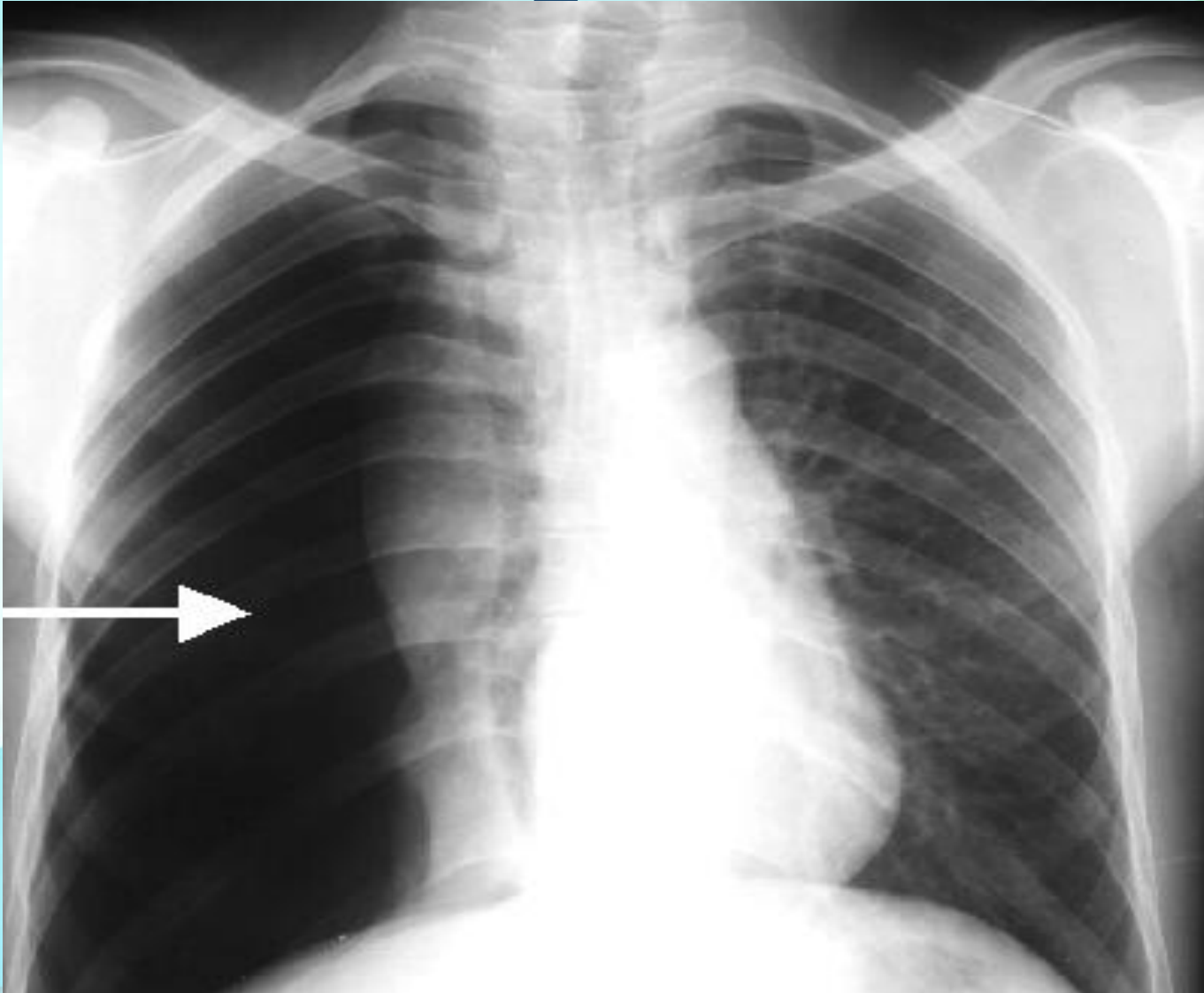
(5 of 5)

- ◆ Tension pneumothorax associated with closed trauma
- ◆ **If the patient demonstrates significant dyspnea and distinct signs and symptoms of tension pneumothorax:**
 - ◆ Provide thoracic decompression with either a large-bore needle or commercially available thoracic decompression kit.
 - ◆ Insert a 2-inch 14- or 16-gauge hollow needle or catheter into the affected pleural space.
 - ◆ Usually the second intercostal space in the midclavicular line

Insert the needle just above the third rib to avoid the nerve, artery, and vein that **lie just beneath each rib.**

