Regional injuries and Sequelae

Dr. Asela Mendis

Regional injuries comprise of injuries to various anatomical locations.

Include injuries to the head, spine, neck, chest, abdomen, bones, limbs and joints.

This lecture will deal with all types of regional injuries except head injuries.

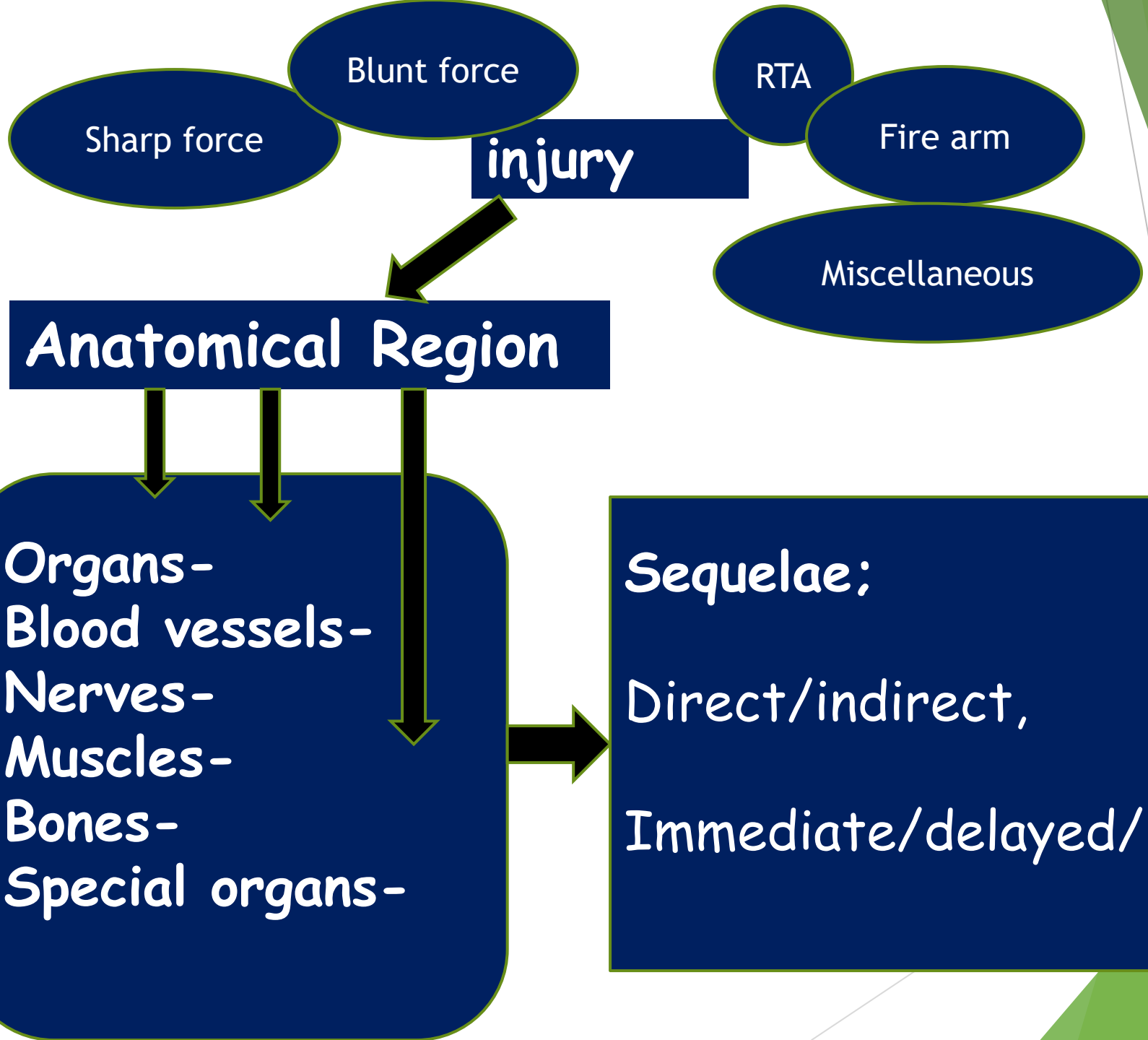
Objectives

- Understand the importance of injury types in relation to the anatomical site.
- Understand the mechanism of or the reasons for particular injury.
- Understand the importance of underlying and associated structures and organs.
- Develop skills necessary to analyze the types and pattern of injuries in different types of trauma.

Why do you need to know these?

- **Determining the manner/circumstance of death or injury.**
- **Determining the cause of death.**
- **Formulating opinion on mechanism of death.**
- **Coexistence of disease and trauma.**

- Complications of therapy.
- Intoxications.
- Intentional cessation of life support.
- Compensation issues.


Blunt force
Sharp force
injury
RTA
Fire arm
Miscellaneous
Anatomical Region
Organs-
Blood vessels-
Nerves-
Muscles-
Bones-
Special organs-
Sequelae;
Direct/indirect,
Immediate/delayed/late

There are

- Different types of injuries.
- Different degrees of injuries.
- Involvement of different organs.
- Involvement of important and vital structures.

Therefore when an injury occur;

there are different sequel/complications which depends on the structures involved.

Many people die as a result of traumatic injuries;

- Often within seconds,
- Minutes or
- Hours.

However some die days or weeks later

Occasionally a person might die years after.

In some cases injuries cause a significant amount of morbidity as well.

In most cases it is due to a complication arising out of the injury.

These sequelae or complications can be sub-divided in to

immediate,

delayed and

late

complications.

Another way to classify is as direct and indirect complication.

Direct sequelae:

Haemorrhage; -

- Sudden circulatory failure and death.
- Haemopericardium causing cardiac tamponade, Haemo/haemopneumo- thorax
- Raised intracranial pressure
- Brain stem haemorrhages

Shock; less rapid haemorrhage lead to shock.

- Circulatory failure.
- Hypovolaemic shock.
- Renal failure from acute tubular necrosis.
- Disseminated intra-vascular coagulation.

Damage to vital organs. – brain, heart, lungs, liver, kidneys

Unexpected causes. – reflex cardiac arrest, neurogenic shock caused by severe pain.

Indirect sequelae

Infection:

Septicaemia, tetanus, gas gangrene, bed sores, Pneumonia; including hypostatic pneumonia.

Fat embolism,

Air embolism,

Pulmonary embolism.

Injury aggravating pre-existing diseases - ischaemic heart disease, hypertension, liver failure, renal failure

Surgical repair of injuries under anaesthesia. - anaesthetic misadventure, surgical misadventure.

Remote complications – epilepsy following head injury, rupture of aneurysms, adhesions, hernia etc.

Anatomical regions involved;

- Face
- Neck
- Chest
- Abdomen
- Upper limb
- Lower limbs
- Neuro-vascular structure
- Spinal cord

What are the sequelae of injuries?

History of Traumatic Event

- What was the mechanism of injury?
- Was the patient mobile, restrained, or stationary?
- Is the injury the result of blunt or penetrating trauma?
- Was the object that caused the injury mobile or stationary?
- Can the degree of energy transfer be estimated?
- Are there any associated thermal or chemical injuries present?

Face

Approach to the Patient with Traumatic Injury of the Face

- Facial trauma is defined as injury to the soft tissues of the face (including the ears) and to the facial bony structures.
- May result in hemorrhage and airway obstruction accompanied by multisystem involvement (as many as 60% of patients have associated injuries)
- Evaluation includes history, physical exam, and diagnostic imaging

Facial injuries

- Mortality
  - Primarily associated with brain and spine injury
  - Severe facial fractures may interfere with airway and breathing
- Morbidity
  - Disability concerns
  - Cosmetic concerns

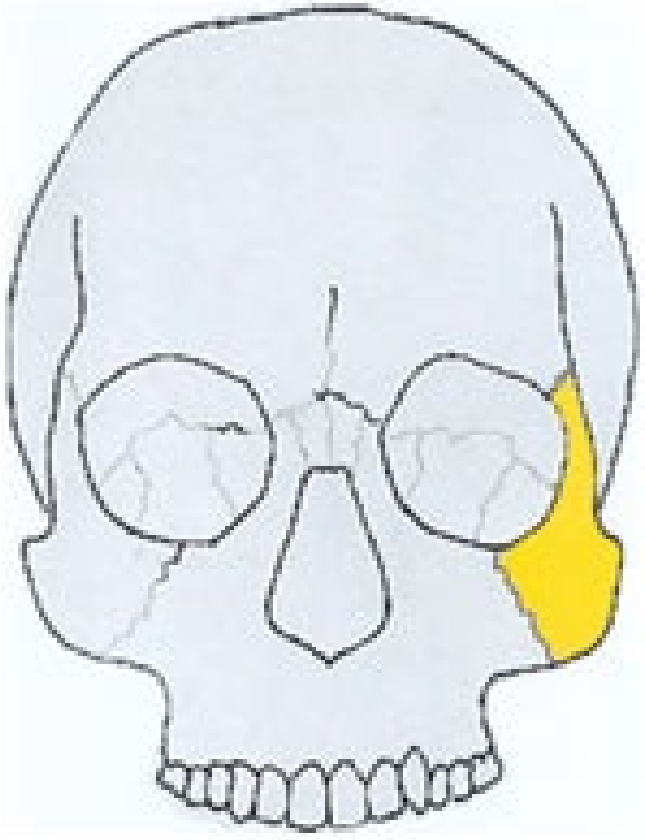
Facial trauma

- Seldom life-threat unless injury involves the airway
- Spinal motion restriction
- Airway is the most difficult and most critical priority
- Consider early intubation
- Suction and control bleeding
- Critical trauma patient - transport accordingly

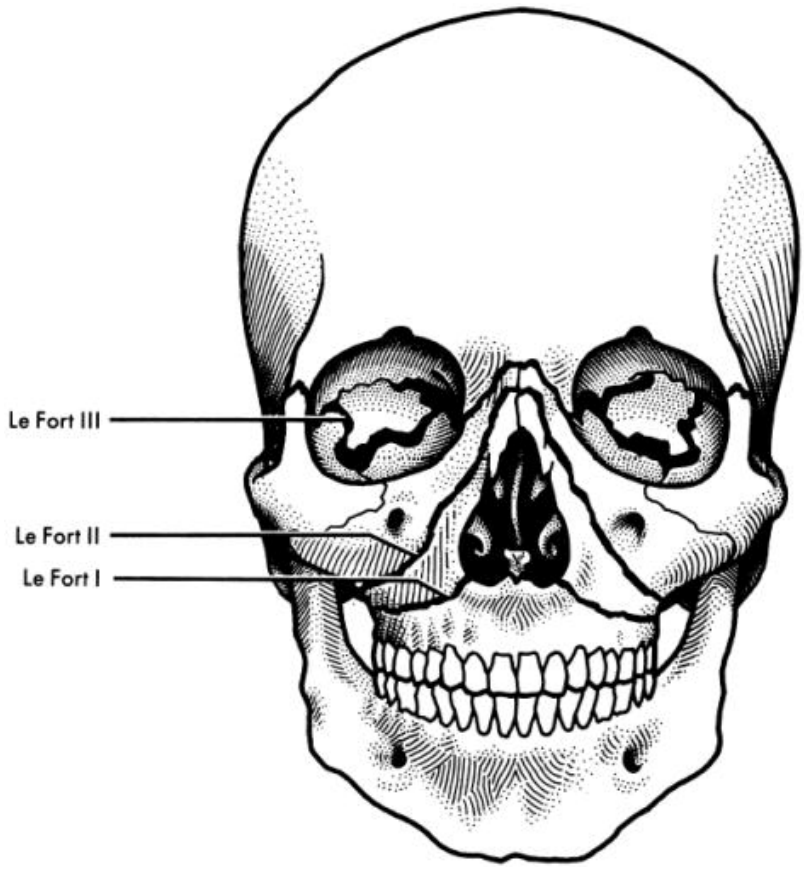
Facial trauma

- Causes
  - MVC, home accidents, athletic injuries, animal bites, violence, industrial accidents…
- Soft tissue
  - Lacerations, abrasions, avulsions
  - Vascular area supplied by internal and external carotids

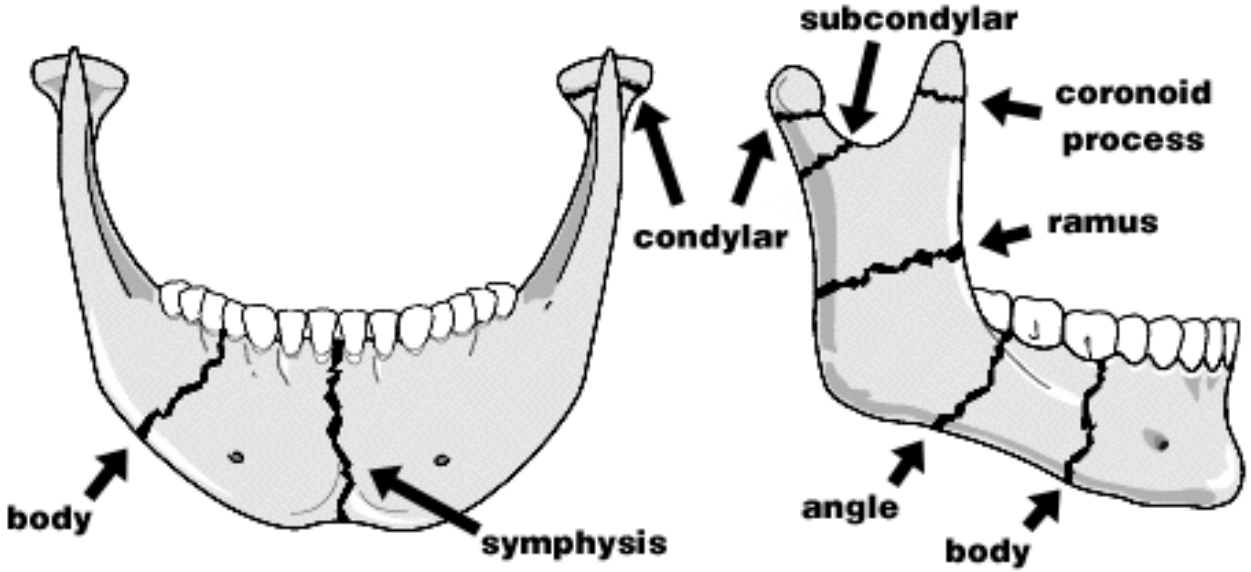
Zygomatic Fractures



Maxillary Fractures



Mandibular Fractures



- Any patient with malocclusion after facial trauma is assumed to have mandibular fracture until proven otherwise

Ear Pathologies

- Auricular Hematoma
- Tympanic Membrane Rupture
- Otitis Externa
- Otitis Media

Ear
Auricular Hematoma

Figure 1: Courtesy of Sandra E. Lane, MD

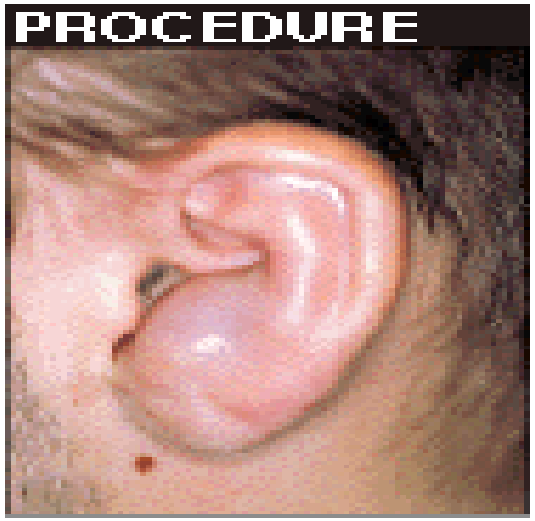


Figure 1. Auricular hematoma in a wrestler.

Figure 2: Courtesy of Sandra E. Lane, MD

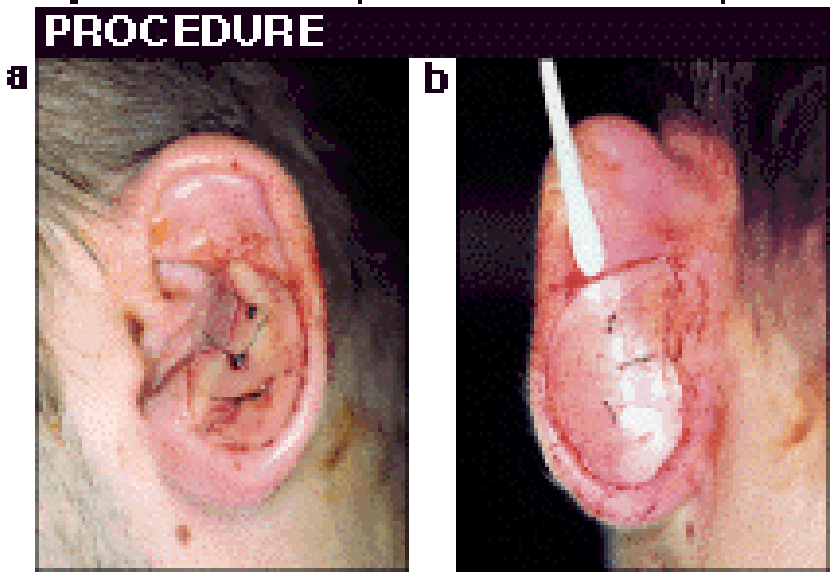
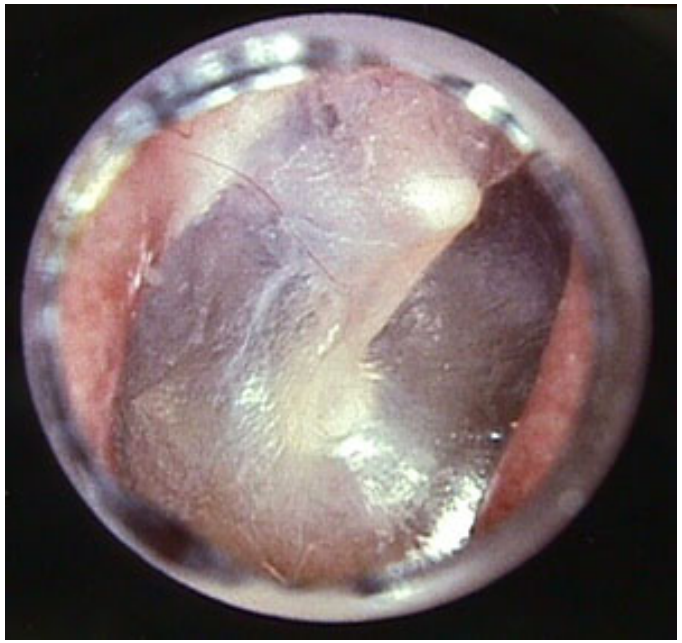


Figure 2. Anterior (a) and posterior (b) placement of the silicone splint.

Ear
Tympanic Membrane Rupture

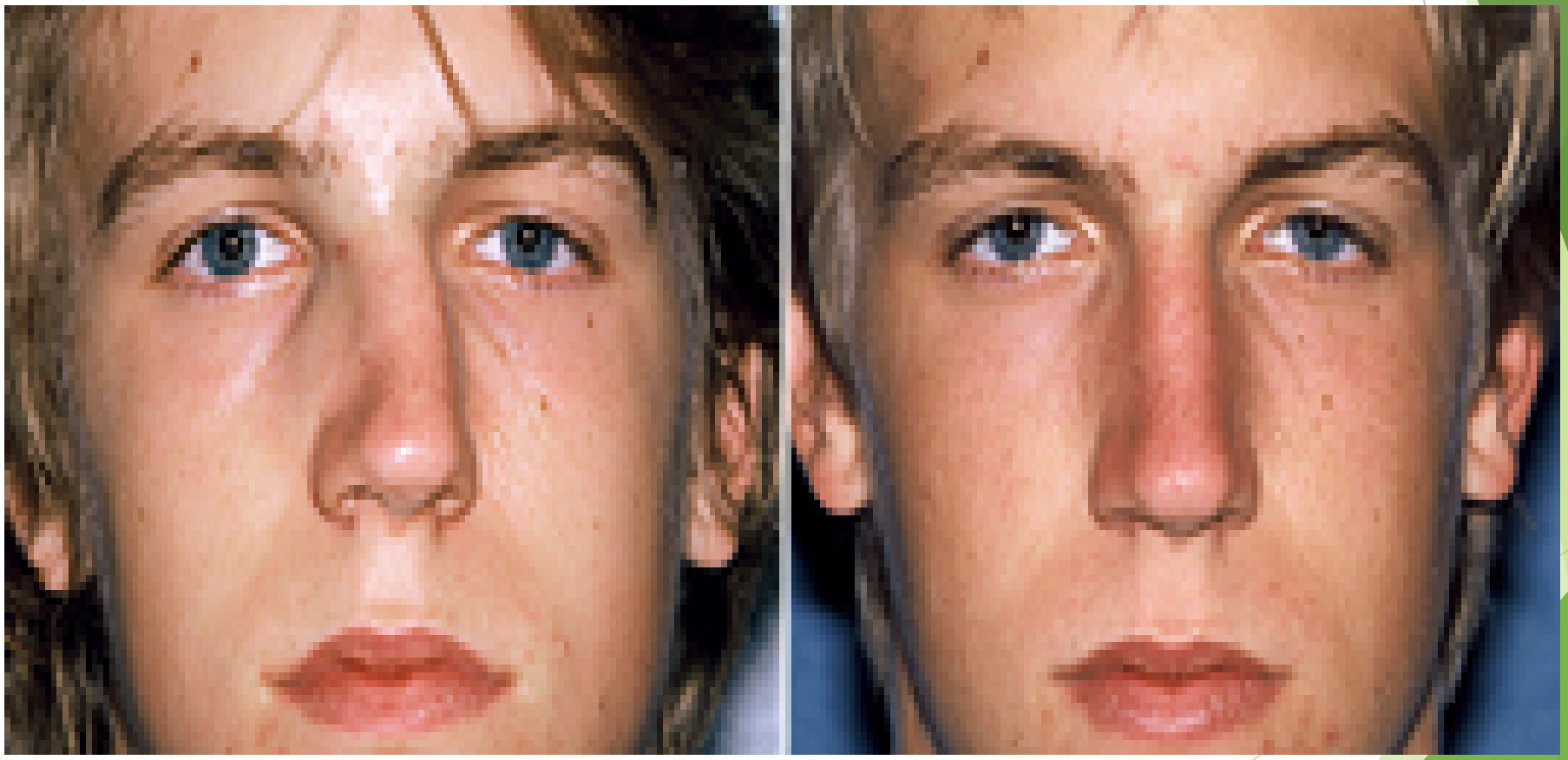


Nasal Injuries

- Epistaxis
- Nasal fractures
- Deviated Septum

Nose
Epistaxis

Nose
Nasal Fracture



Nose
Deviated Septum

Eye Injuries
General Eye Evaluation

- History
- Inspection
  - Periorbital region
  - Eyebrows
  - Eyelids
  - Globe orientation
    - Orbital concerns
- Palpation
  - Supraorbital ridges
  - Nasal, frontal, zygomatic bone/arch
- Functional Test
  - Visual fields
  - Eye movements
  - Vision
  - CN Testing
    - II, III, IV, VI
- Neurological Testing
- Opthalmoscope

- Remember to look for S/S of Head Injury

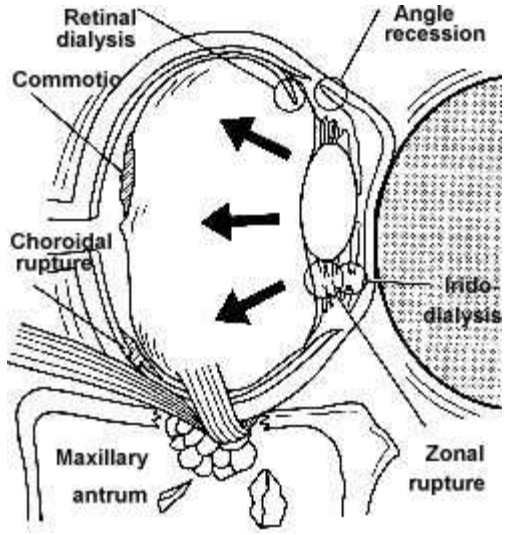
Eye Pathologies

- Orbital Hematoma
- Orbital fractures (Blowout fracture)
- Ruptured Globe
- Corneal Abrasion
- Corneal Laceration
- Hyphema
- Iritis
- Detached Retina
- Conjunctivitis
- Hordeolum
- Periorbital Lacerations
- Foreign Bodies
- Contact Lens Removal