PNEUMOTHORAX

Diagnose



PNEUMOTHORAX

Diagnose

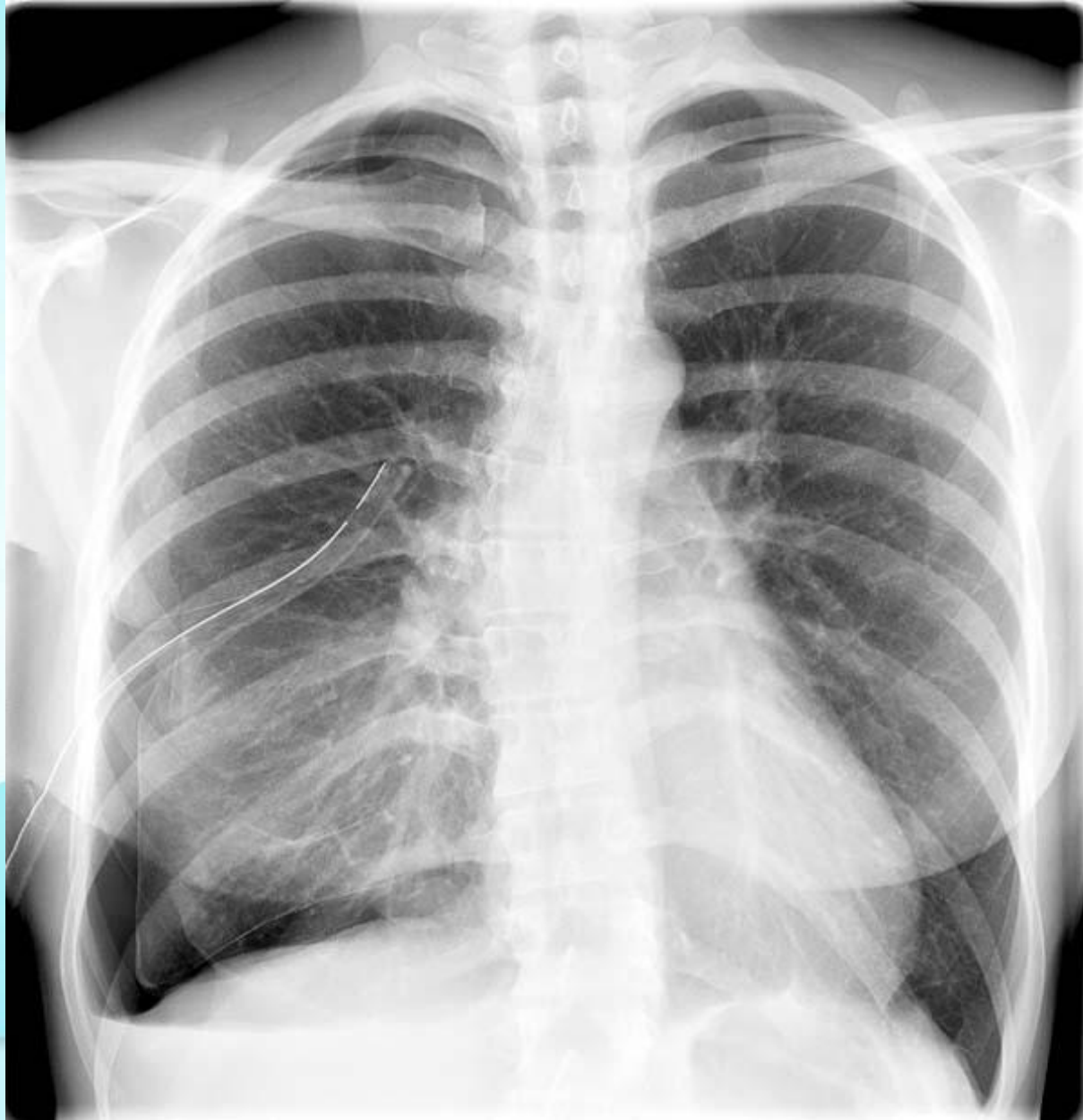


PNEUMOTHORAX

Diagnose

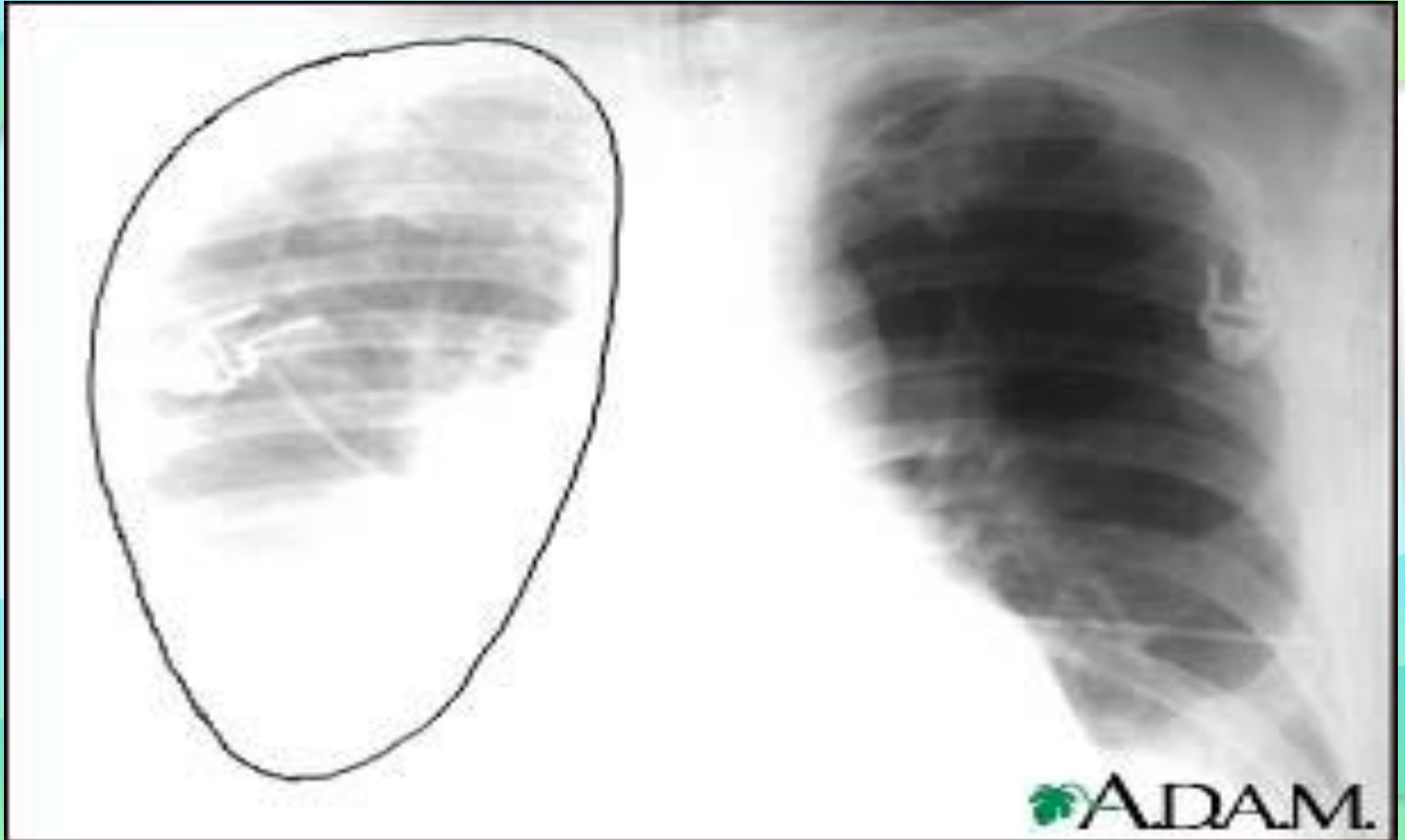


PNEUMOTHORAX Diagnose



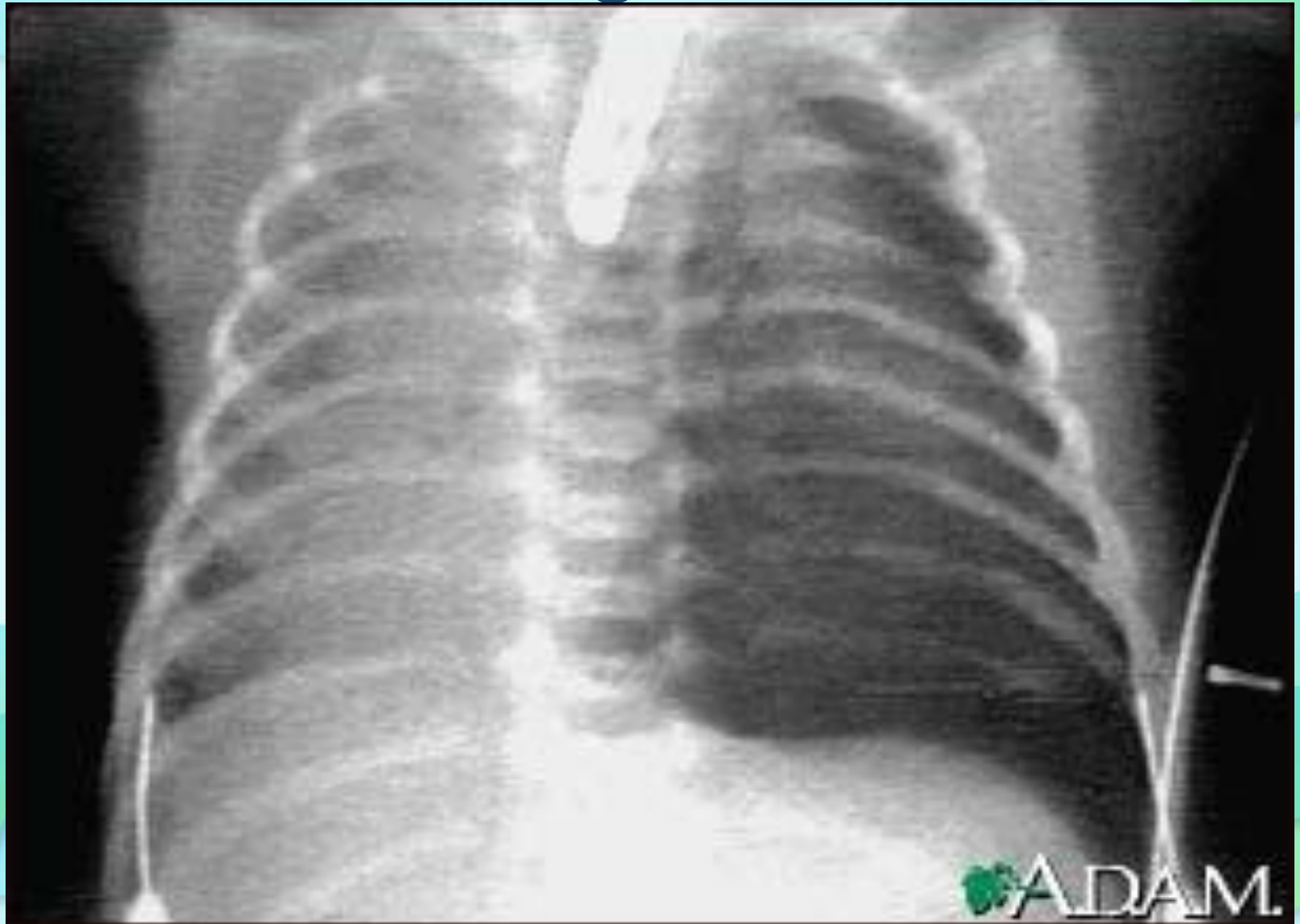
PNEUMOTHORAX

Diagnose



PNEUMOTHORAX

Diagnose

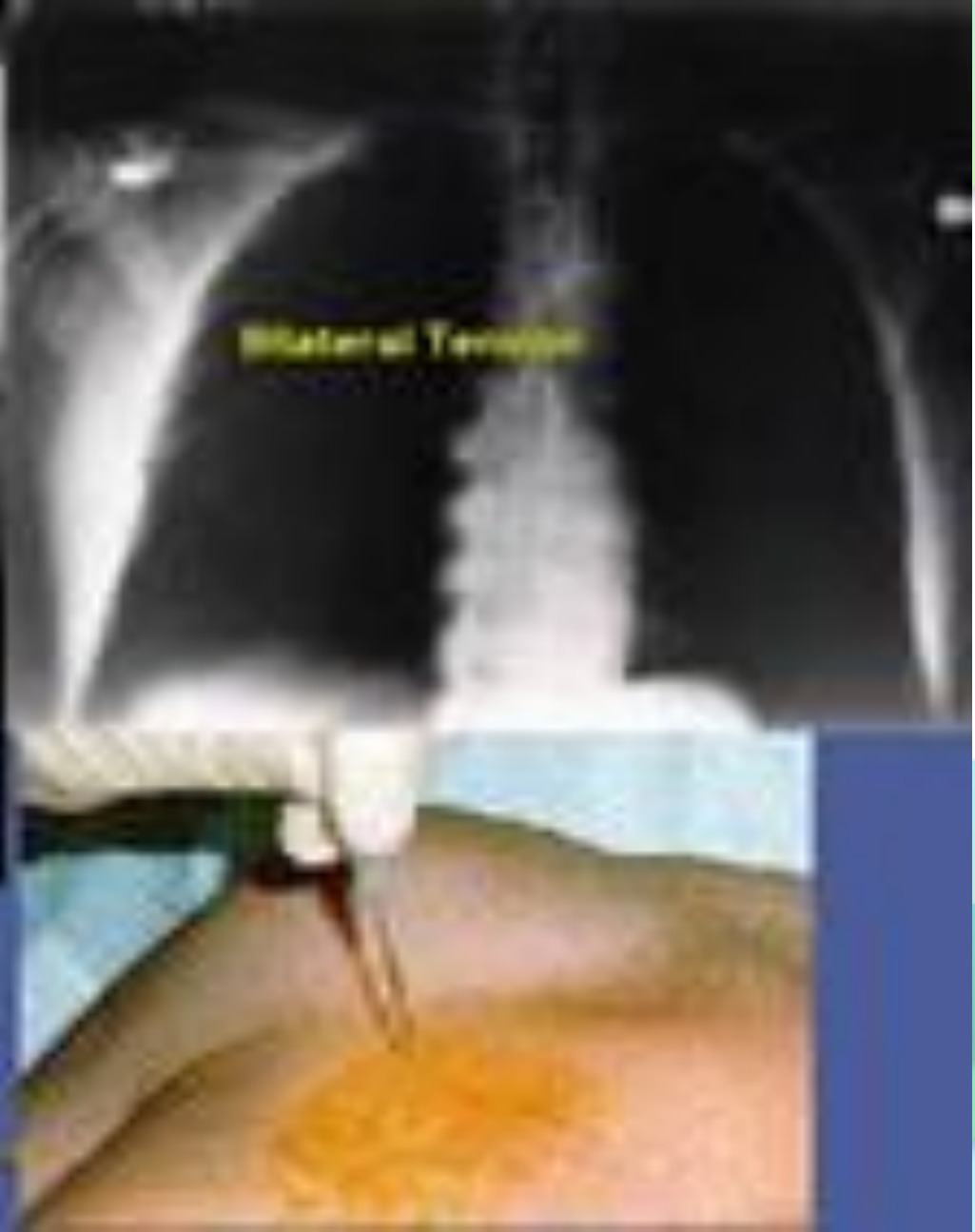


Life threatening condition



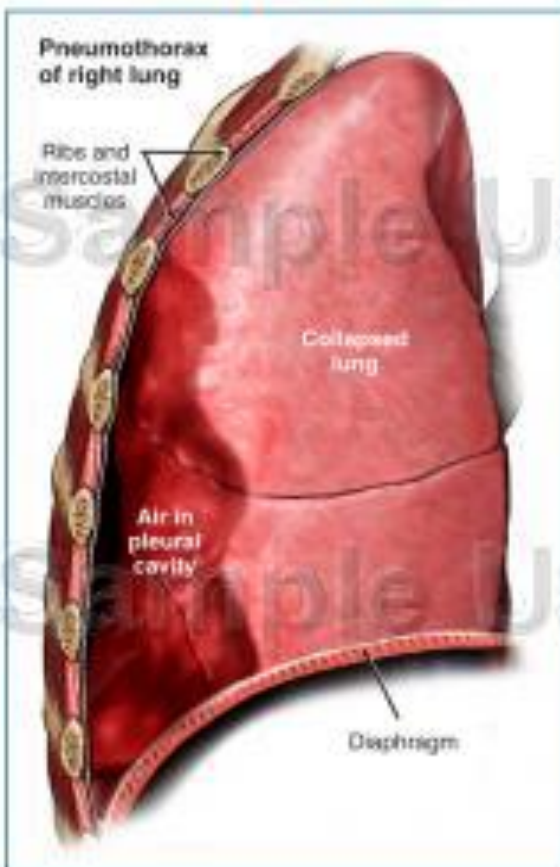
Tension pneumothorax

Tension pneumothorax



Pneumothorax with Thoracostomy Tube Placement and Perforation of the Right Lung

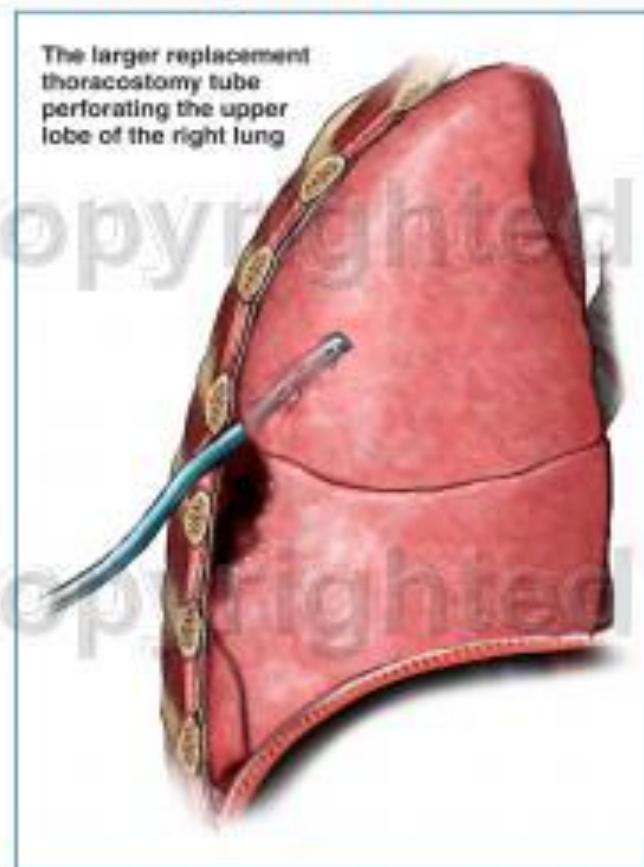
Initial Condition



Initial Repair



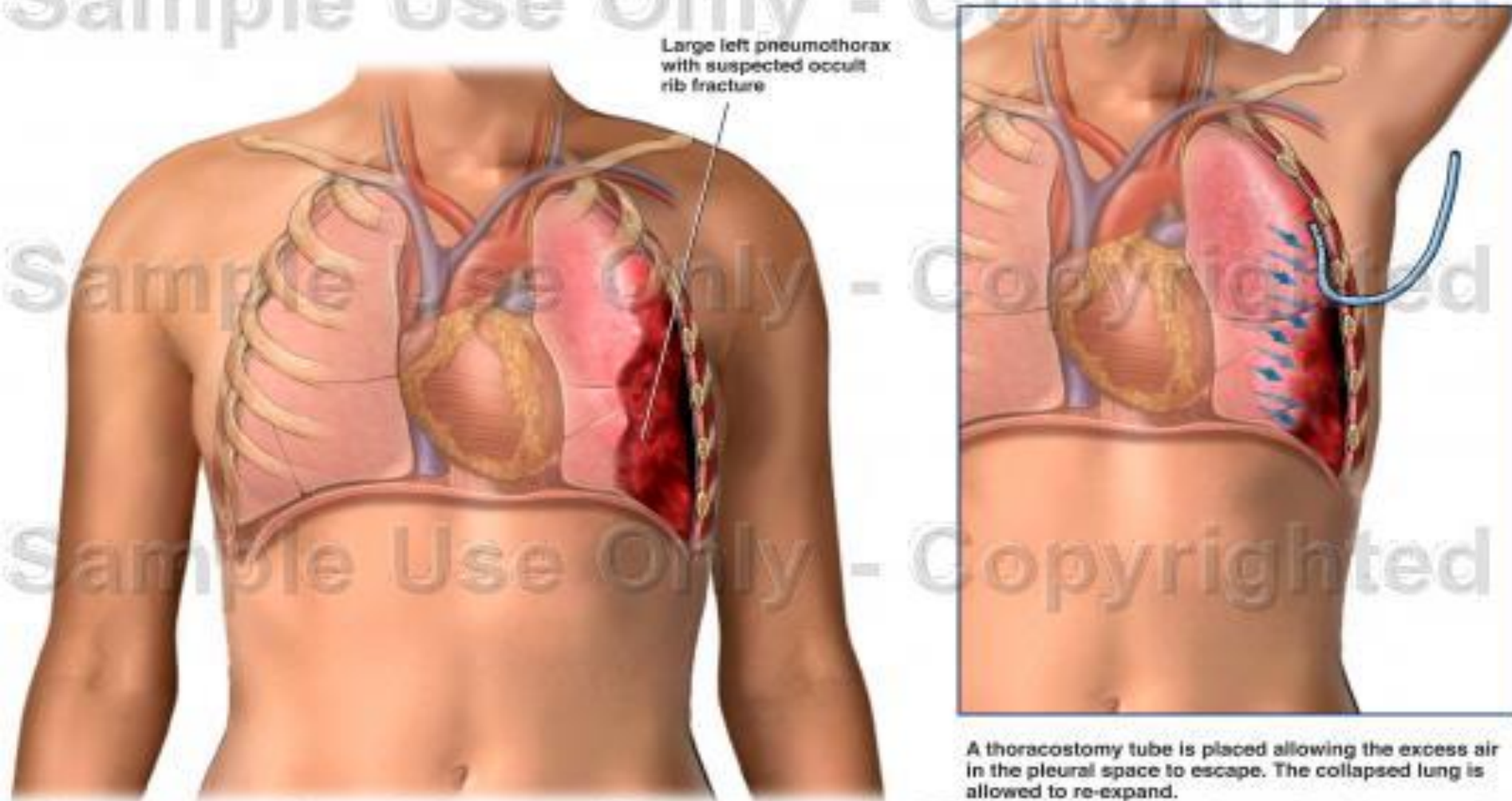
Subsequent Condition



Anterior cut-away

Pneumothorax