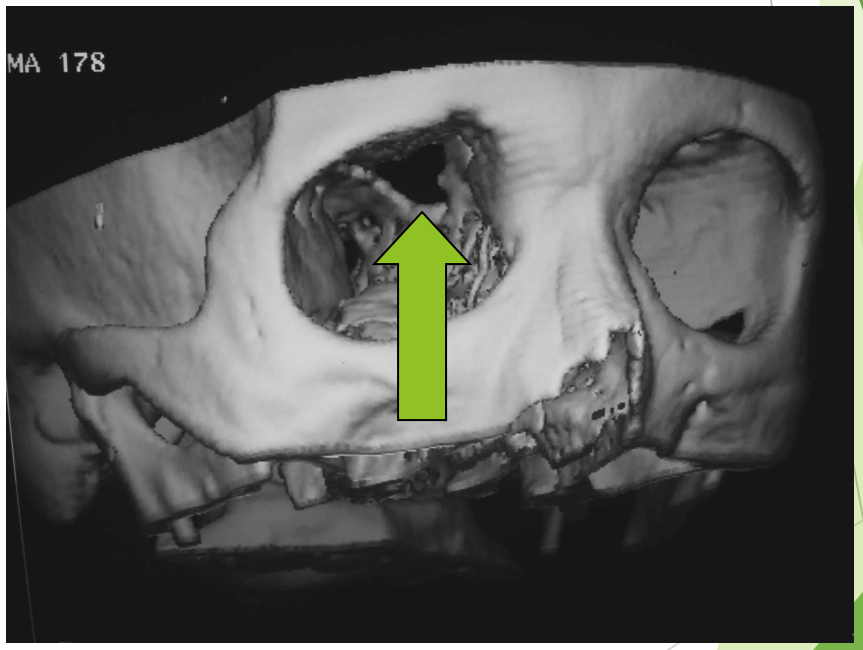
Eye
Orbital Hematoma

Eye
Orbital Fracture

- Mechanism/Etiology
  - AKA “Blow Out” or “Blow Up” fracture



Blow out fracture

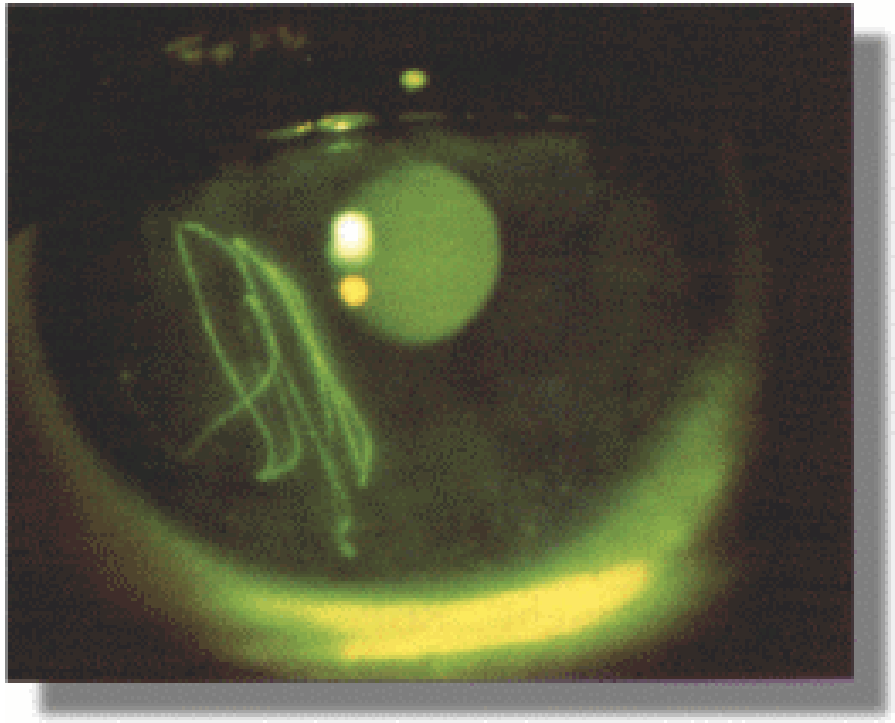


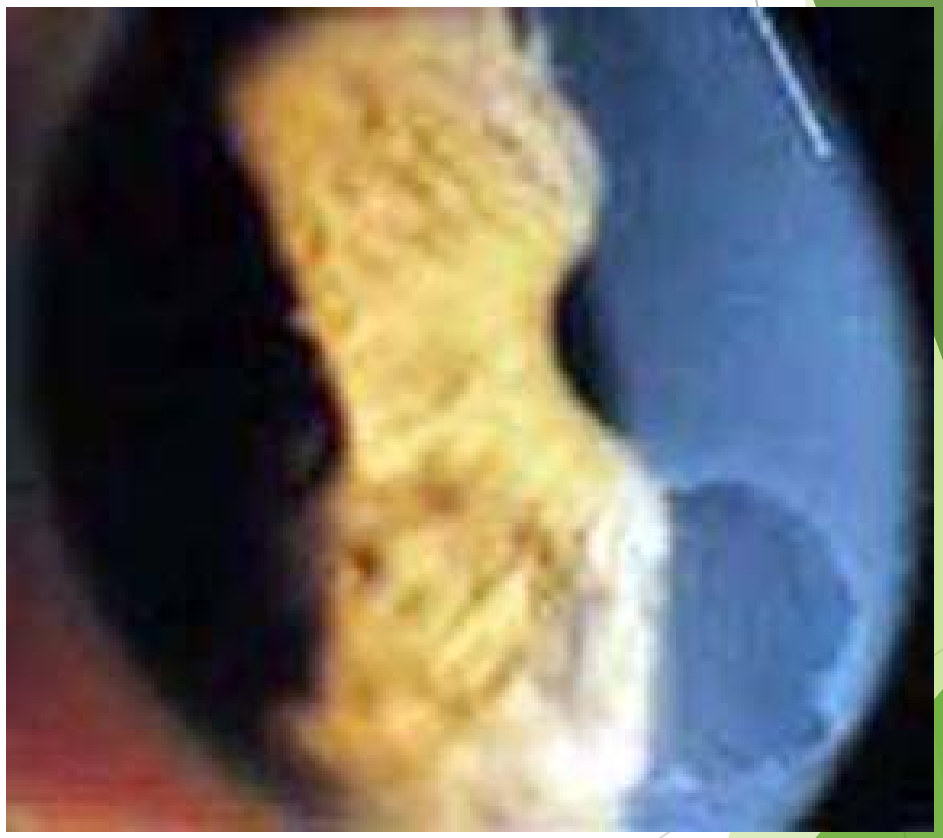
Blow up fracture

Eye
Orbital Fracture

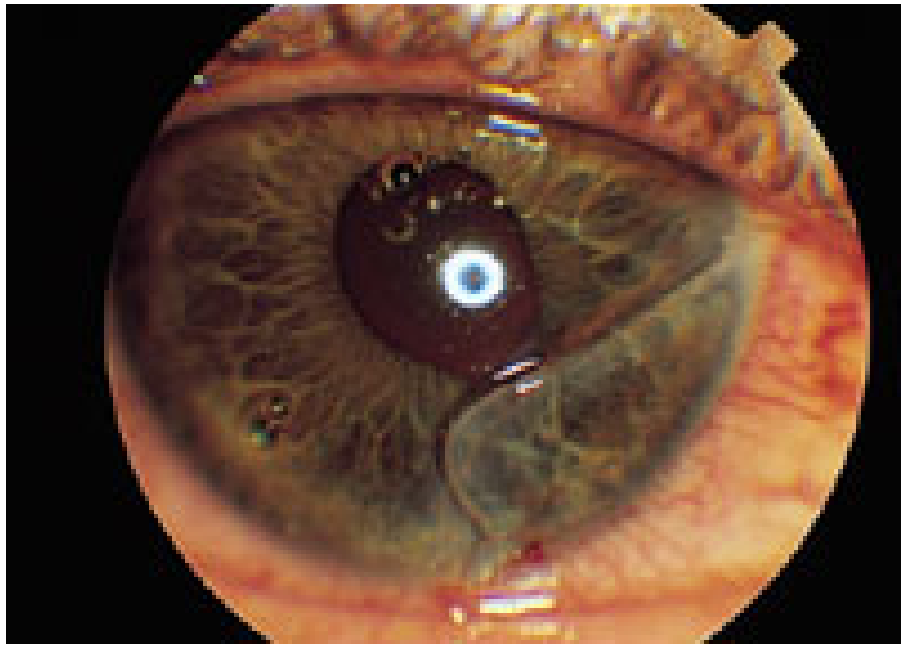
Eye
Ruptured Globe

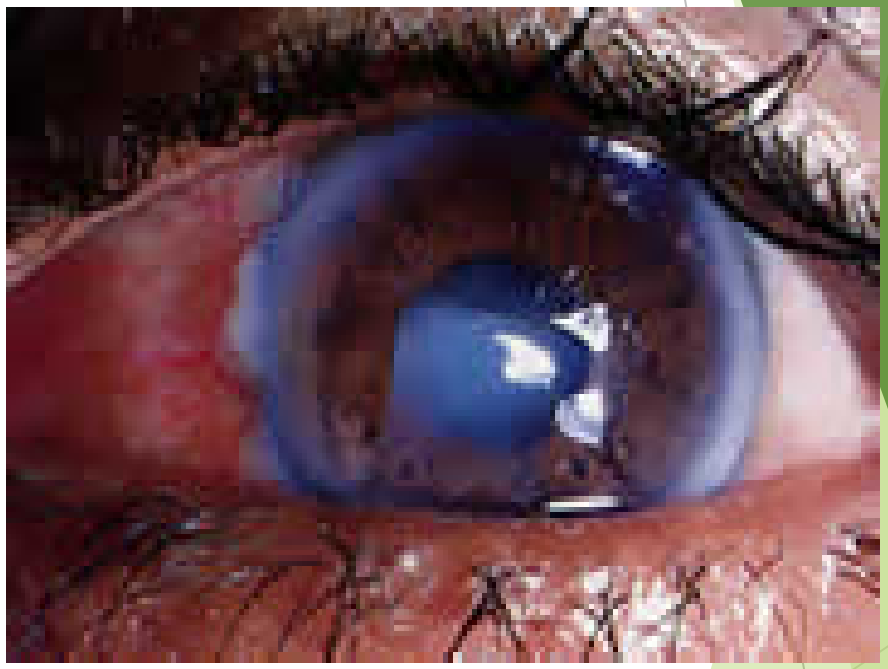
Eye
Corneal Abrasion





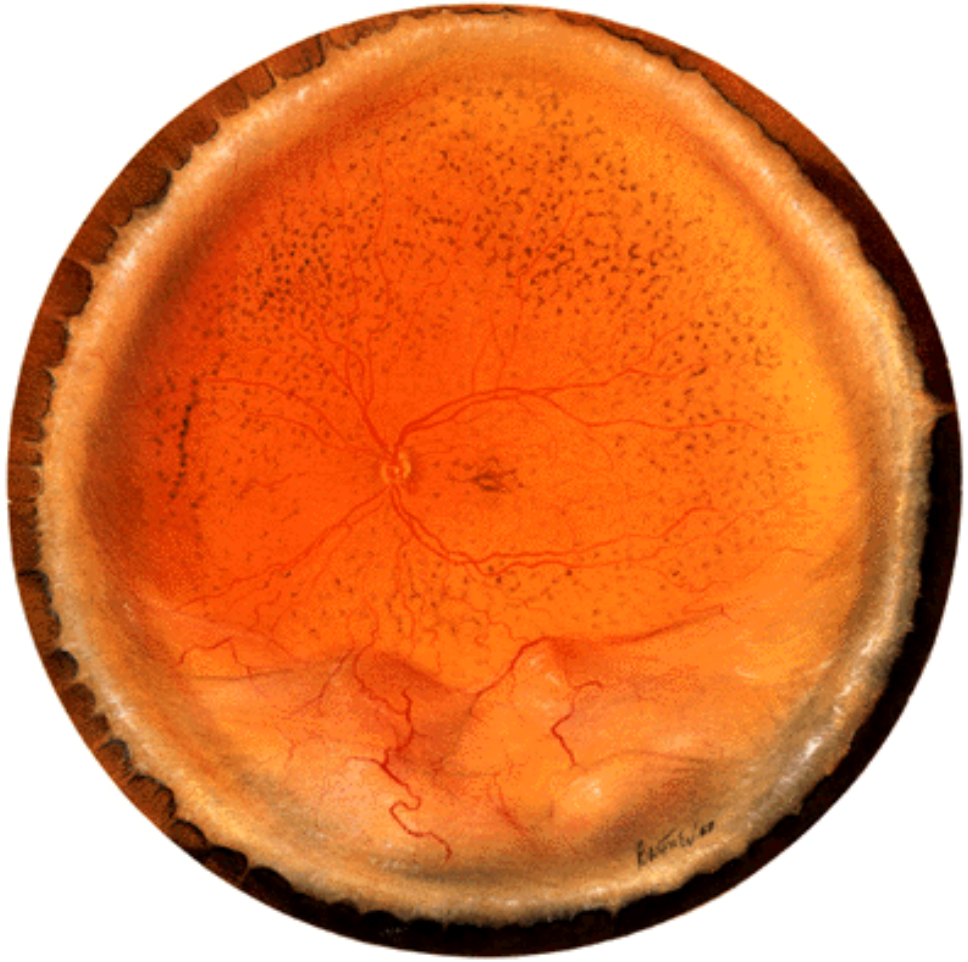
Eye
Corneal Laceration



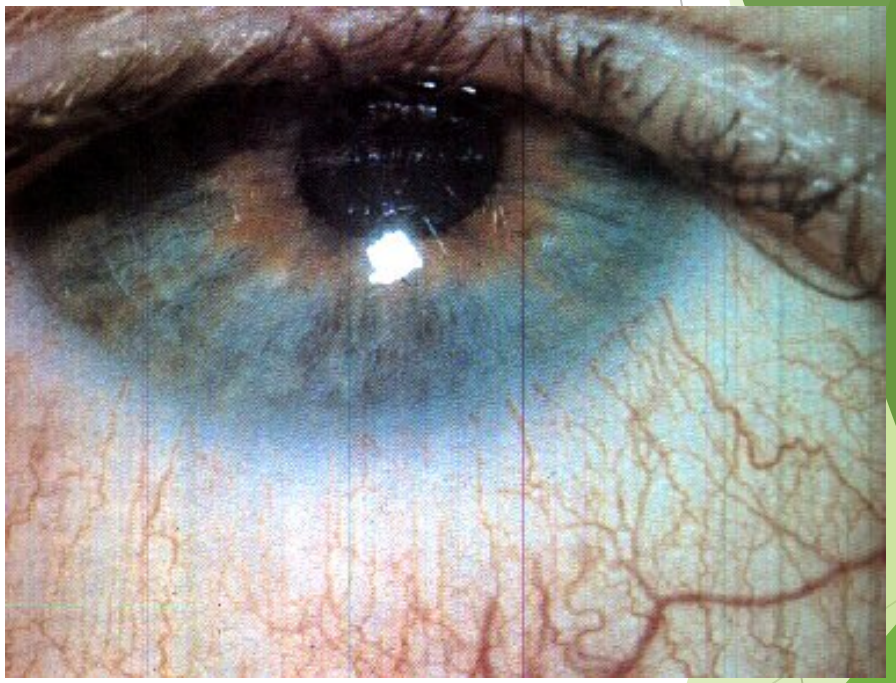


Eye
Iritis

Eye
Detached Retina

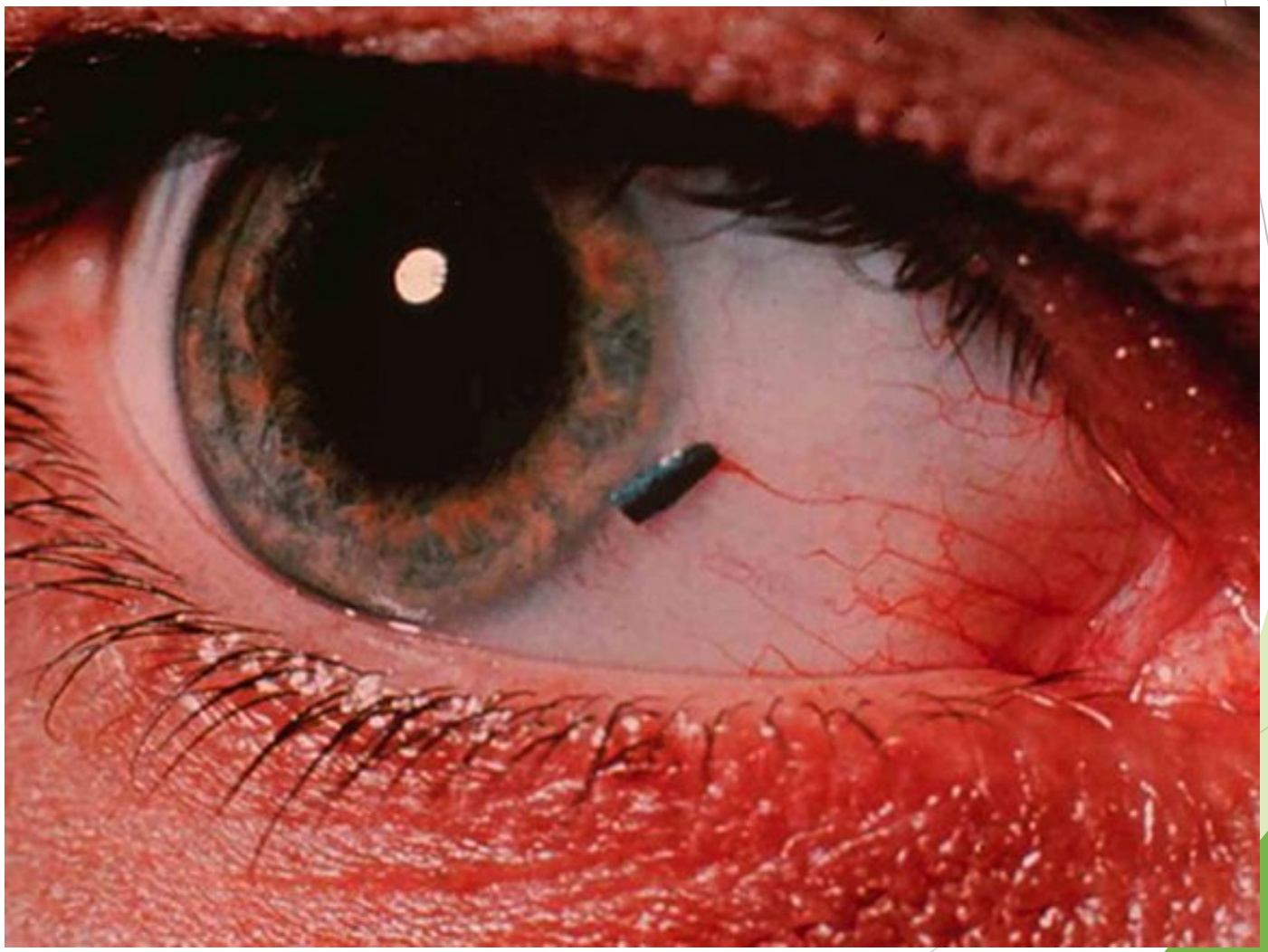


Eye
Conjunctivitis

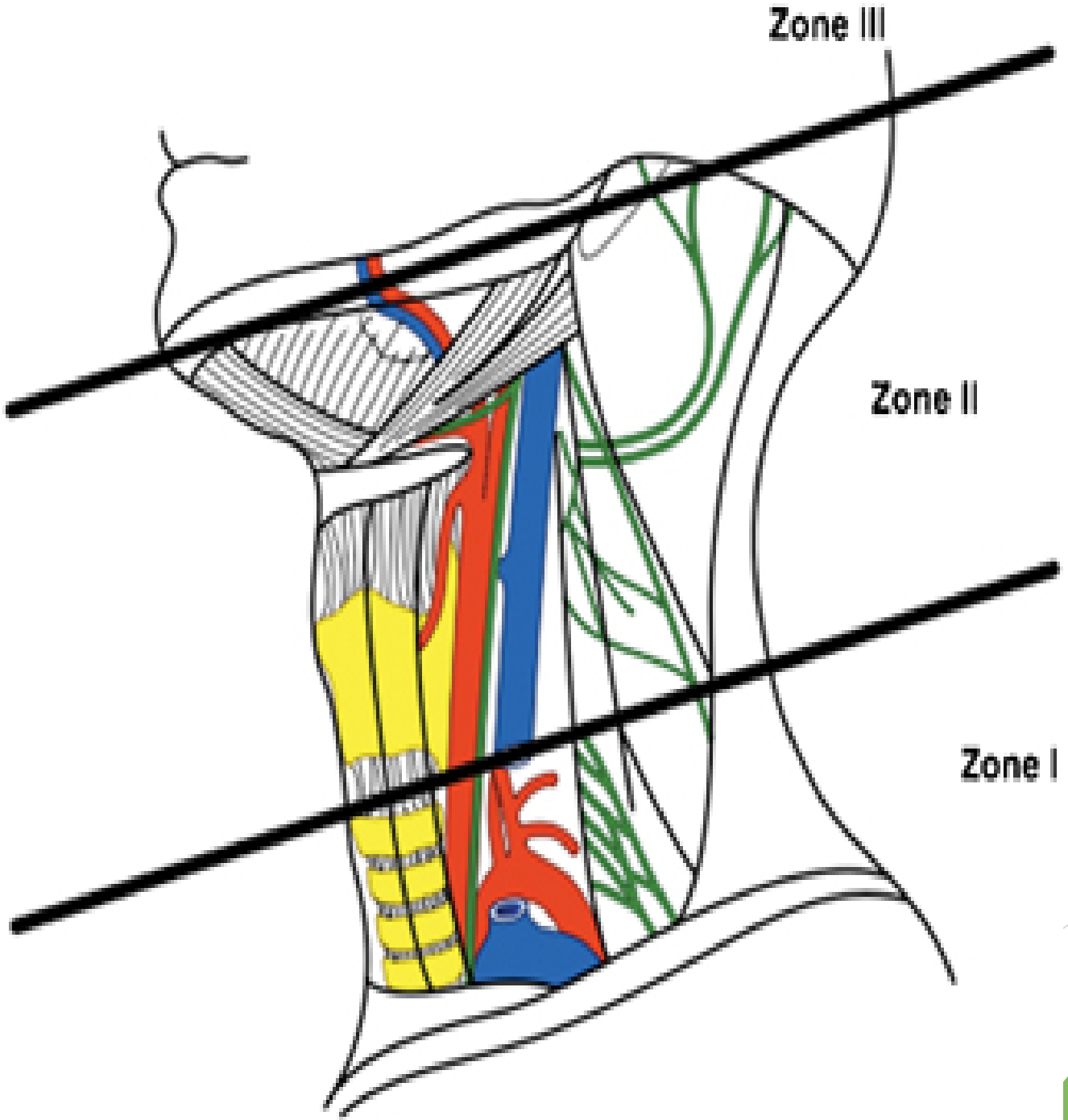


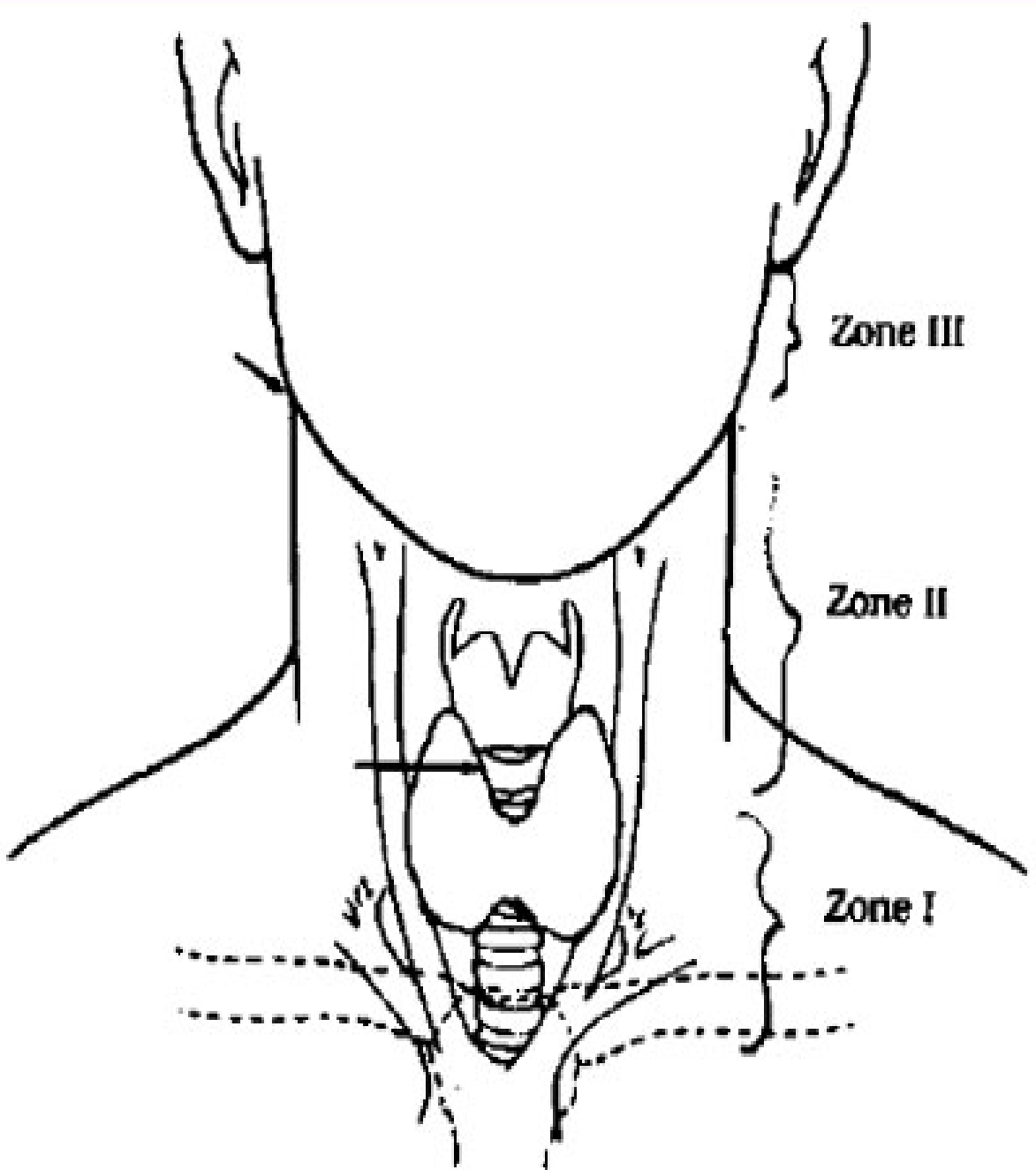
Eye
Periorbital Lacerations

Eye
Foreign Bodies



Neck


Zone III
Zone II
Zone I


Zone III
Zone II
Zone I

- **Why is the ‘neck’ important?**
  - **Cerebral vessels run through,**
  - **Spinal cord runs through,**
  - **Respiratory tract runs through,**
  - **GIT runs through,**

  - **Ad neck being small and exposed right around it is more vulnerable to injury.**
  - **Penetrating type of trauma is more likely to cause severe complications.**

- Injuries even mere compression can lead to death
- Specific injuries like different types of neck compressions.
- Possible death from vagal inhibition - without any visible injuries.

- Penetrating trauma
  - Cuts,
  - Stabs
  - Penetrating missiles
- Blunt trauma
- Compression -Hanging & strangulation.
- Excessive movement – AP/Transvers.

Penetrating Trauma

Symptoms of injuries to structures such as the esophagus can be subtle or delayed in presentation

Penetrating Trauma

- 5-10% of all traumatic injuries
- GSW
  - High velocity
  - Low velocity (50% lower incidence of significant lesions)
- Stab wounds
- Miscellaneous (shrapnel, impalement)

Penetrating Trauma Incidence

Location	Percentage %
Arterial	12.8
Venous	11.3
Tracheolaryngeal	10.1
Pharyngoesophegeal	9.6
Spinal cord	3
Neuroligical, other	3.4
Thoracic duct	0

Total 1275 patients

Pathophysiology

Mechanism of injury

1. Gunshots (more dangerous)
2. Stabbings
3. Miscellaneous

Organ System Classification

- Vascular (most common)
- Pharyngoesophageal
- Laryngotracheal
- Others (cranial nerve, thoracic duct, brachial plexus, spinal cord….

Vascular

Three pathophysiologic mechanisms

- External hemorrhage
- Extending soft tissue hematoma, distort or obstruct the airway
- Disruption of cerebral perfusion (CVA)

Classification of injuries

- Laryngotracheal
- Pharyng-oesophageal
- Vascular : delayed dissection or thrombosis (CVA)

Laryngotracheal

- Small puncture wound
- Airflow away from respiratory tree
- Obstruction of airway

Pharyngoesophageal

- Rarely causes any immediate consequence
- Delayed diagnosis can lead to serious soft tissue infection, mediastinitis and sepsis

Blunt Trauma

- Rare, compared with penetrating trauma
- Motor vehicle crash or an assault
- Off - road vehicles

Blunt Trauma

- Vascular injuries are rare but represent one of the most under diagnosed injuries
- Aerodigestive injuries are rare in comparison to penetrating injuries but can cause acute AW compromise and delayed complications
- Causes:
  - Motor vehicle collisions
  - 'Clothesline' injuries
  - Assault
  - Strangulation
  - Sports injuries

Neck Compression

- Near hanging
  - Complete/judicial
  - Incomplete
  - Typical
  - Atypical
- Manual Strangulation
- Ligature Strangulation

Four recognized mechanisms by which thrombosis can occur

- A direct blow to the neck
- A blow to the head that causes hyperextension and rotation of the head and lateral neck flexion resulting in a stretch injury to the vessels
- Blunt intraoral trauma
- Basilar skull fracture

Spinal column and spinal cord injuries are more prevalent in blunt trauma

In the neck it is mainly the cuts or penetrating injuries that would cause serious complications.

Aspiration of blood and subsequent choking.

loss of voice

air embolism and even sudden death.

Injuries to oesophagus –

- Mediastinitis,
- Empyema
- Septicaemia.
- Oesophageal fistula.

Chest

- Blunt force injuries;
- Sharp force injuries;
- Combination of both;
- Missile injuries,
- RTA;
- Traumatic asphyxia;

- **Structures/organs involved**
  - Chest wall,
  - Ribs,
  - Sternum,
  - Heart and pericardium,
  - Aorta and branches,
  - Diaphragm,
  - lungs

Main Causes of Chest Trauma

- **Blunt Trauma- Blunt force to chest.**
- **Penetrating Trauma- objects or Projectile that enters chest causing small or large hole.**
- **Compression Injury- Chest is caught between two objects and chest is compressed.**

Common Injuries Develop After Blunt Chest Trauma

- Thoracic cage fractures
- Lung contusion and tears
- Myocardium contusion
- Aortic rupture

Injuries of chest

- Simple/Closed Pneumothorax
- Open Pneumothorax
- Tension Pneumothorax
- Flail Chest
- Cardiac Tamponade
- Traumatic Aortic Rupture
- Traumatic Asphyxia
- Diaphragmatic Rupture

Chest injuries:

Injuries caused by various mechanism results in many complications. Some of these are quite common and others rather uncommon.

Require immediate intervention;

- **Tension pneumothorax,**
- **Open pneumothorax,**
- **Disruption of major airways,**
- **Haemopericardium,**
- **Haemothorax - large**
- **Air embolism**
- **Flail chest.**

Injuries with potential for threatening survival

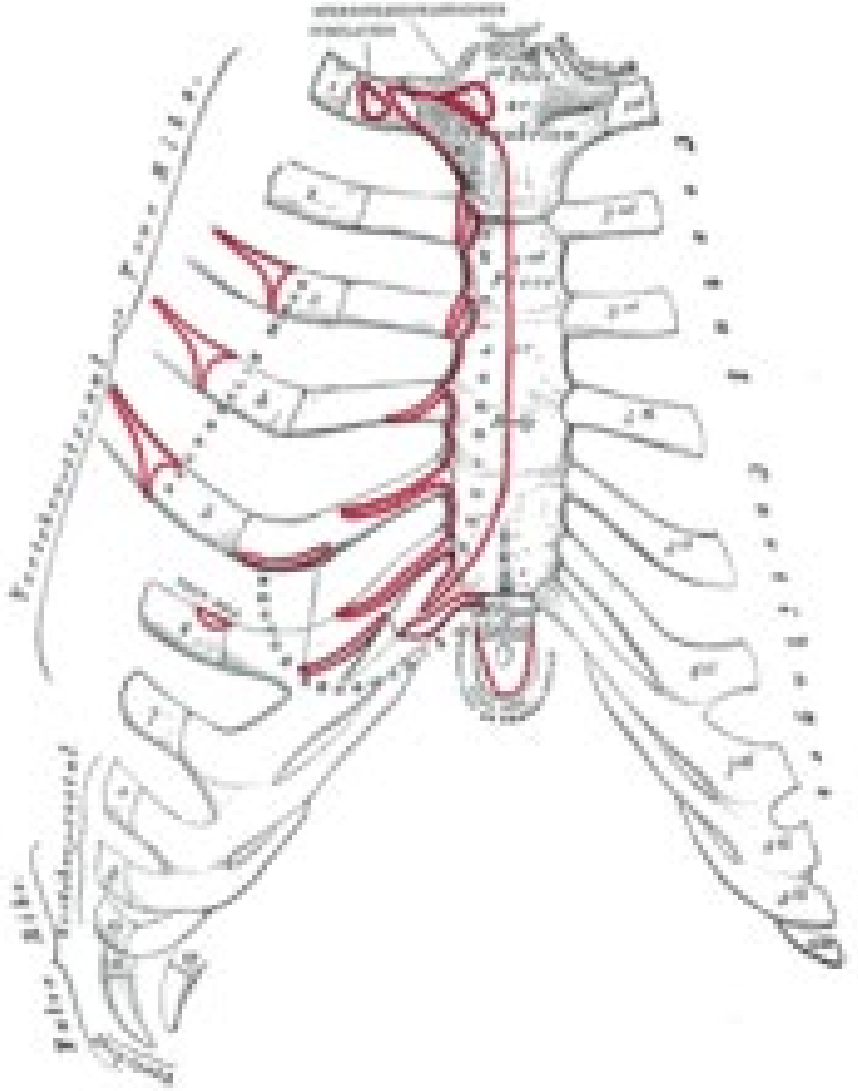
- Lung contusions
- Lung paranchymal injuries.
- Myocardial contution
- Aortic rupture.
- Oesophageal disruption.
- Diaphragmatic rupture.
- Rib fractures.
- Traumatic asphyxia.
- Small pneumo-, haemo- haemopneumo thorax.