Left Pneumothorax with Placement of Chest Tube

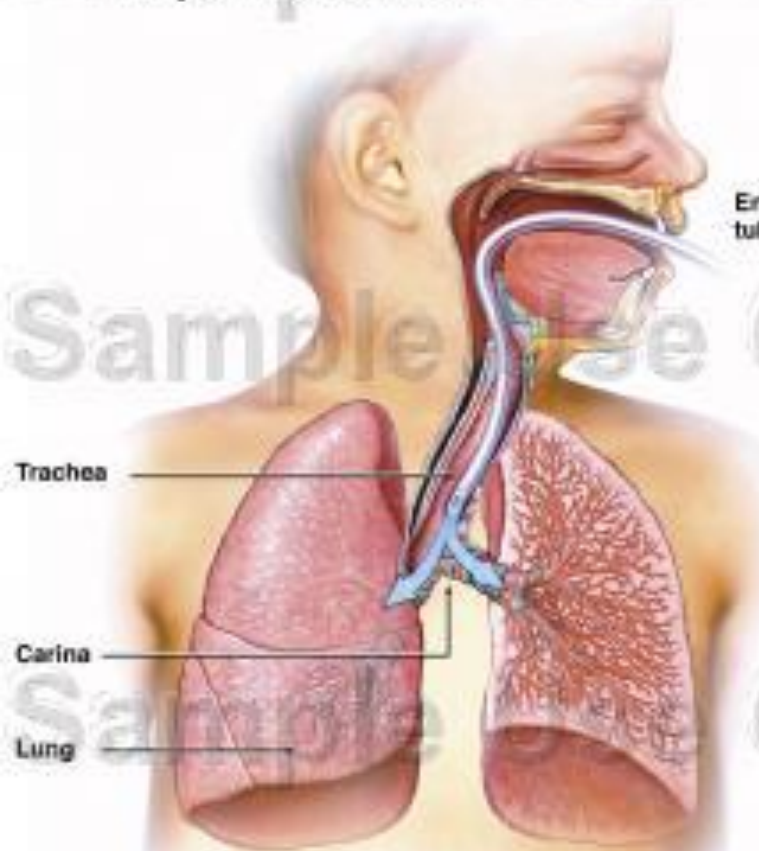


Intubation

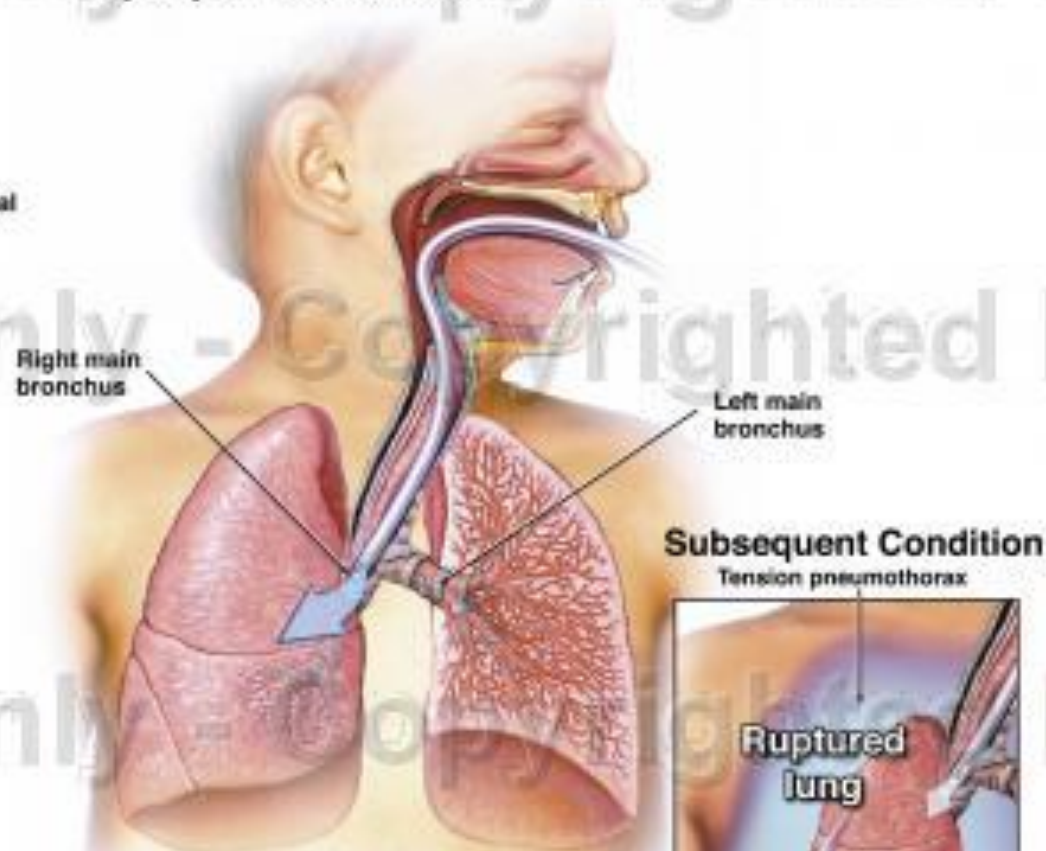
Misplaced Intubation Tube with Rupture of Lung and Tension Pneumothorax

Proper Placement

Improper Placement



The tip of the tube is placed just above the carina in the distal trachea allowing air to enter both of the lungs.

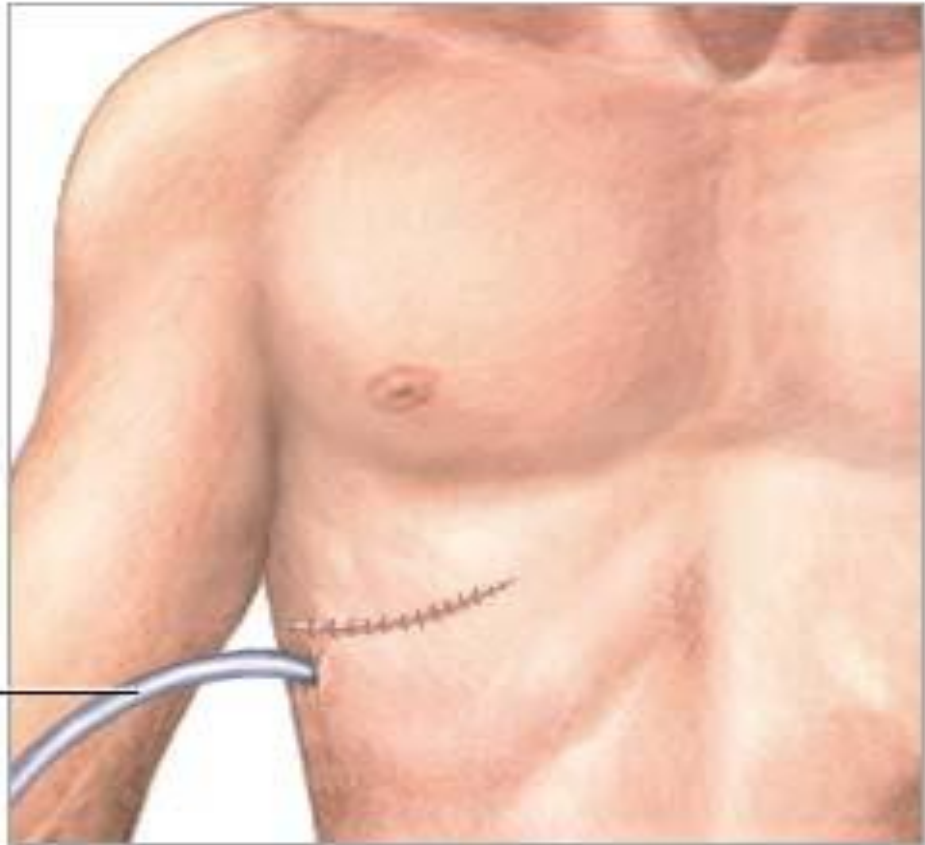


The tip of the tube is placed in the right main bronchus causing over inflation of the right lung and eventual rupture.

Positive pressure in thorax prevents lungs

Buleau Drainage

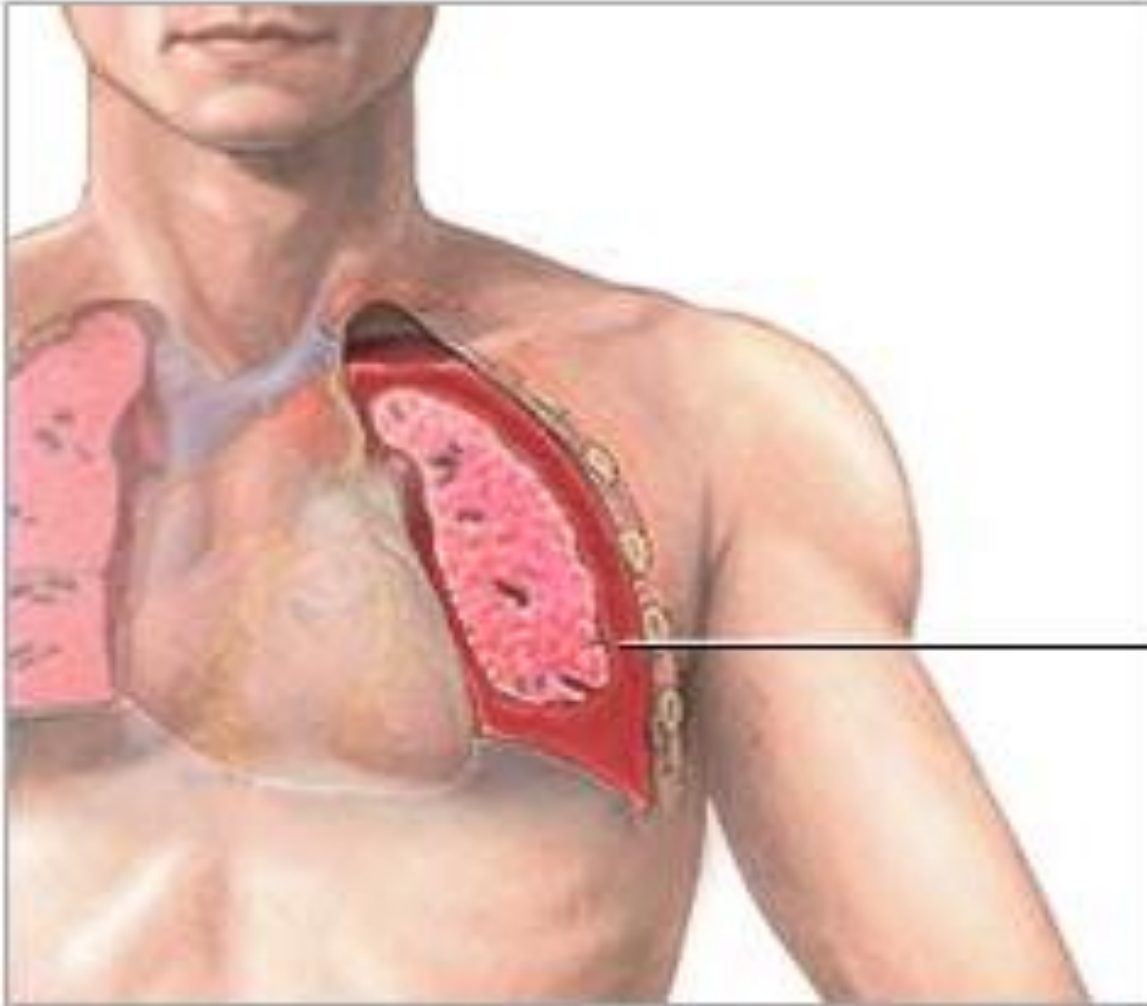
Chest tube



Hemothorax

- ◆ Accumulation of blood in the pleural space caused by bleeding from
 - ◆ Penetrating or blunt lung injury
 - ◆ Chest wall vessels
 - ◆ Intercostal vessels
 - ◆ Myocardium
- ◆ Hypovolemia results as blood accumulates in the pleural space.

Hemothorax



✳ If this condition is associated with pneumothorax, it is called a hemopneumothorax.