Long term sequelae

- Clotted haemothorax
- Empyema
- Phrenic nerve palsy
- Pericardal complications
- Fistulae
- Diaphragmatic hernia
- Chylothorax

Intercostal Muscle Strain.
Costal cartilage injury

Costal cartilage injury



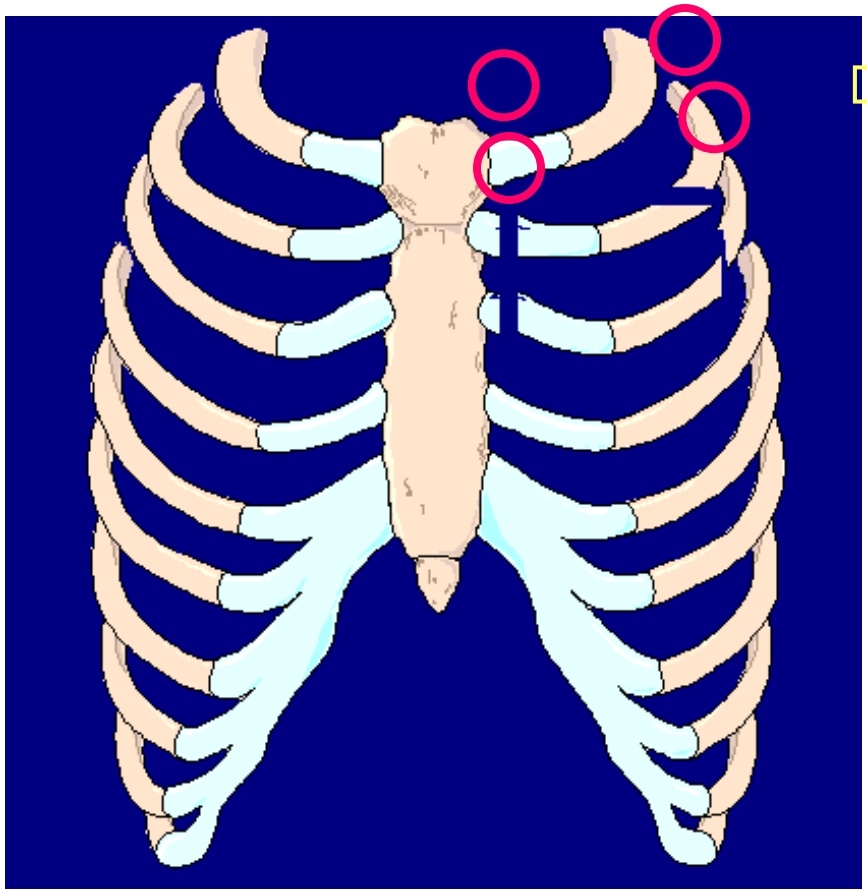
Rib Fractures

- **Most common in collision sports**
- **Ribs 5-9 most commonly fractured**
- **Possibility of cause damage to or puncturing a lung**

- **Mxn:**
  - **direct impact**
  - **compression of rib cage**

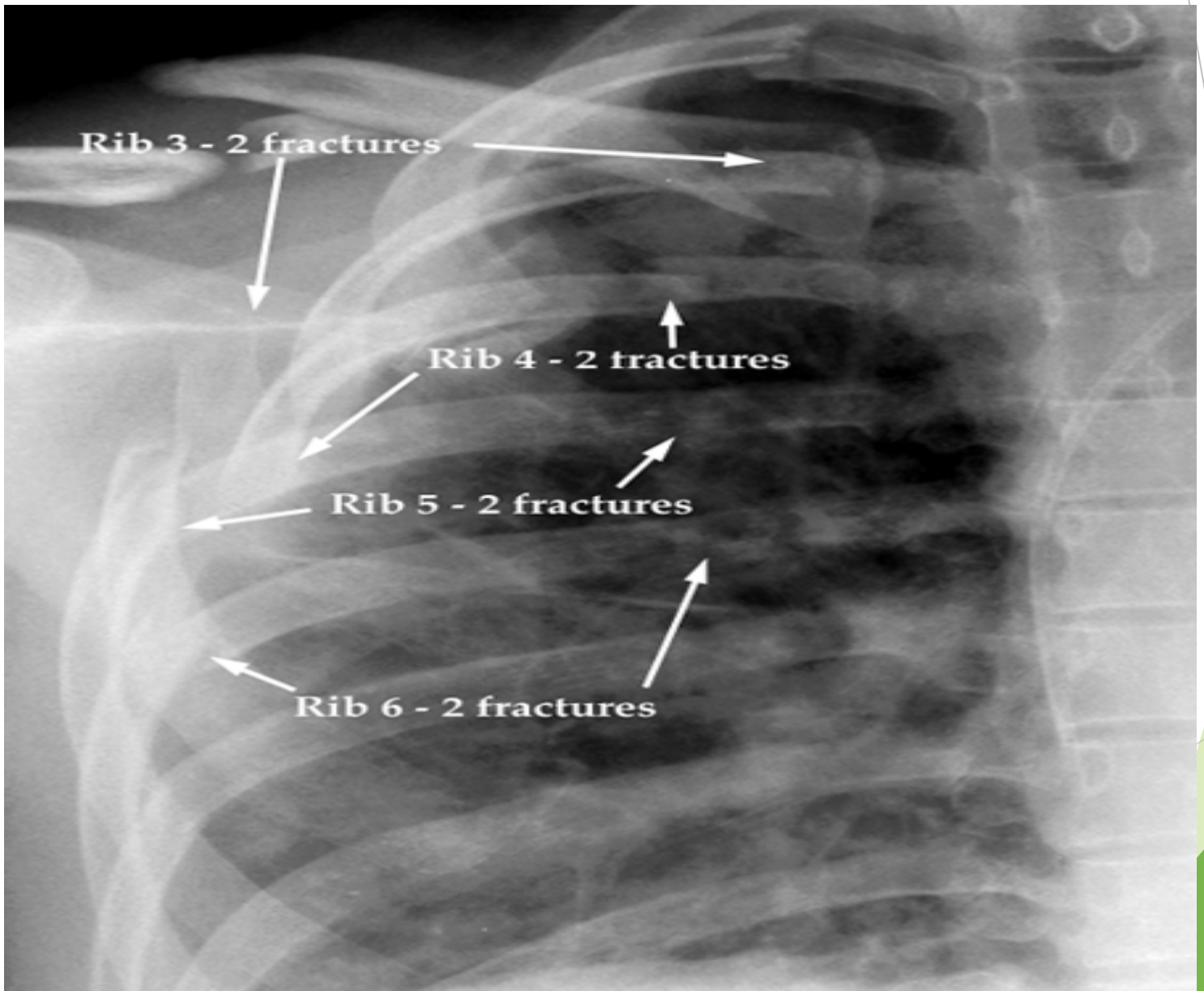
Rib Fractures

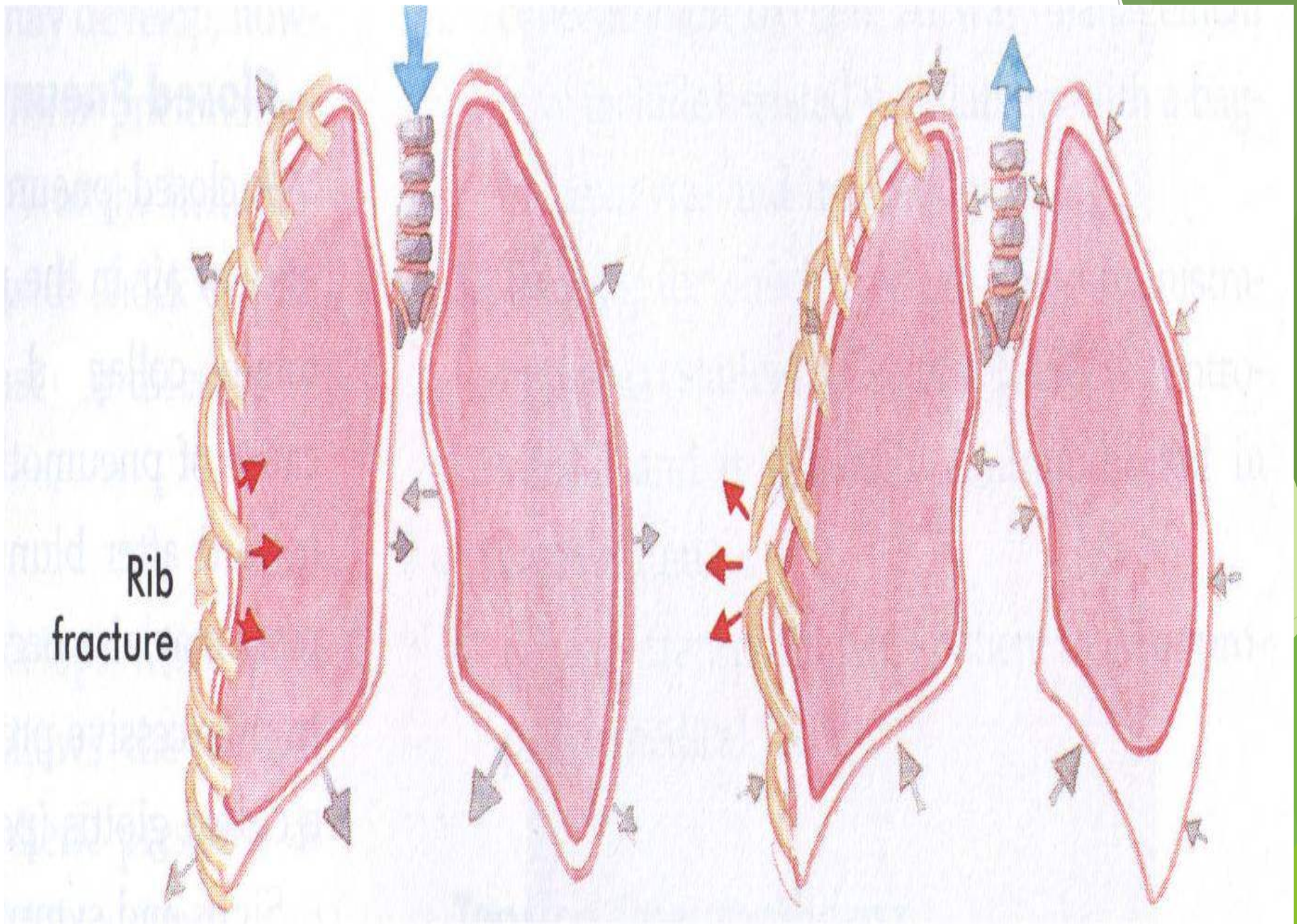
Flail Chest



- The breaking of 2 or more ribs in 2 or more places

Flail Chest


Rib 3 - 2 fractures
Rib 4 - 2 fractures
Rib 5 - 2 fractures
Rib 6 - 2 fractures


Rib
fracture

Flail Chest is a True Emergency

Troublesome Injuries

- Sternal fracture
  - More serious injuries may accompany
  - If suspected, a lateral CxR may be diagnostic
  - Operative reduction is usually unnecessary
  - Hospitalization is not mandatory if the ECG is normal and the patient's vital sign is stable

Troublesome Injuries

- Blunt Cardiac Trauma - spectrum
  - Asymptomatic myocardiac contusion
  - Symptomatic myocardiac contusion
  - Free wall or septal wall rupture
  - Valvular tears
  - Coronary artery thrombosis

Troublesome Injuries

Blunt Cardiac Trauma – risk factors

- Chest impact > 15 mph
- Marked precordial tenderness, ecchymosis or contusion
- PH of cardiac disease
- Fractured sternum
- Thoracic spine or ribs fractures
- Hemodynamic instability, or multiple injuries
- Age > 50

Troublesome Injuries

- **Blunt Cardiac Trauma - assessment**
- **Most are asymptomatic; severe cases die before arrival**
- **Common manifestation : arrhythmia, hemo-dynamic instability**
- **Evaluation : CxR, ECG, cardiac enzymes, echo-cardigram,**

Lung Injuries

- Injures to lungs are rare but can be life threatening

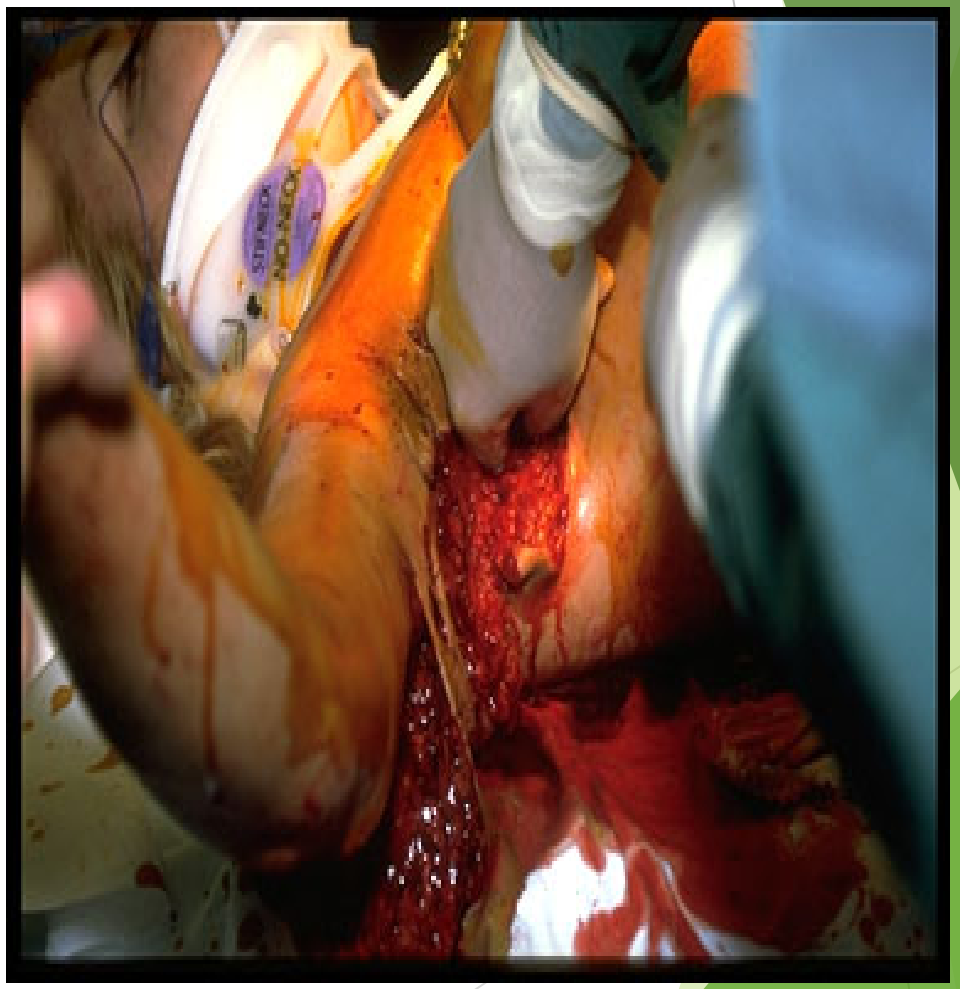
- Pneumothorax
- Tension Pneumothorax
- Hemothorax
- Traumatic asphyxia

Pneumothorax

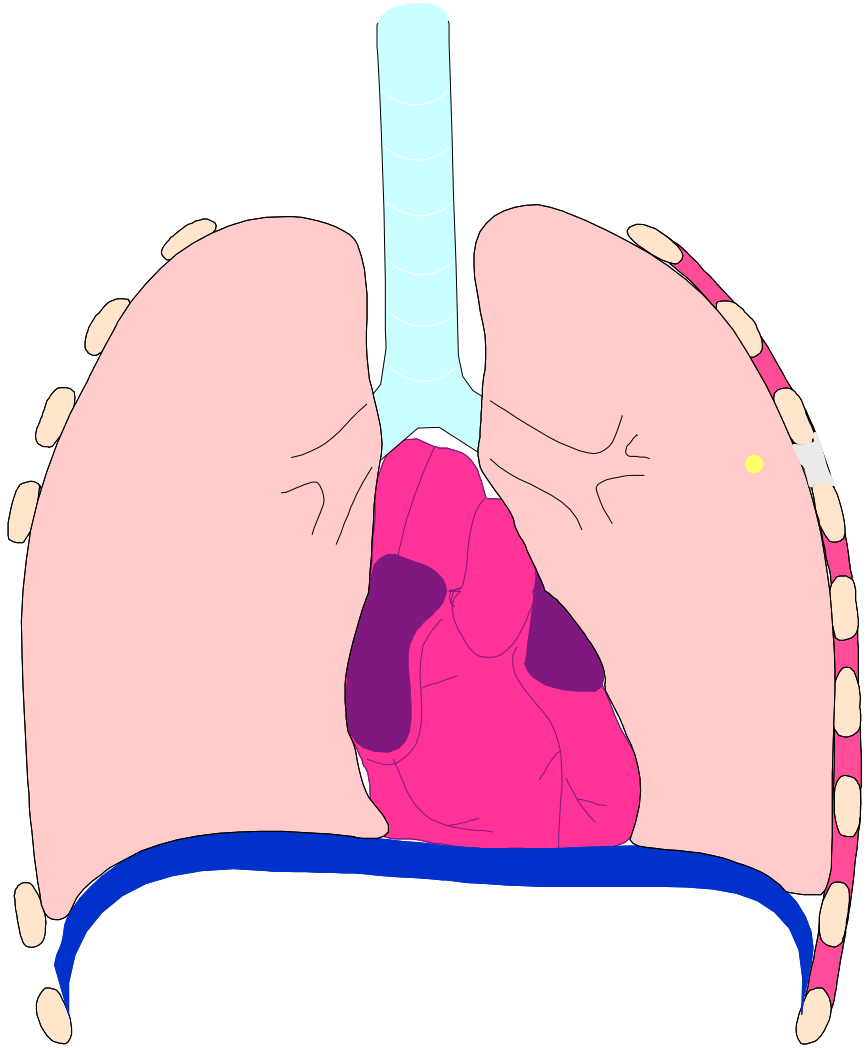
- Condition in which pleural cavity surround lung becomes filled w/ air that has entered through an opening in the chest
- As pleural cavity fills with air, lung on that side collapses

Open Pneumothorax

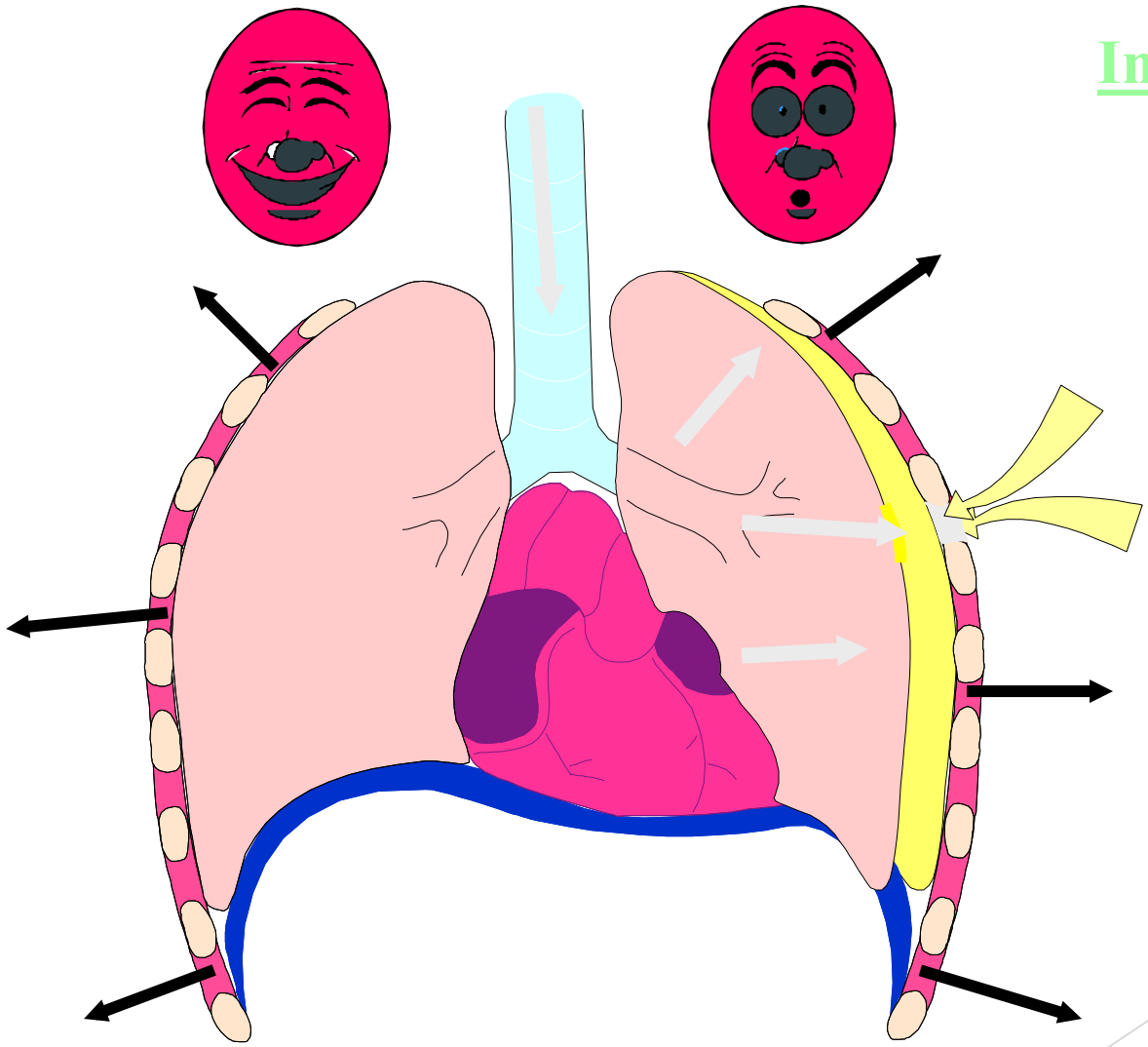
- Opening in chest cavity that allows air to enter pleural cavity
- Causes the lung to collapse due to increased pressure in pleural cavity
- Can be life threatening and can deteriorate rapidly



Open Pneumothorax

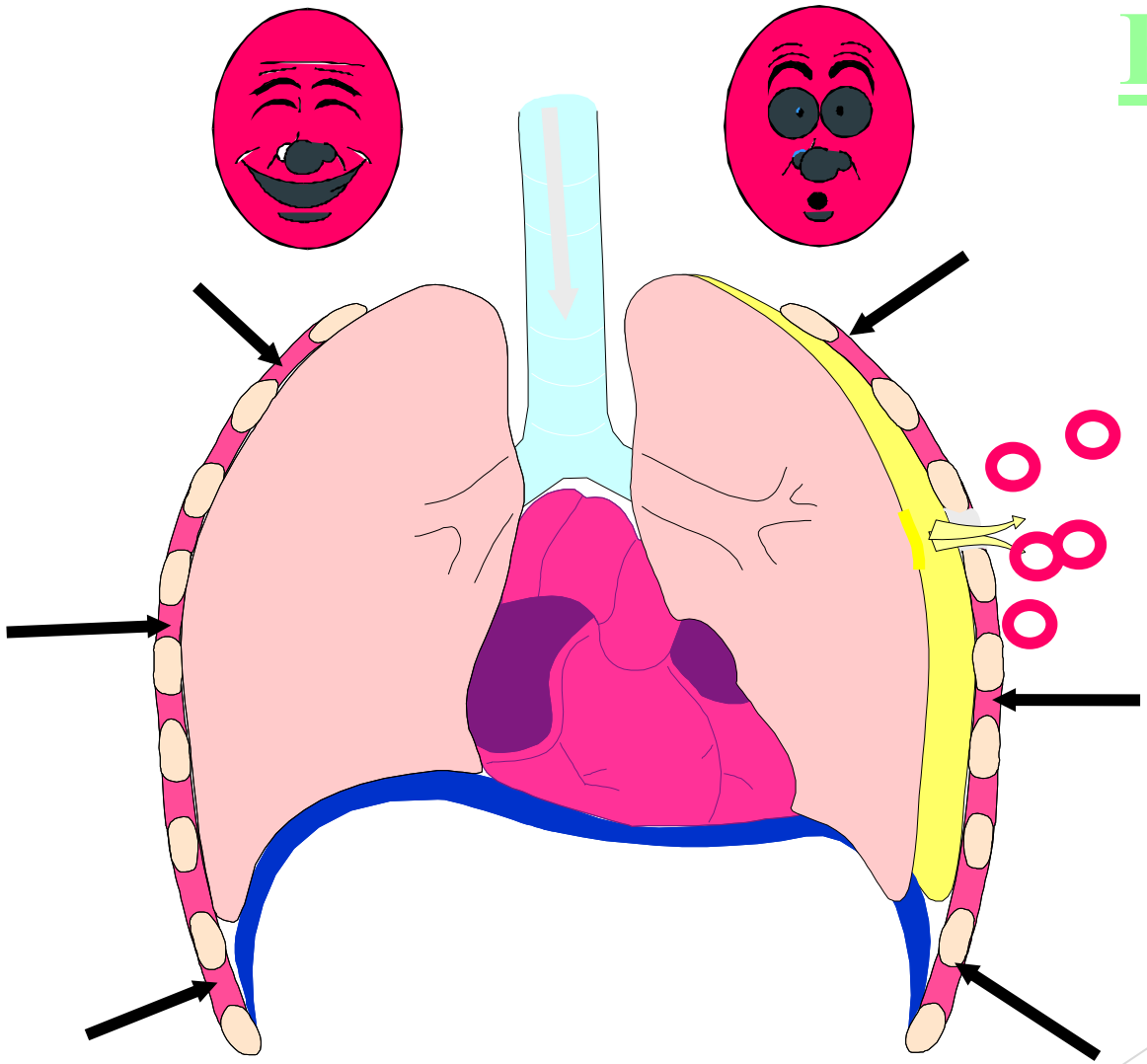


Open Pneumothorax



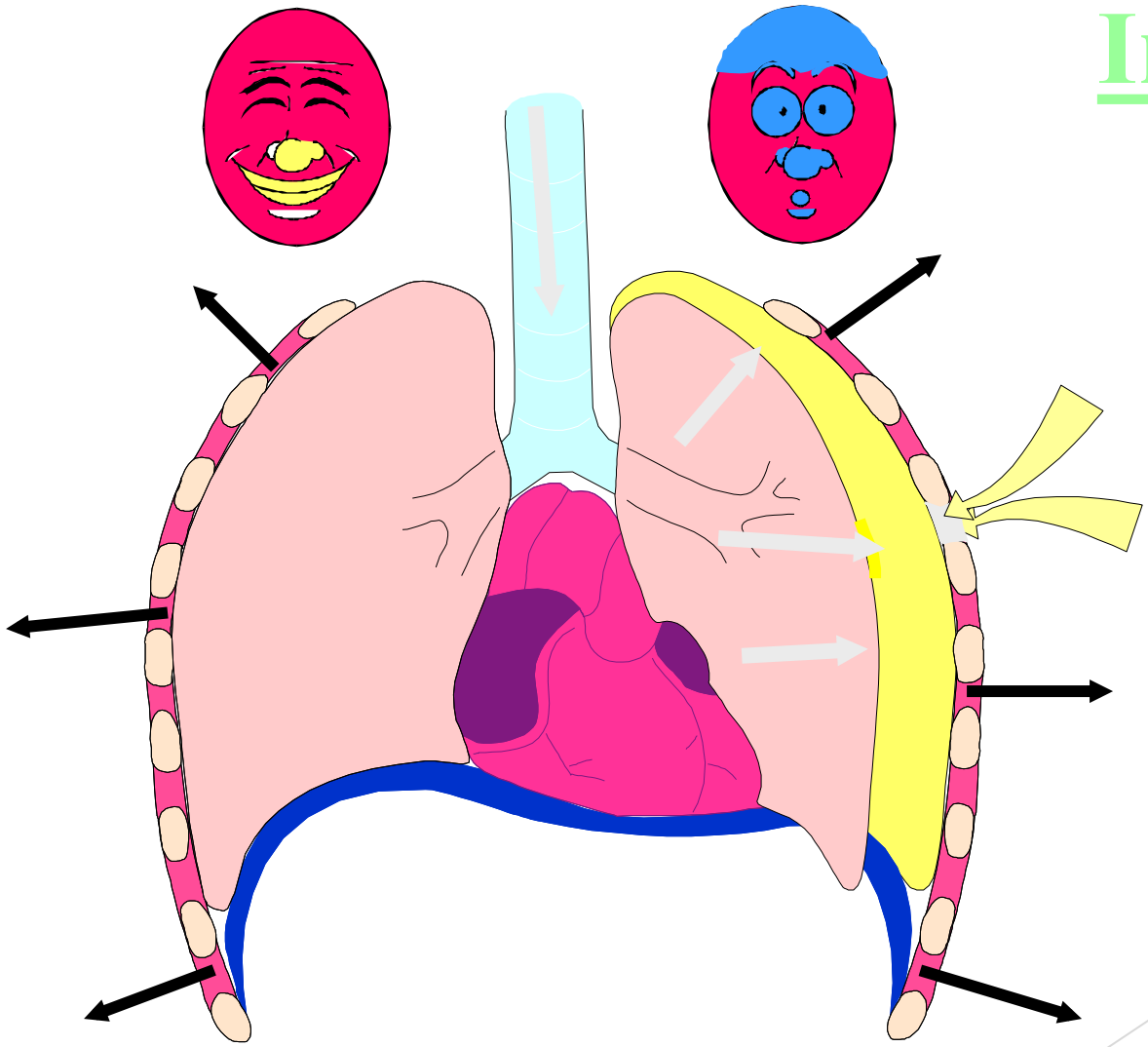
Inhale

Open Pneumothorax



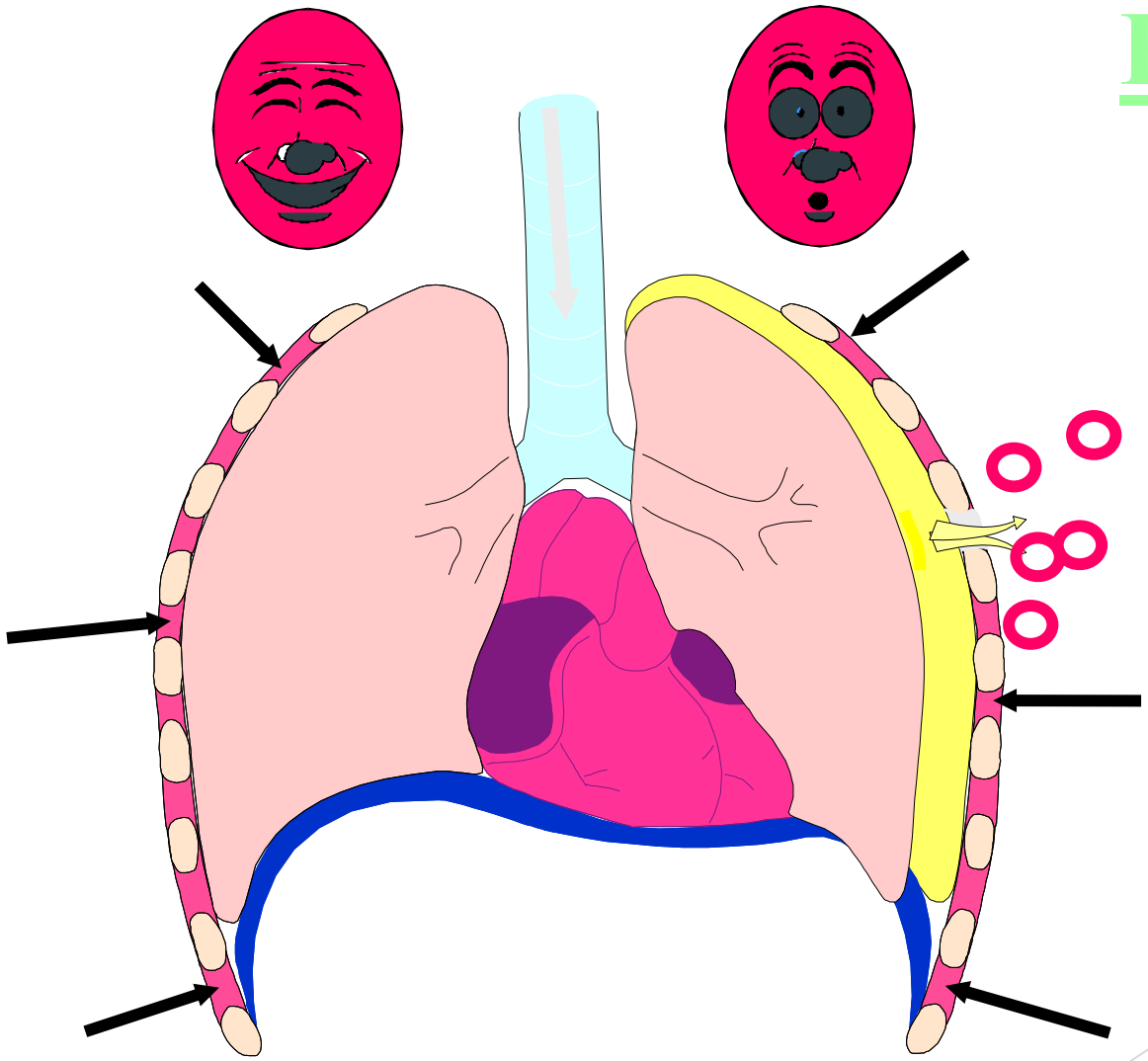
Exhale

Open Pneumothorax



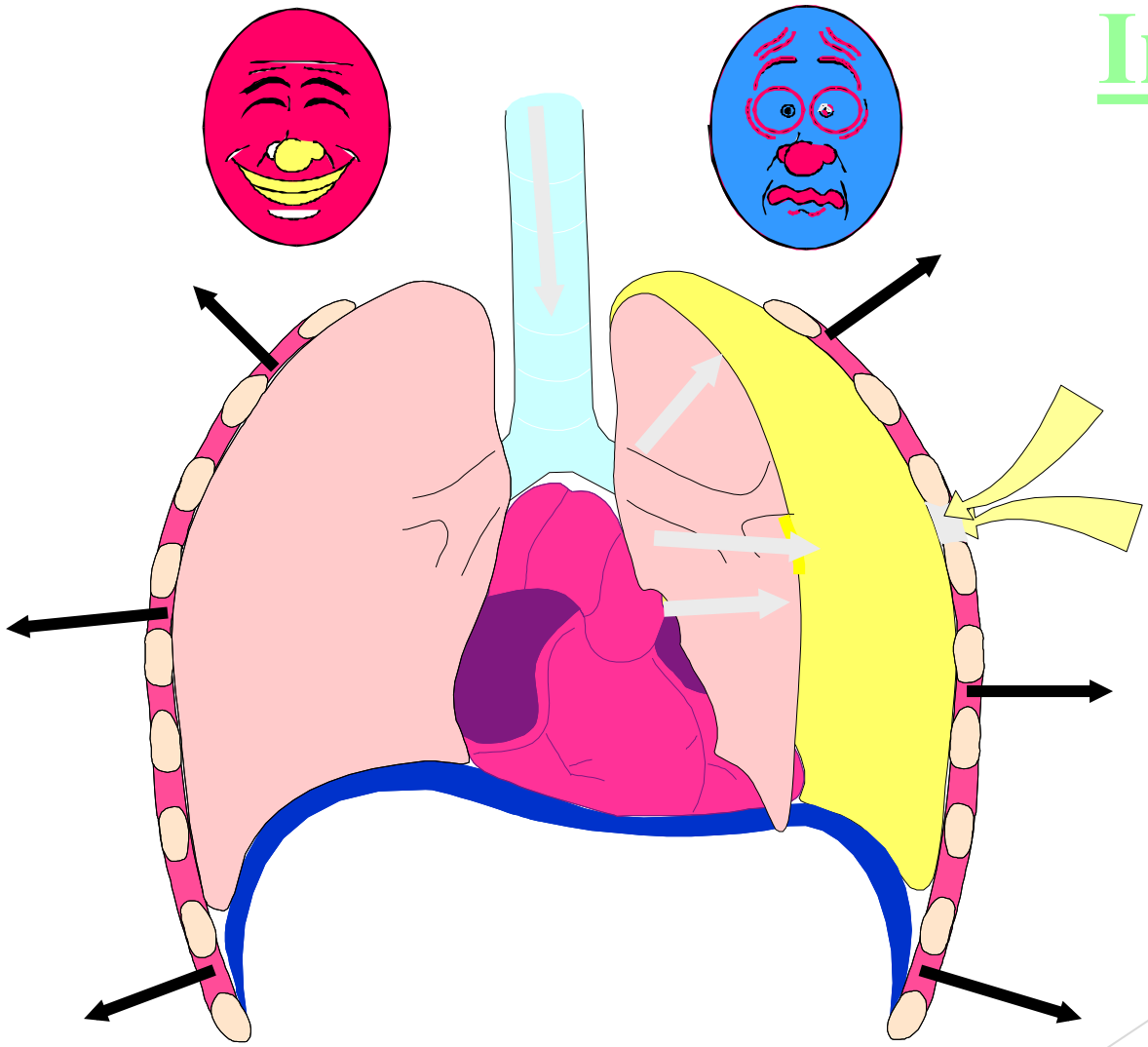
Inhale

Open Pneumothorax



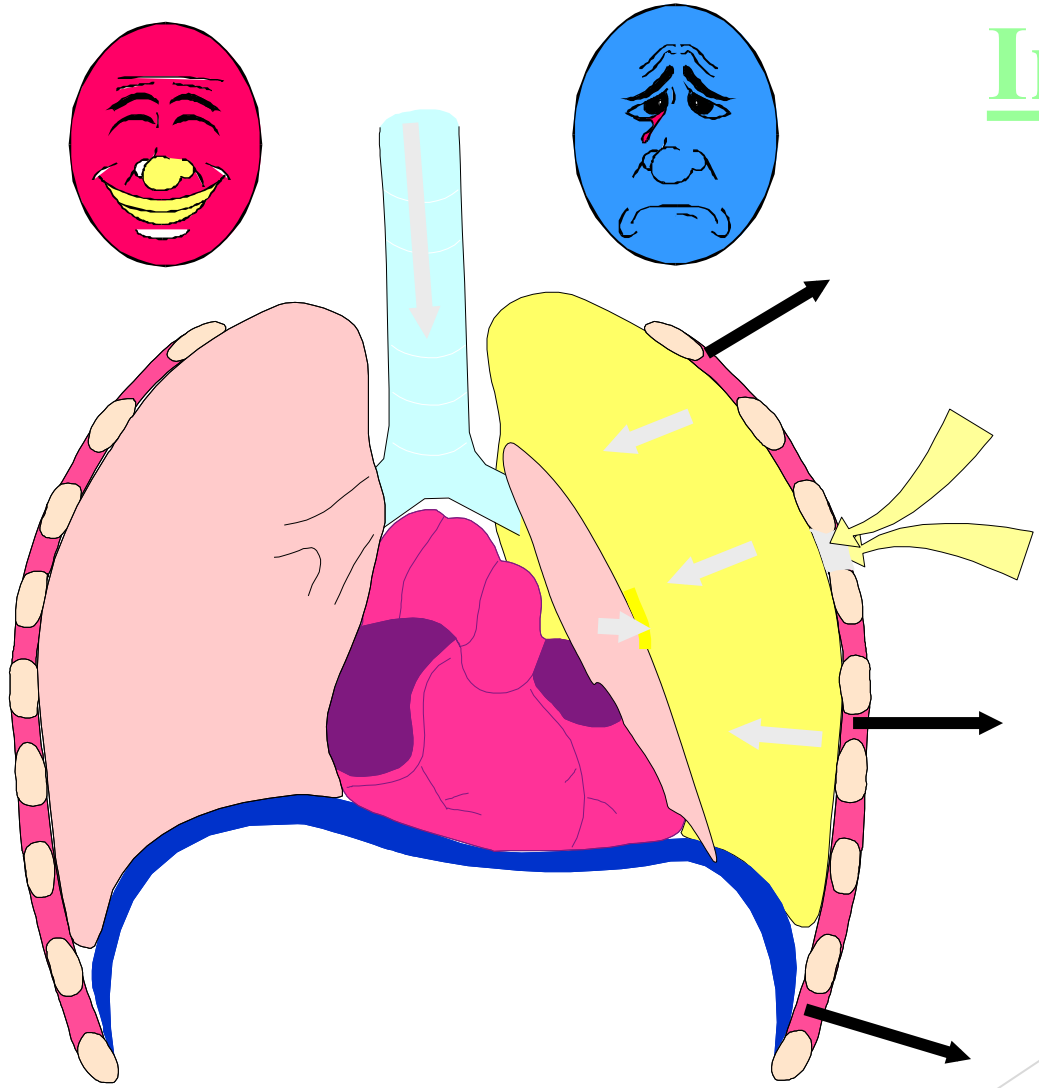
Exhale

Open Pneumothoarx



Inhale

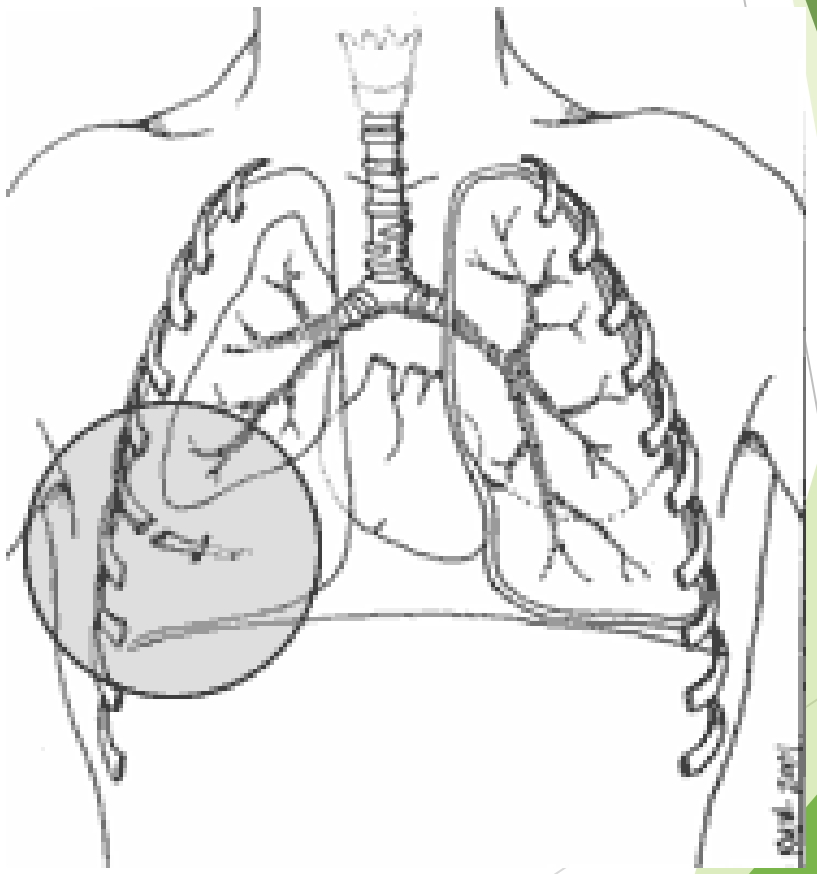
Open Pnuemothorax



Inhale

Simple/Closed Pneumothorax

- Opening in lung tissue that leaks air into chest cavity
- Blunt trauma is main cause
- May be spontaneous
- Usually self correcting



Subcutaneous Emphysema

- Air collects in subcutaneous fat from pressure of air in pleural cavity
- Feels like rice crispies or bubble wrap