Blood in
pleural space

Diagnose of haemothorax

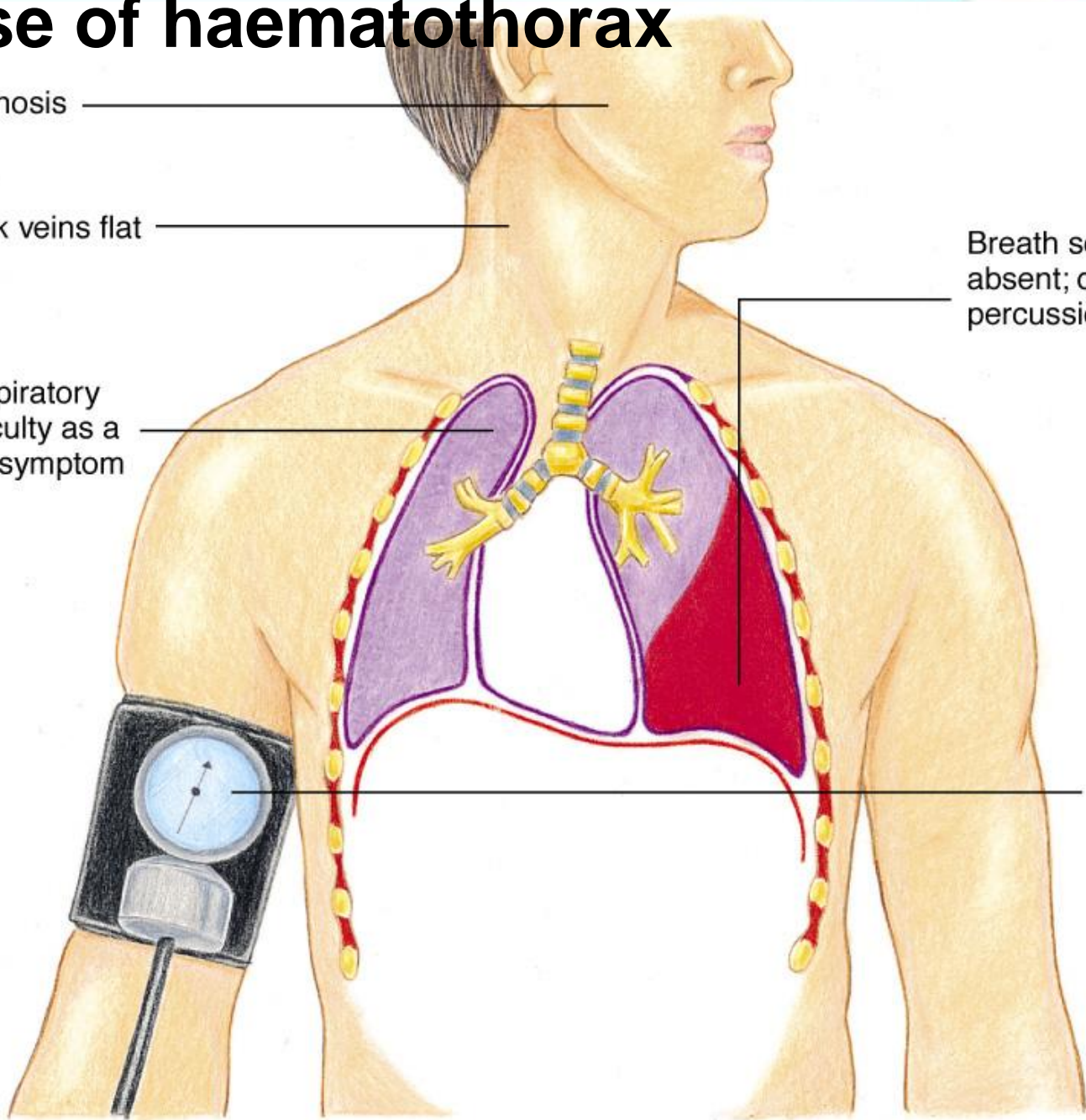
Cyanosis

Neck veins flat

Breath sounds
absent; dull to
percussion

Respiratory
difficulty as a
late symptom

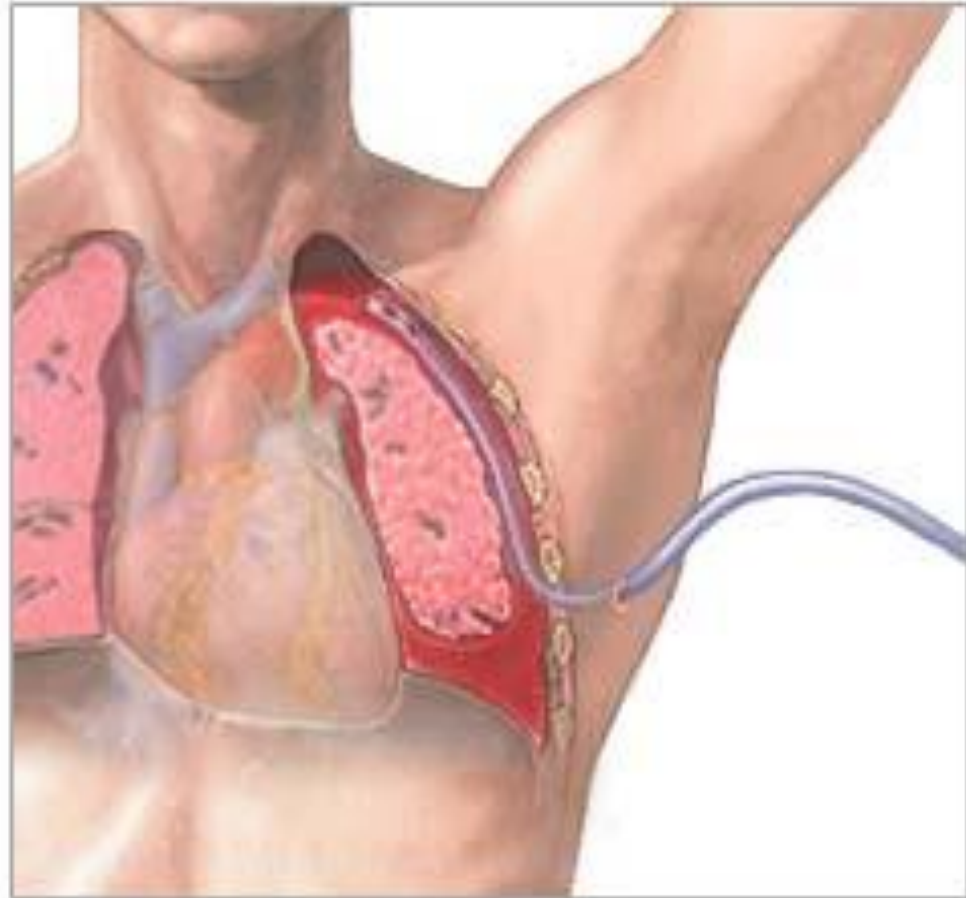
Shock



Haemothorax therapie



Chest tube
drains blood
from the lungs

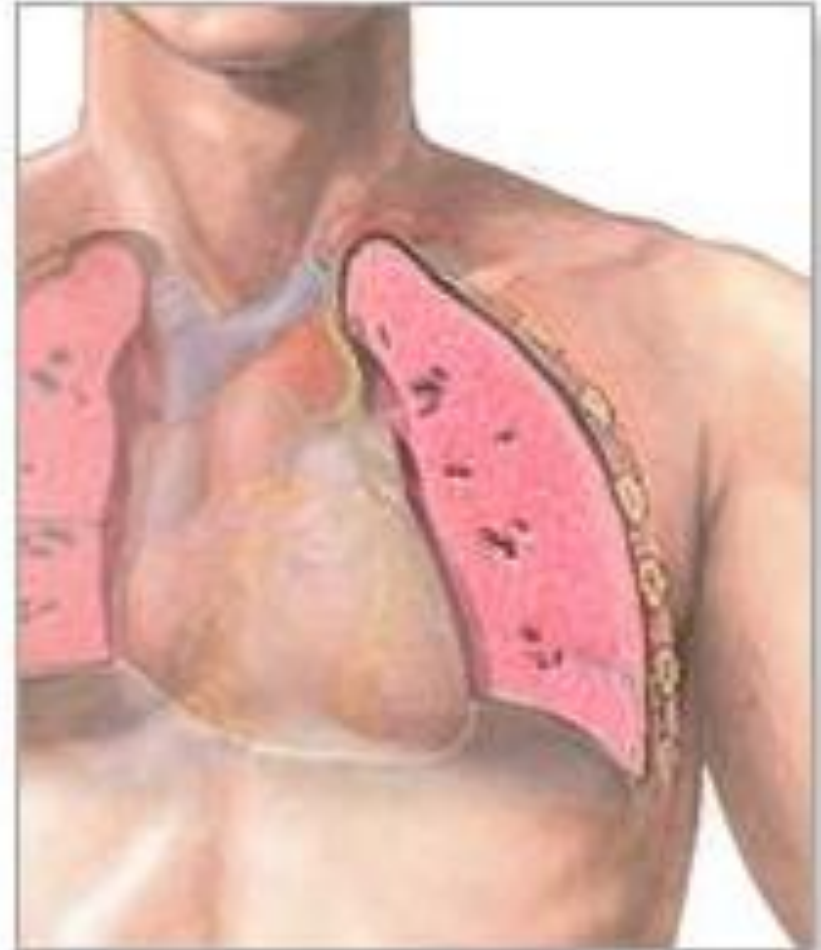


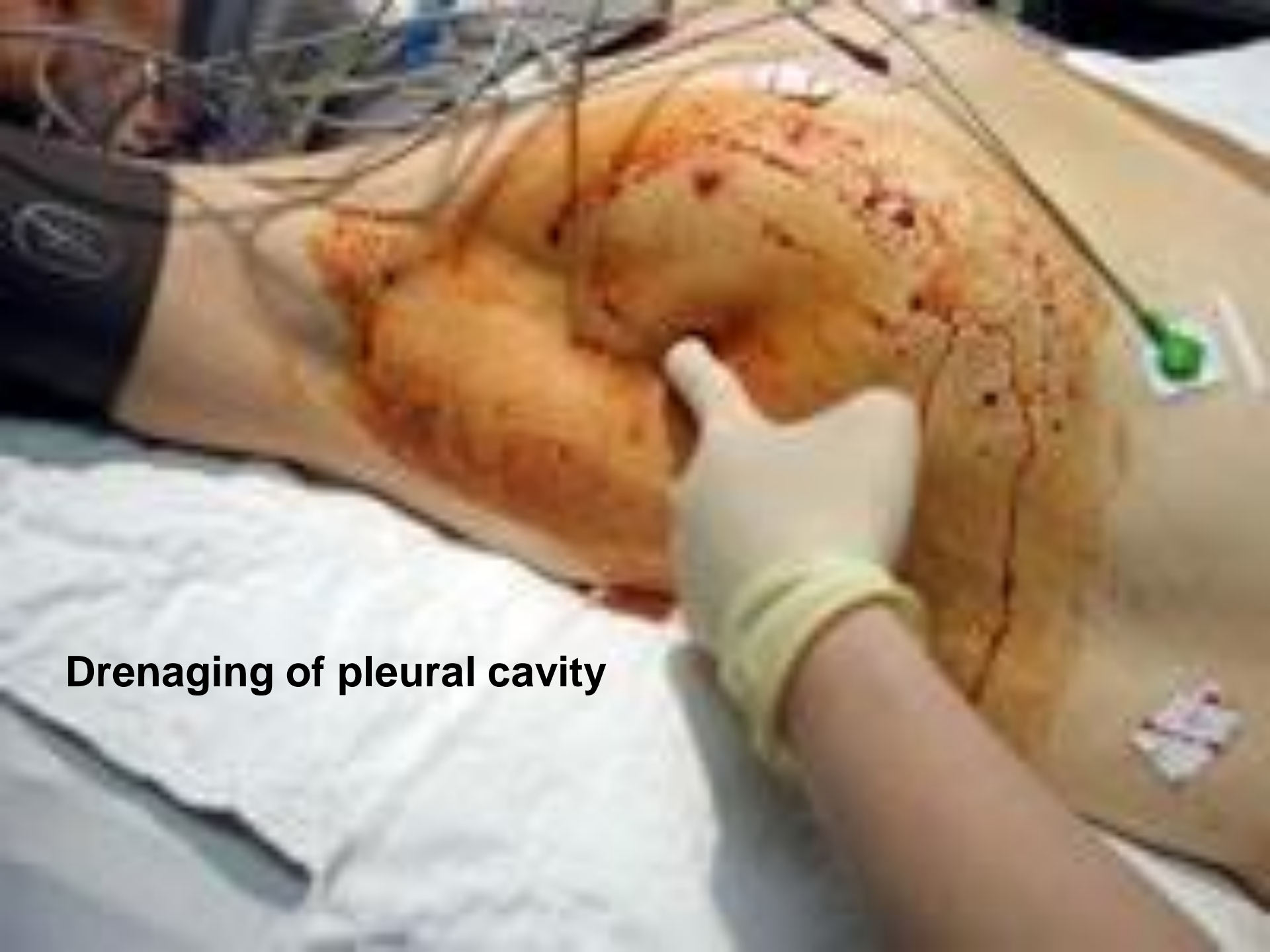
Haemothorax therapie

Before



After





Drenaging of pleural cavity









ABDOMEN

◆ BLUNT TRAUMA:

- ◆ Hemorrhagic abdomen- internal bleeding
- ◆ Peritonitic abdomen

◆ WOUNDS:

- ◆ Penetrating
- ◆ Perforating



Blunt
trauma



Abdominal bleeding

Abdominal bleeding is a serious medical condition characterized by a site of bleeding in the abdomen. It is also known as **intra-abdominal bleeding**, and it can be caused by a number of things, from disease to trauma to the abdomen. This medical condition requires prompt intervention, with the patient usually ending up in surgery so that the source of the bleeding can be identified and addressed. Abdominal bleeding is an especially common concern in the wake of a major trauma such as a car accident.

- ◆ With blunt injuries, massive blood loss may cause hypovolemic shock. Generally, damage to a solid abdominal organ (**liver, spleen, pancreas, or kidney**) **causes hemorrhage**, whereas damage to a **hollow organ (stomach, intestine, gallbladder, or bladder)** **causes rupture** and release of the affected organ's contents (including bacteria) into the abdomen, which, in turn, produces inflammation.

Symptoms of abdominal bleeding

The symptoms of abdominal bleeding can vary.

Pain and tenderness in the abdomen are common, along with distention and rigidity.

The patient may experience nausea and vomiting, and some types of abdominal bleeding result in excretion or vomiting of blood.

If the bleed is severe, the patient may go into shock, a state characterized by confusion, chills, lethargy, and eventual unconsciousness.

Diagnosis

- ◆ The diagnosis is carried out with the help of a number of tests and examinations like, **blood test, CT scan, ultrasound, colonoscopy, endoscopy and angiography.**

- ◆ The **treatment** depends on the location of the bleeding, as well as overall health condition of the patient. On the basis of these, treatment is aimed towards stopping the source of bleeding, and evaluating and repairing the damage.

- ◆ So, proper diagnosis or identification of the source of bleeding is key to the effective treatment of this condition



Segment of small intestine is severely congested due to mesenteric hemorrhage

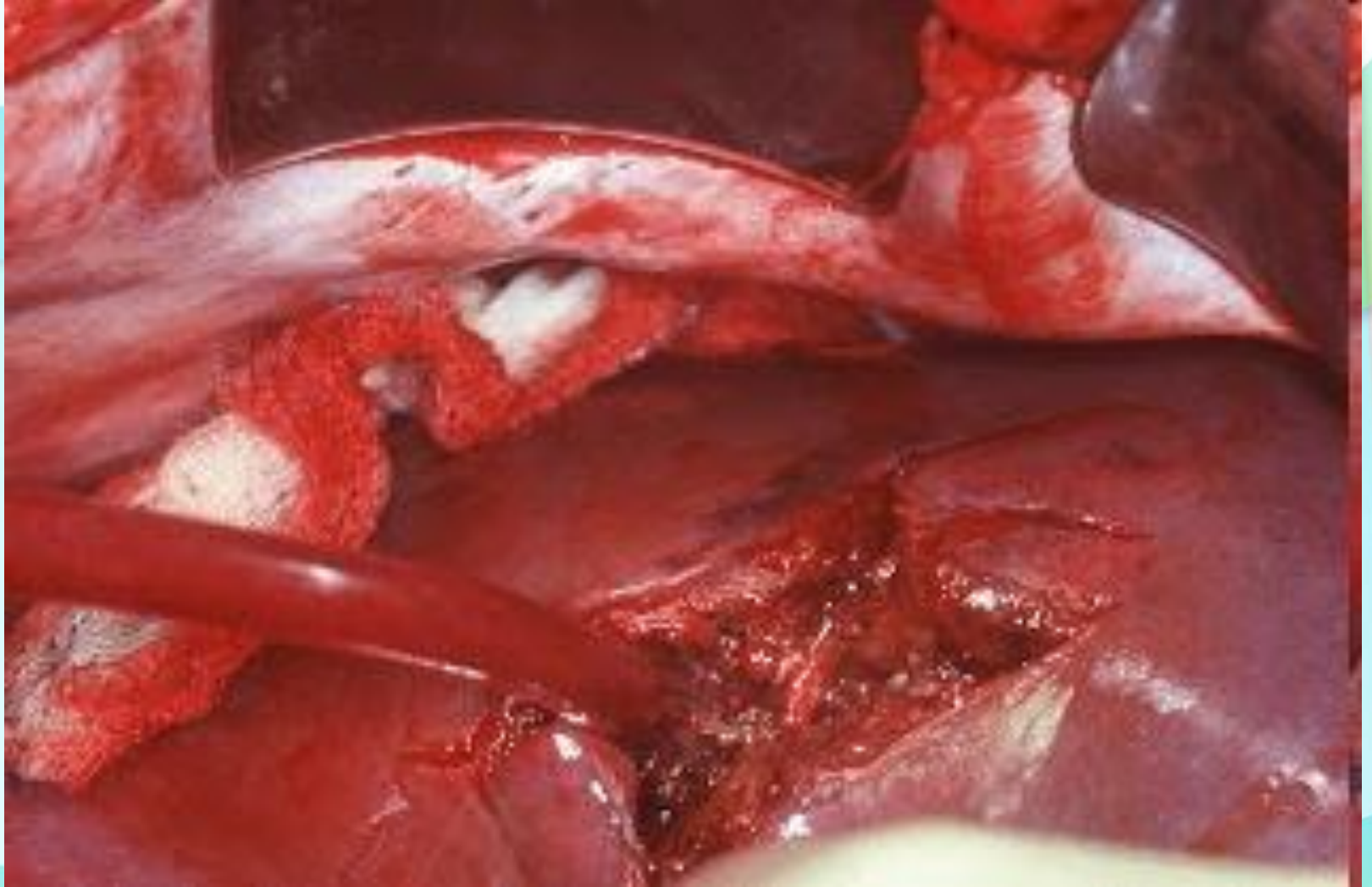


Rapture of lien

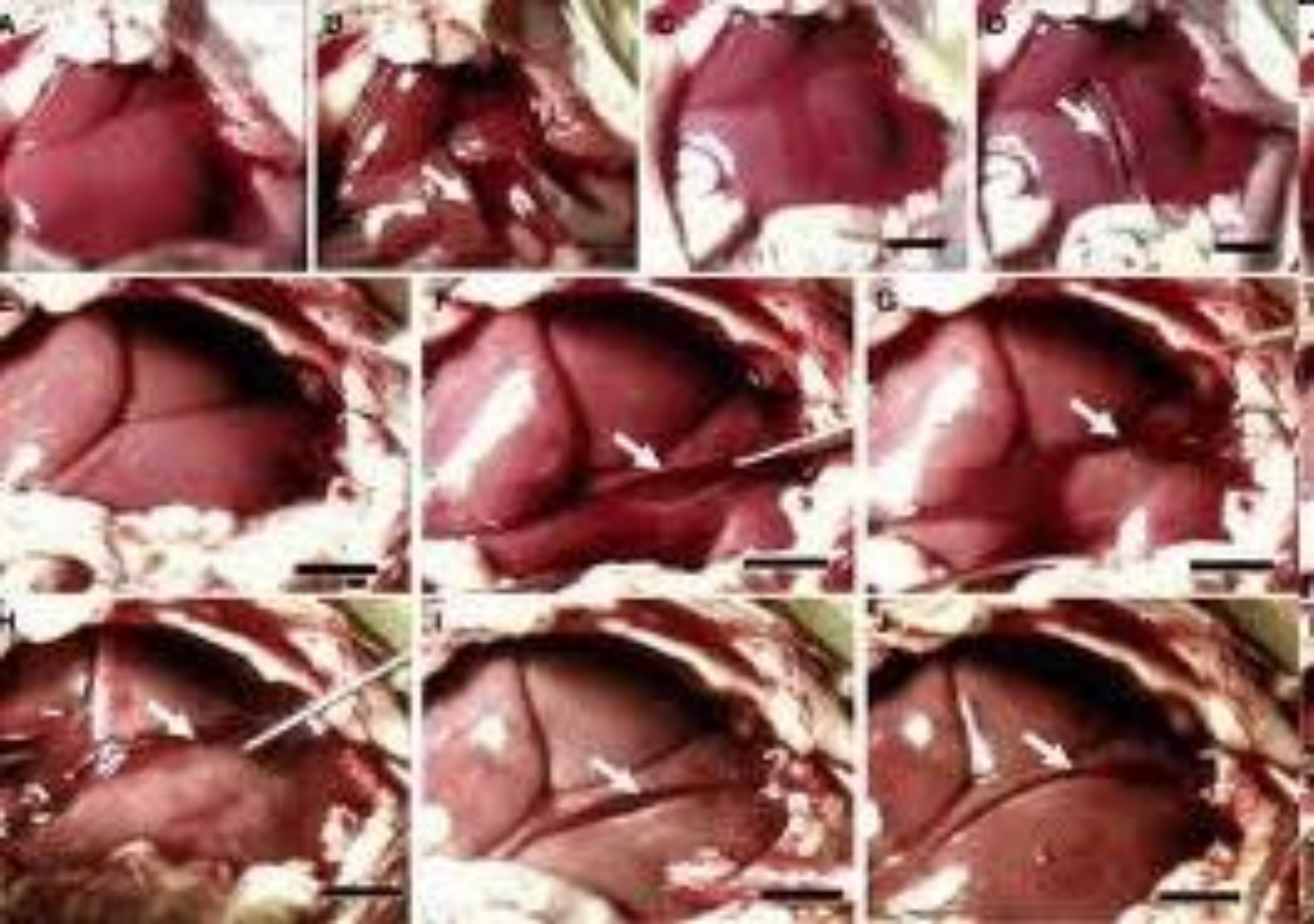


Abruption of part of a liver





- ◆ **This is a liver injury** . The injury has been opened to control bleeding branches of the portal and hepatic veins as well as the hepatic arterial radicles. Several biliary ducts were ligated.



The liver is separated (arrow). Note the profuse bleeding

Fracture of the pelvic bones



External fixation of the pelvis



Primary survey

- ◆ The primary survey aims to identify and treat immediately life-threatening injuries. **“ABCDE”**
- ◆ **Airway control**, stabilize the cervical spine.
- ◆ **Breathing** (work and efficacy).
- ◆ **Circulation** with control of external bleeding.
- ◆ **Disability** or neurologic status.
- ◆ **Exposure** (undressing of the patient).
- ◆ Protect the patient from hypothermia.

I- Airway with C-spine control

- ◆ Assess the airway.
- ◆ Maintain the cervical spine in the neutral position. A hard collar or sandbags and tape.
- ◆ A chin lift, a jaw thrust, or an oropharyngeal airway to overcome upper airway obstruction. Suction of secretions & vomitus.
- ◆ Cricothyroidectomy or emergency tracheostomy.

II- Breathing

Assess the work of breathing and its efficacy by conducting the following:

- ◆ **Inspection**

- ◆ Distressed, tachypneic, grunting or wheezing
- ◆ Are signs of disruption to the chest wall evident or using accessory muscles?
- ◆ Does paradoxical movement occur (flail chest)?

III- Circulation and hemorrhage control

- ◆ Urgent treatment of exsanguinating hemorrhage or shock is lifesaving.
- ◆ It includes identifying and managing external hemorrhage.
- ◆ This priority can be controlled with a pressure dressing.

Shock in trauma patients

- ◆ It is defined as inadequate organ perfusion and tissue oxygenation, is caused most commonly by hypovolemia.
- ◆ Shock secondary to tension pneumothorax, cardiac tamponade, or spinal cord injury also may occur.
- ◆ Signs of shock include tachypnea, tachycardia, poor pulse volume, hypotension, pallor, poor capillary refill, oliguria, and a depressed level of consciousness & the neck veins may be flat.

Shock

- ◆ Healthy mental status generally implies an adequate cerebral perfusion pressure, while diminished mentation may be associated with shock with or without intracranial trauma.

Circulation & Hemorrhage

- ◆ Insert **2 large-bore peripheral lines** (14-gauge), obtaining relevant blood samples.
- ◆ Start volume resuscitation. The **ATLS** advice a **2000-cc crystalloid volume challenge**.
- ◆ If hypotension is unresponsive to this fluid challenge it implies massive hemorrhage.
- ◆ It is a trigger for blood, packed RBCs or un cross-matched blood transfusion and immediate surgical intervention.

IV- Disability

- ◆ During the resuscitation of a trauma victim, a brief assessment of **neurologic status** should be performed. This assessment should include the patient's posture (i.e. normal, symmetrical, decerebrate, decorticate),
- ◆ Pupil asymmetry, pupillary response to light, and a global assessment of patient responsiveness.

V- Exposure

- Patients should be completely un-dressed during the initial assessment to ensure that significant injuries are not missed.
- Prevent significant hypothermia, using a warm ambient room (28-30°C), overhead heating, and warmed IV fluids, the temp. is monitored & maintained at 37°C.



Thanks
for your
attention!

"Doc told me I have brain damage.
As my manager responsible for this,
it's time for me to damage yours!"