- Can be seen from neck to groin area

Tension Pneumothorax

- Air builds in pleural space with no where for the air to escape
- Results in collapse of lung on affected side that results in pressure on mediastium,the other lung, and great vessels

Tension Pneumothorax

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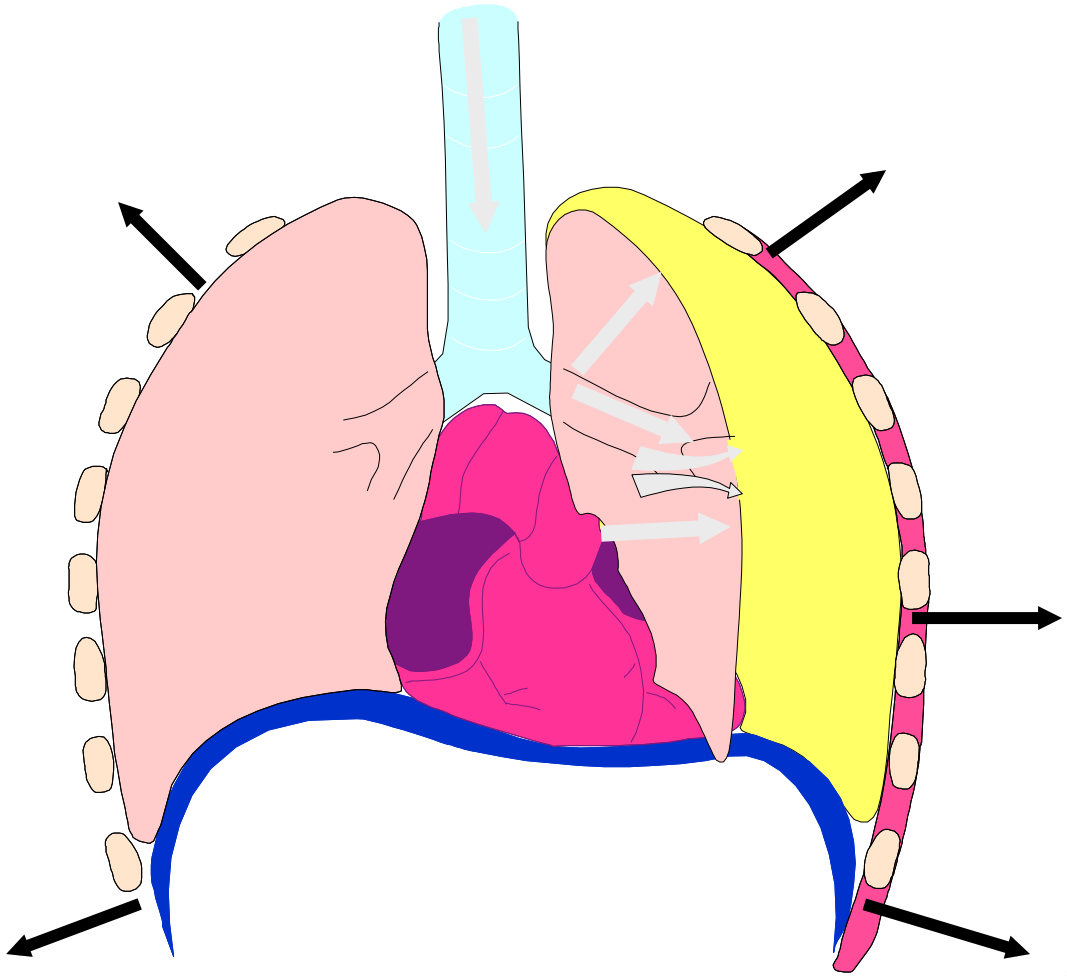

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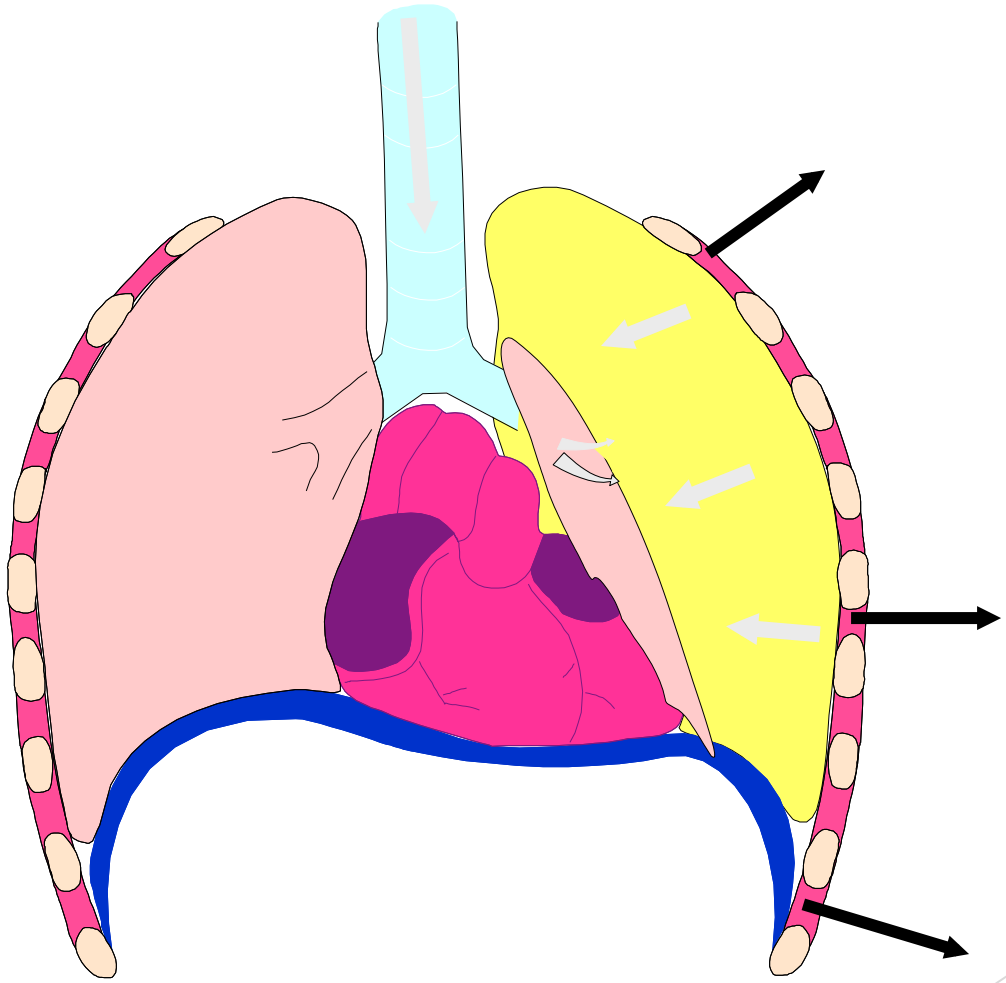
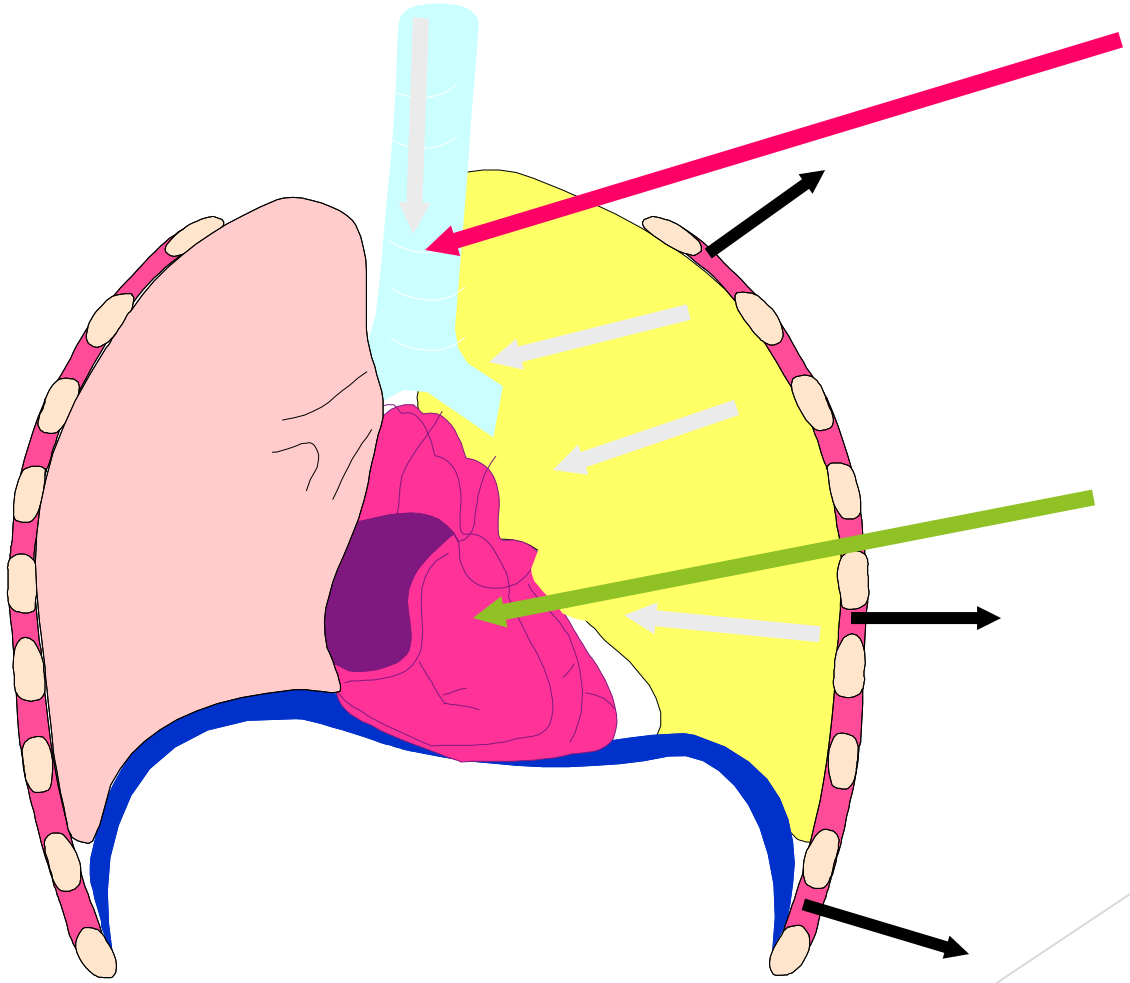


Tension Pneumothorax



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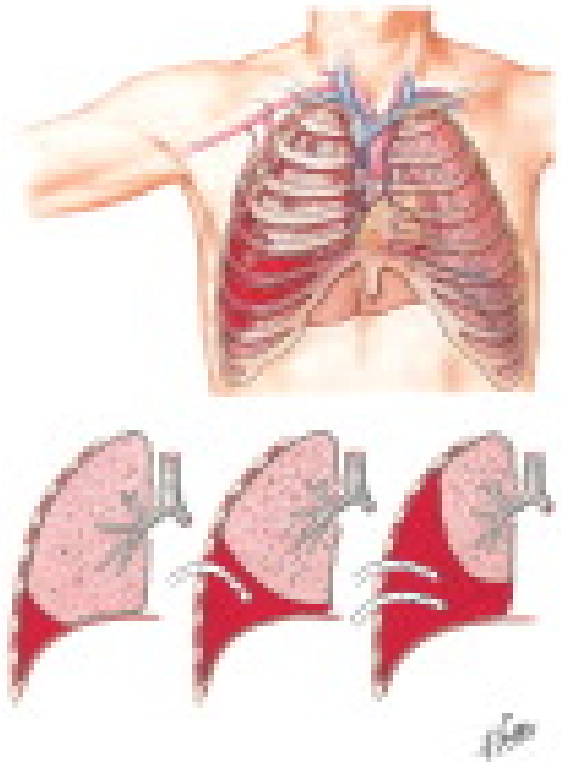
Hemothorax



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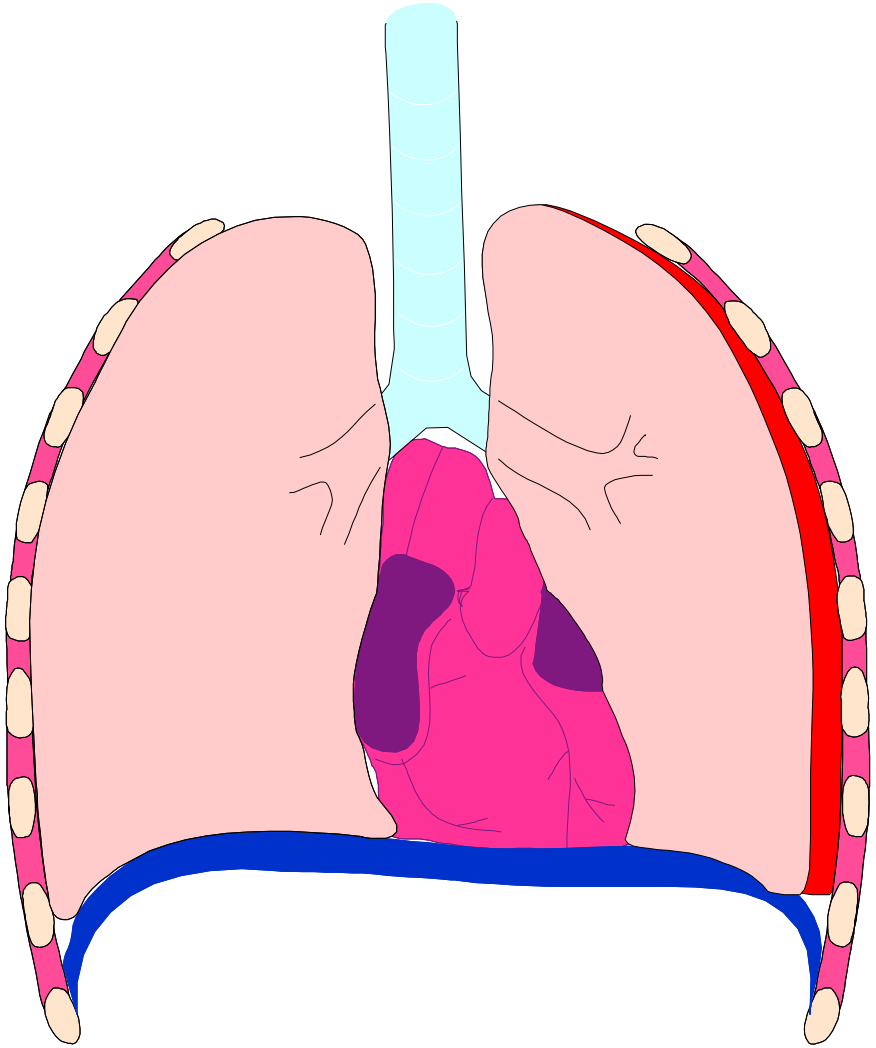

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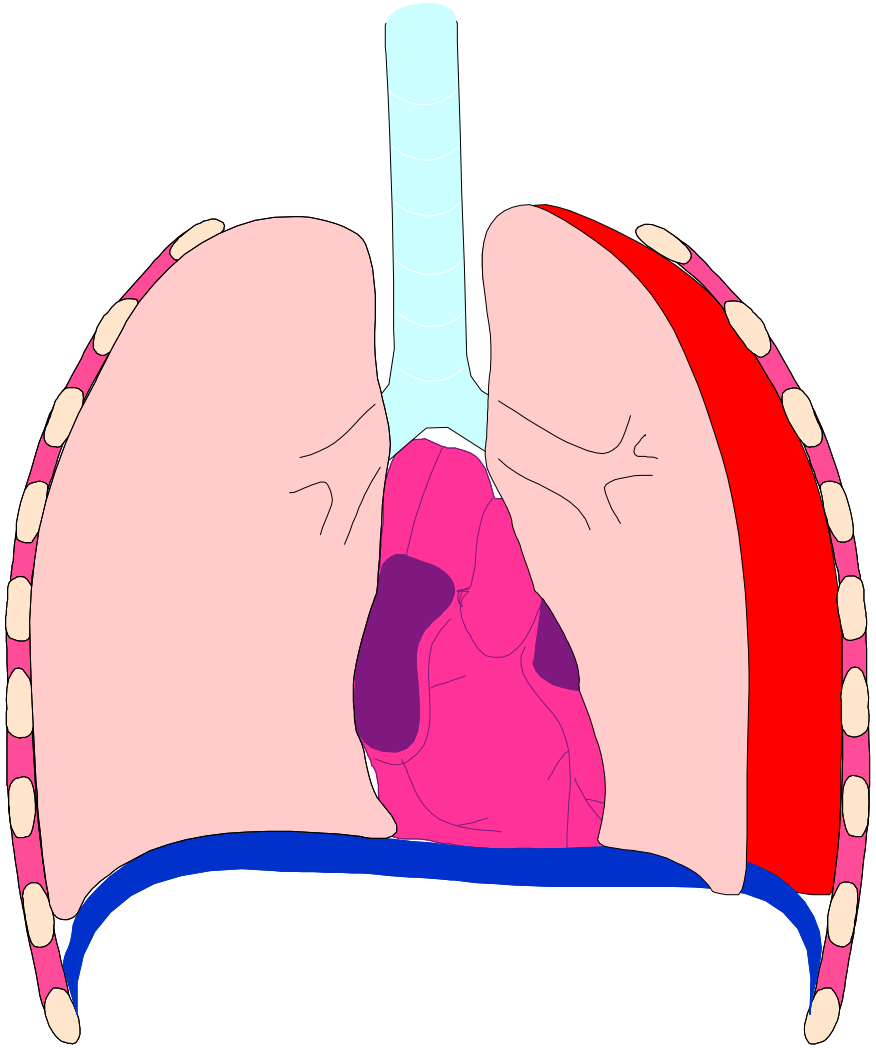

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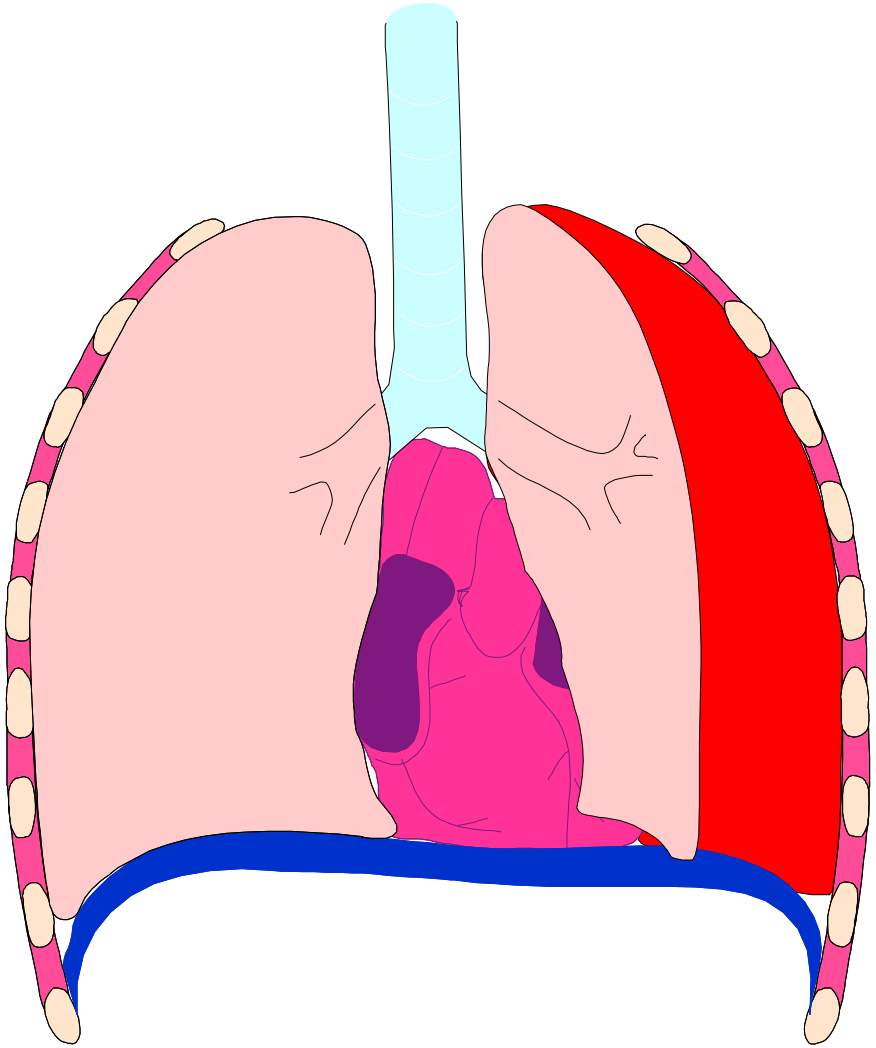

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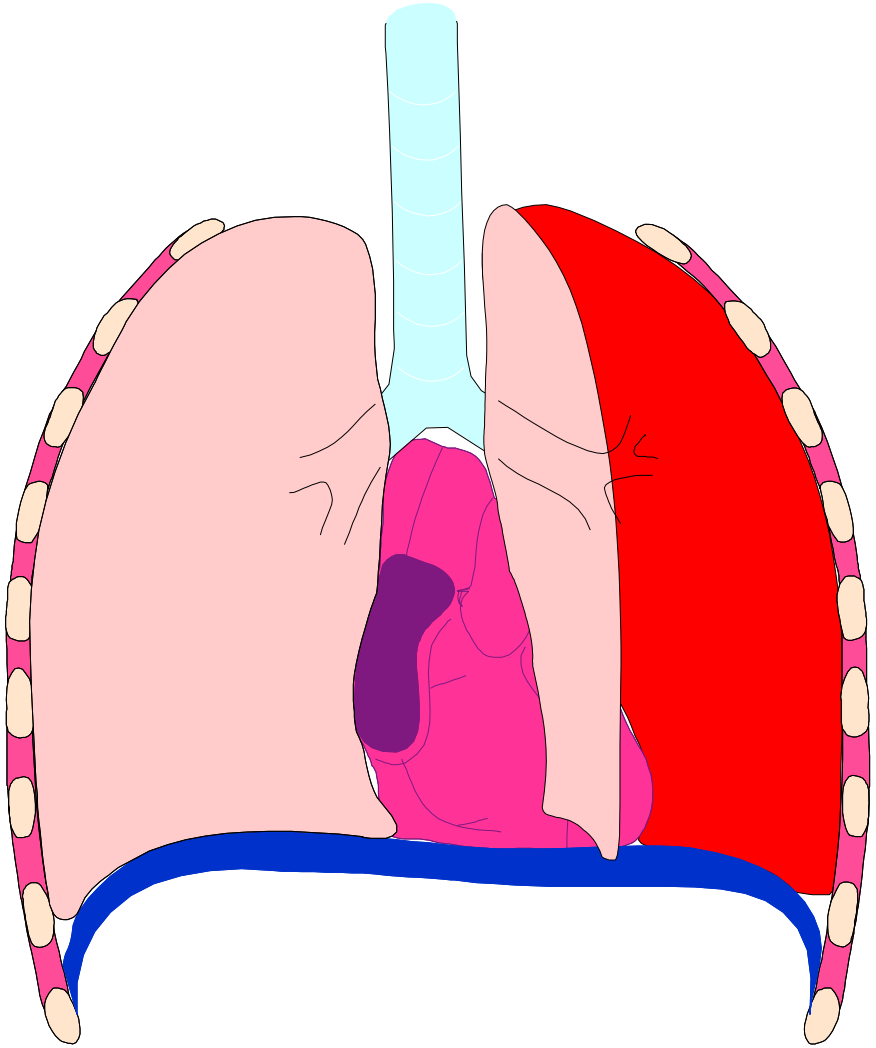

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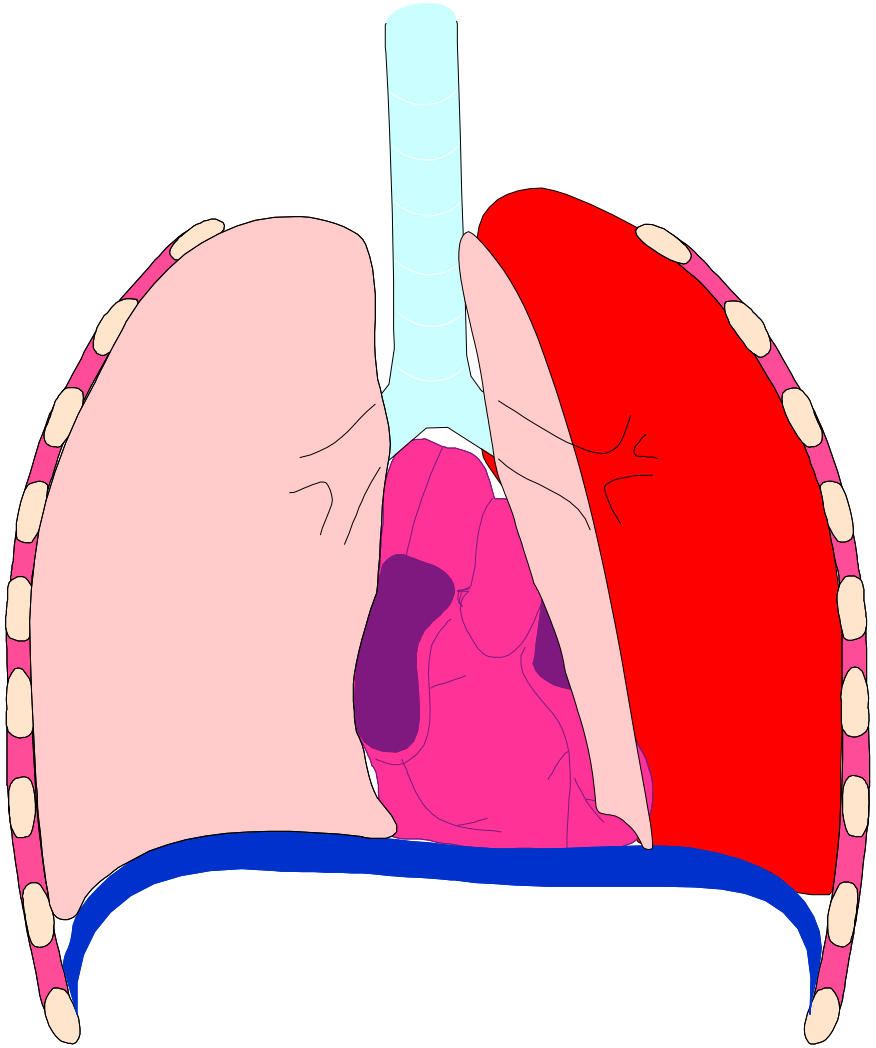

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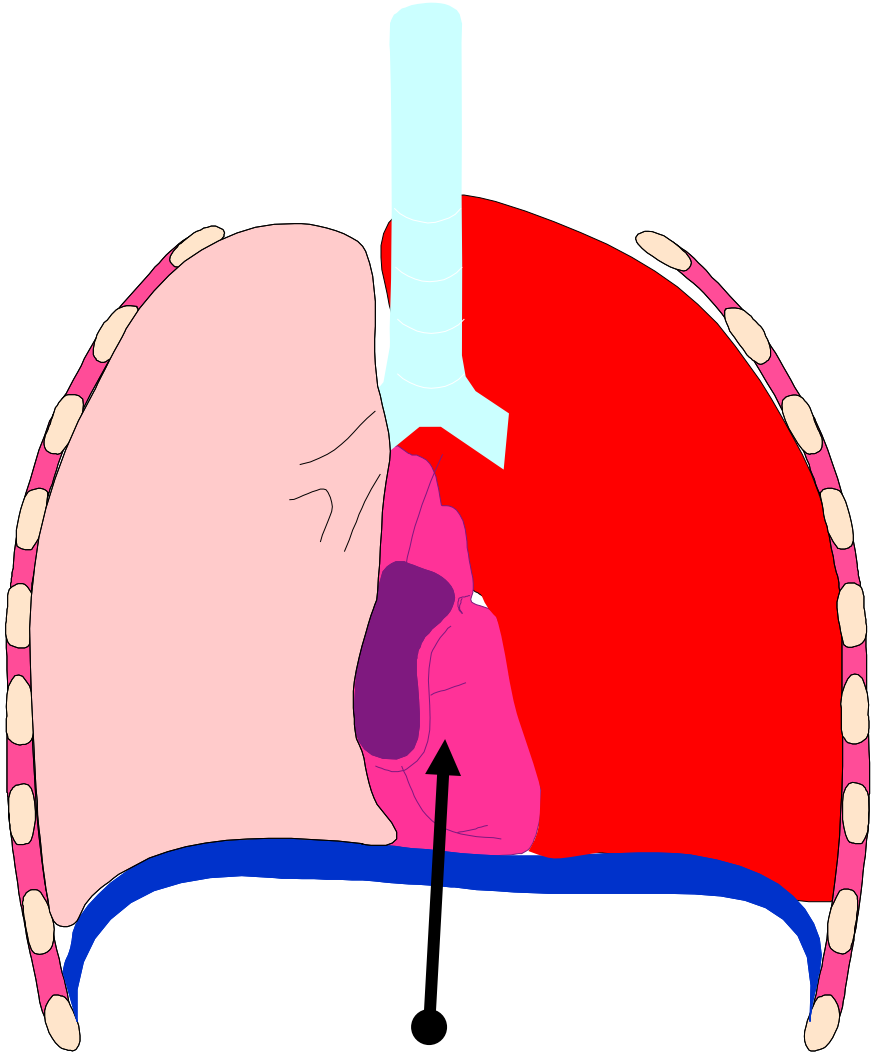

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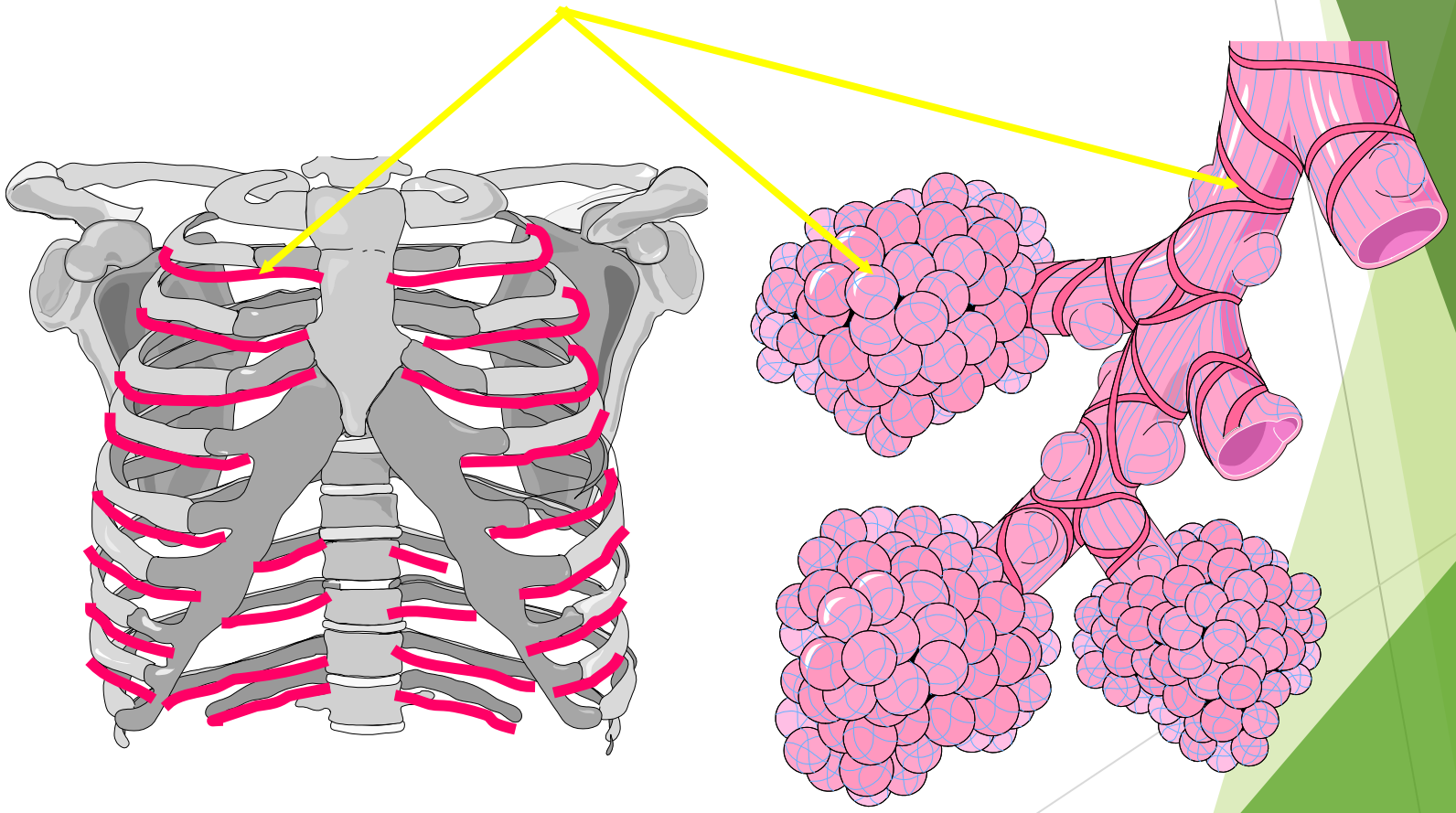
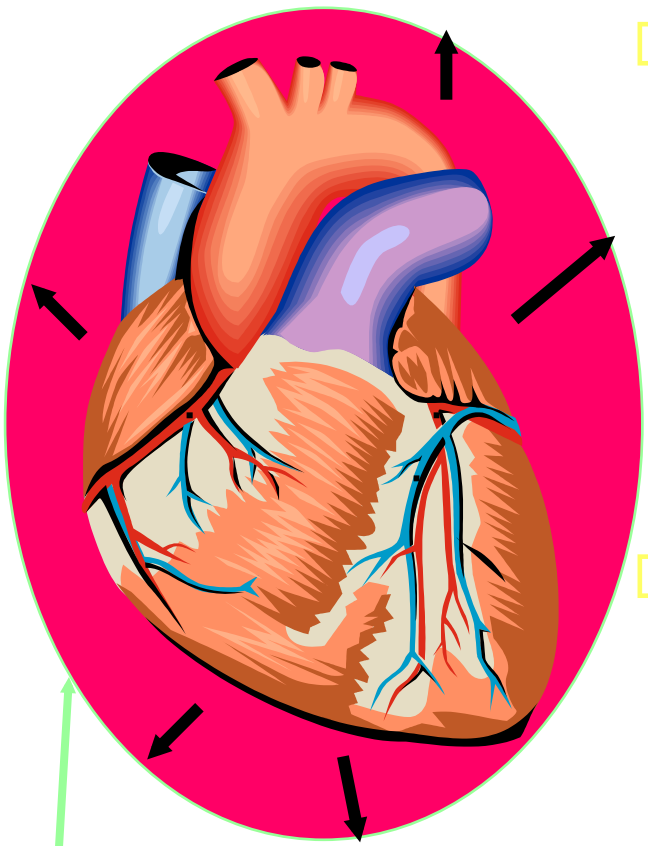


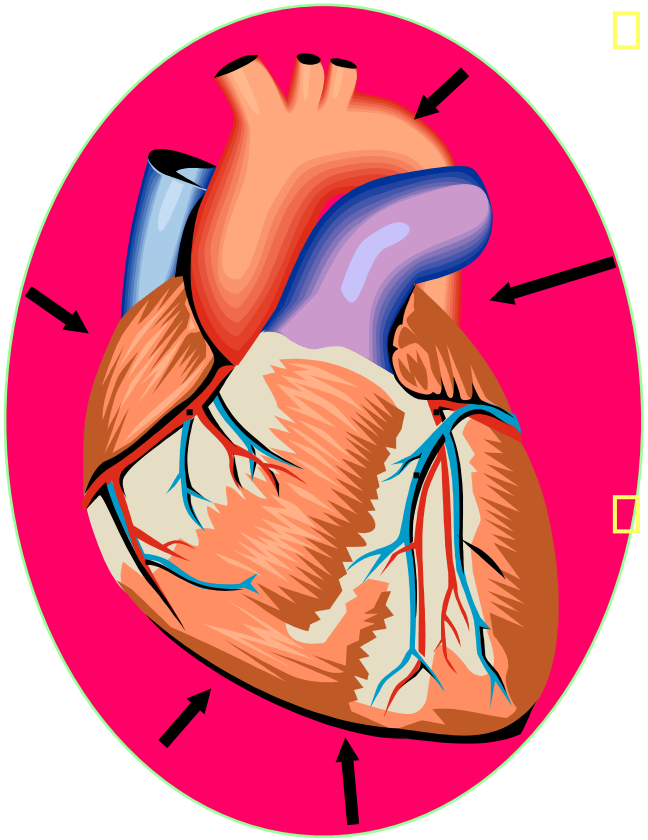
Lots of blood vessels

Pericardial Tamponade



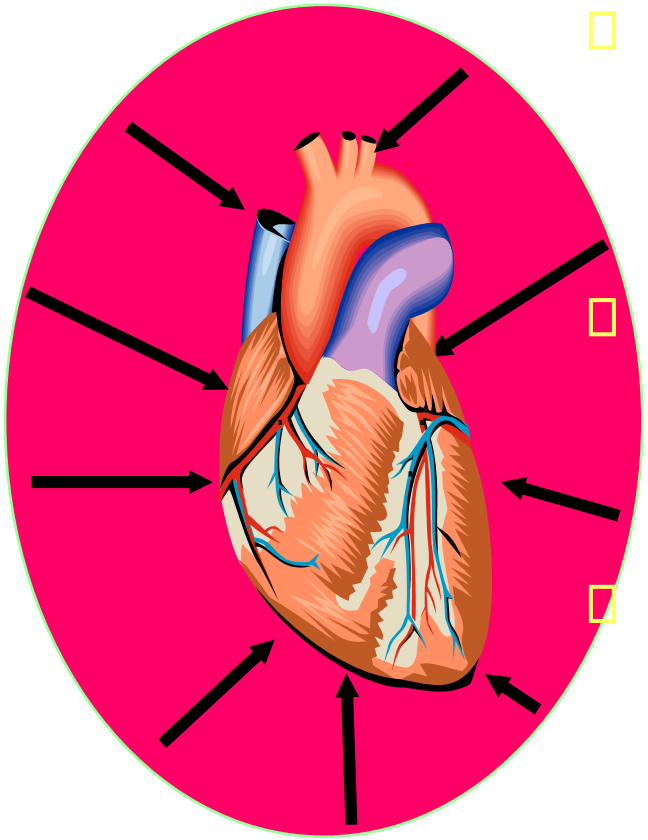
- Blood and fluids leak into the pericardial sac which surrounds the heart.
- As the pericardial sac fills, it causes the sac to expand until it cannot expand anymore

Pericardial Tamponade



- Once the pericardial sac can’t expand anymore, the fluid starts putting pressure on the heart
- Now the heart can’t fully expand and can’t pump effectively.

Pericardial Tamponade



- With poor pumping the blood pressure starts to drop.
- The heart rate starts to increase to compensate but is unable
- The patient's level of conscious drops, and eventually the patient goes in cardiac arrest

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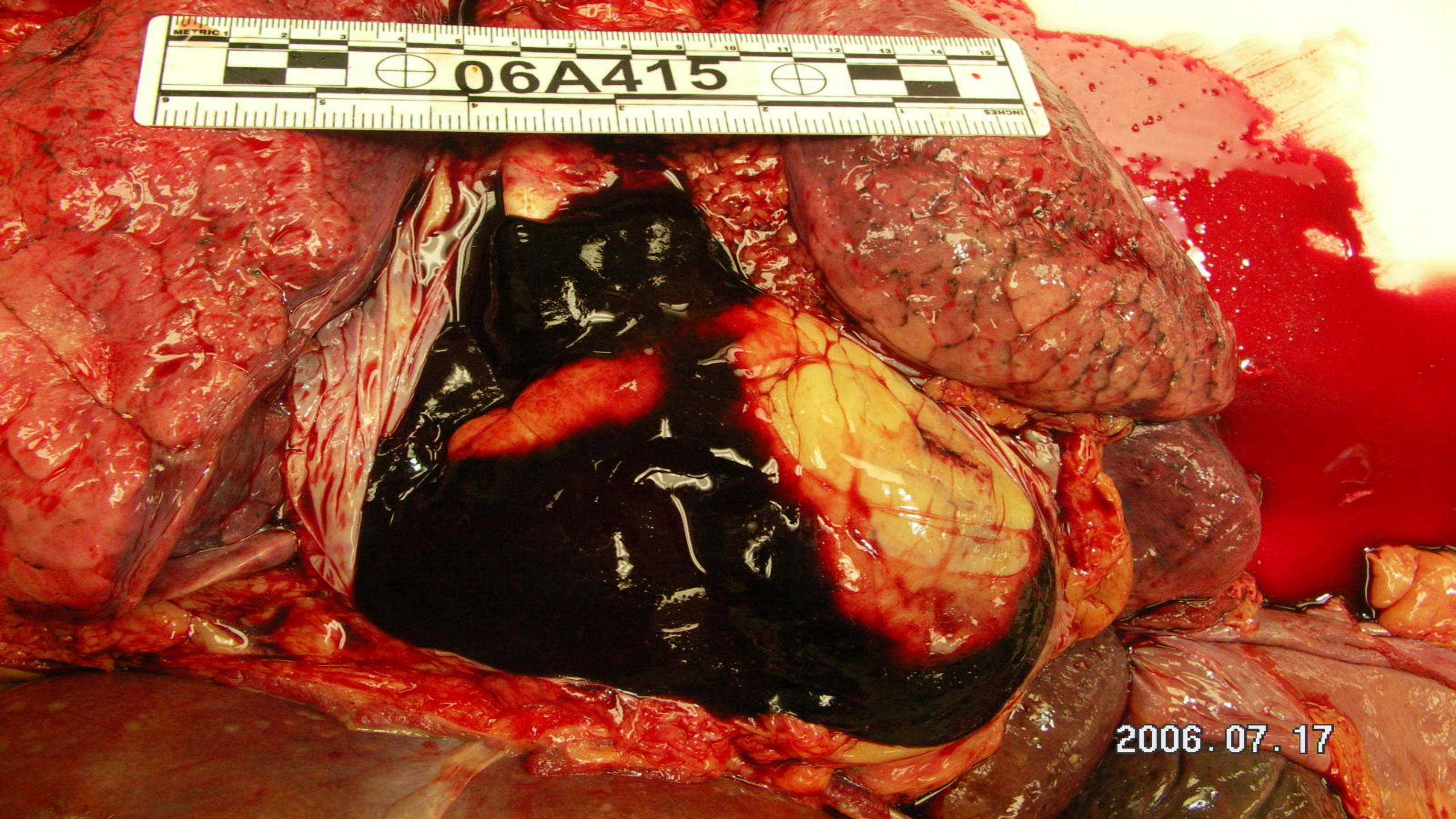
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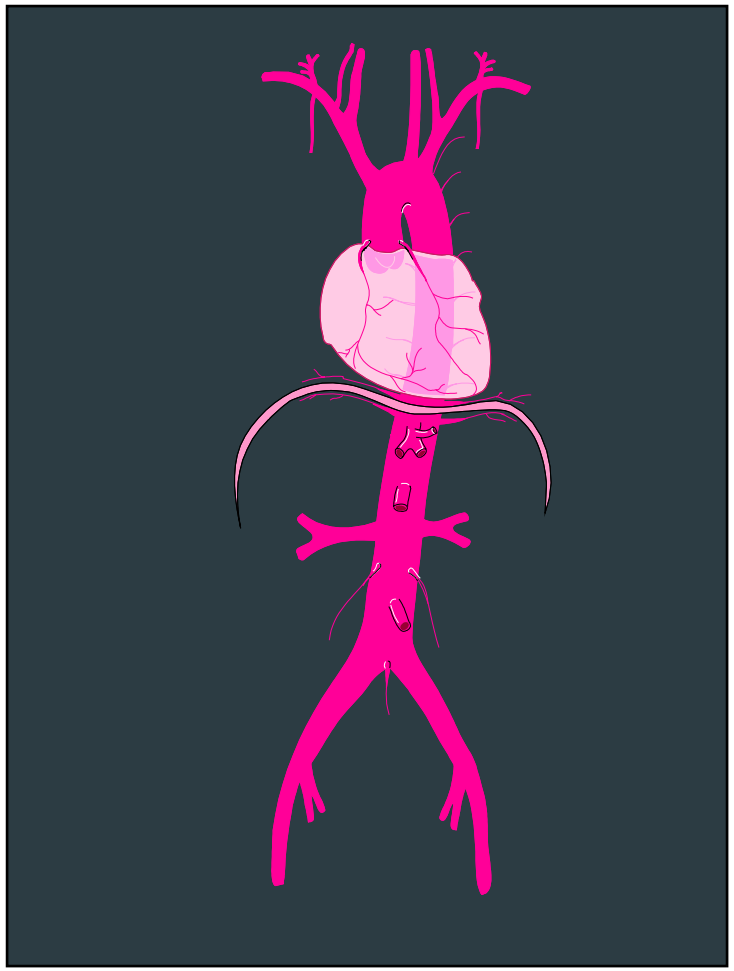
Traumatic Aortic Rupture



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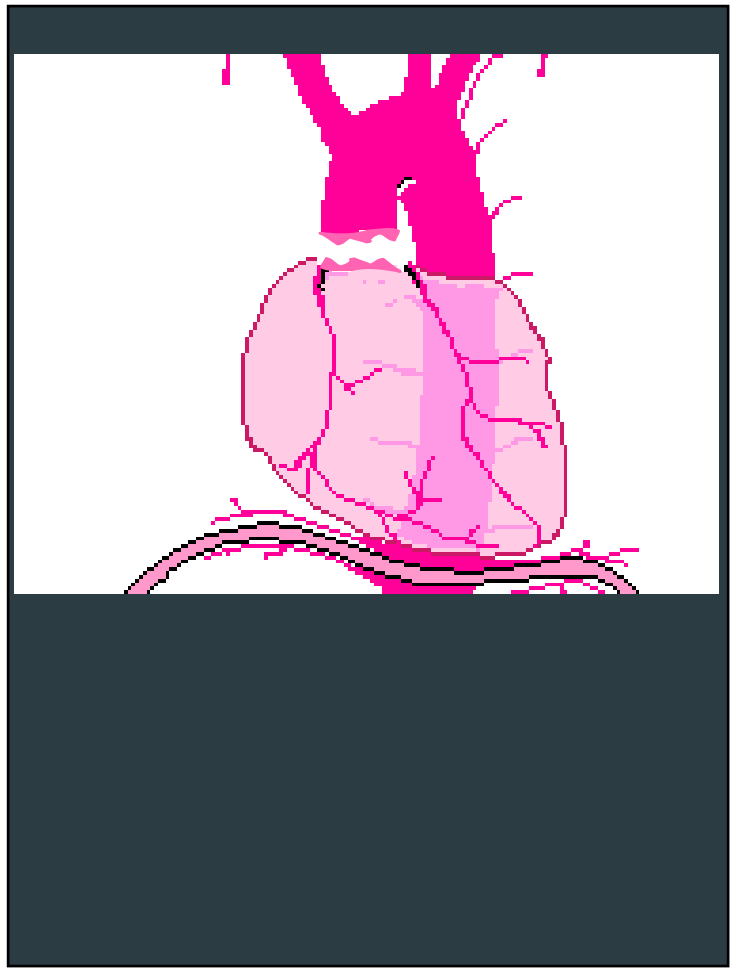
Traumatic Aortic Rupture



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Abdominal & Thoracic Injuries

- Injuries are rare
- Solid organs most often injured
- Life threatening

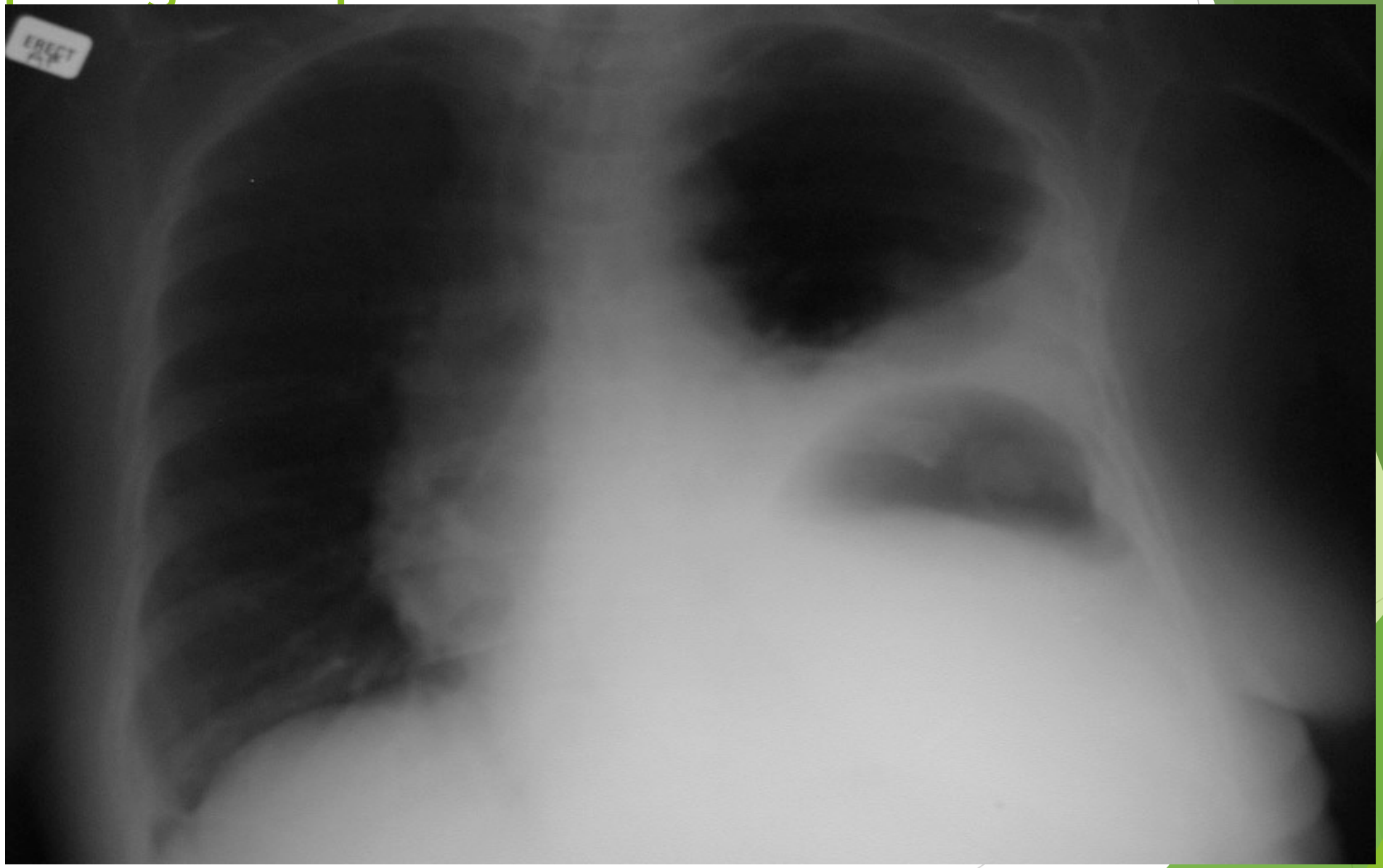
Traumatic Asphyxia

- Results from sudden compression injury to chest cavity
- Can cause massive rupture of Vessels and organs of chest cavity
- Ultimately Death

Diaphragmatic Rupture

- A tear in the Diaphragm that allows the abdominal organs enter the chest cavity
- More common on Left side due to liver helps protect the right side of diaphragm
- Associated with multiple injury patients

Diaphragm Rupture



Abdomen

Anatomy

- Organs are part of:
  - Digestive system
    - Stomach, liver, pancreas, gall bladder, large & small intestine, spleen
  - Urinary system
    - Kidneys, bladder
  - Reproductive system
    - Uterus, ovaries, prostate, seminal vesicles

Anatomy

- Solid organs
  - More often & easily injured
  - Can cause rapid death due to large blood supply—internal bleeding
  - Spleen, liver, kidney, pancreas
- Hollow organs
  - Injuries are rare because tubes are hollow—assist in transporting substances from one organ to another

Abdominal contusions

- Not common but most likely to occur in collision sports
- Mxn:
  - direct blow to abdomen, compressive force to abdominal wall
- S/S:
  - pain, tightness, hematoma formation under the fascial tissue surrounding muscle

Spleen injury

- Mxn:
  - Direct blow to upper left quadrant
  - Falling on UL quadrant
  - Infectious mononucleosis causes enlarged spleen putting athlete at risk
    - If spleen is enlarged due to mono, may resume activity after 3 weeks if the spleen is no longer enlarged or painful and there is no fever

Spleen injury

Kidney Contusion

- Mxn: blow to the back
- S/S:
  - signs of shock
  - nausea
  - vomiting
  - rigidity of muscles of back
  - hematuria (blood in urine)
  - referred pain radiates forward around the trunk into the lower abdominal region

Kidney contusion

- Kidney contusion

Kidney Laceration

Liver Contusion/laceration

- Mxn:
  - hard blow to right side of abdomen
- S/S:
  - hemorrhage
  - signs of shock
  - referred pain
    - just below the right scapula
    - right shoulder
    - substernal area
    - anterior left side of chest (occasionally)

Injuries to Bladder

Mxn:

- blunt force to lower abdominal region if the bladder is distended by urine
- Hematuria associated with contusion of bladder during running
- Known as runner's bladder

- S/S:
  - blood in urine
  - Referred pain to lower trunk, upper thigh anteriorly
  - With rupture, athlete will be unable to urinate

Testicular/Scrotal contusion

- Due to considerable sensitivity & vulnerability, contusions to the scrotum & testicles cause extreme pain, nausea and disability
- Important for males to wear proper protection to prevent incidence of contusions

- Mxn:
  - direct blow to the genitalia

Testicular/Scrotal contusion

- S/S:
  - hemorrhage
  - fluid effusion
  - muscle spasm
  - Vomiting is severe

Sequelae of abdominal injuries

Abdominal injuries-

Liver laceration or rupture of the liver following trauma resulting in haemorrhage . Could cause shock and circulatory failure.

Early complications:

relate to hypoperfusion or massive blood transfusion

Later sepsis could occur

Dilutional coagulopathy and thrombocytopaenia are common following hepatic repair

Severe injury of the spleen could result in massive haemorrhage and even very rapid death.

- Renal injuries
  - Immediate sequelae - haemorrhage due to involvement of vessels. Might be even enough to cause the death of the person.
  - Early complications occur within the first month
    - bleeding,
    - infection,
    - peri-nephric abscess,
    - sepsis,
    - urinary fistula,
    - hypertension,
    - urinary extravasation.

- Delayed complications include;
  - hydronephrosis,
  - calculus formation,
  - chronic pyelonephritis,
  - hypertension,
  - arteriovenous fistula,
  - pseudoaneurysms.

Delayed retroperitoneal bleeding usually occurs within several weeks of an injury or procedure and may be life-threatening.

- Intestinal injuries;

Commonest complication is perforation. Penetrating trauma is the usual cause of injury but it is also found blunt force trauma as well. If left undiagnosed could result in peritonitis.

Complications - fracture pelvis

Acute:

- Major haemorrhage , shock,
- Visceral and soft tissue injury:
  - fractures involving perineum or vagina,
  - associated with lacerations into the rectum or bladder Urethral injuries common in males. Iinsertion of a urethral urinary catheter contraindicated
- Sacral plexus injury
- Ileus

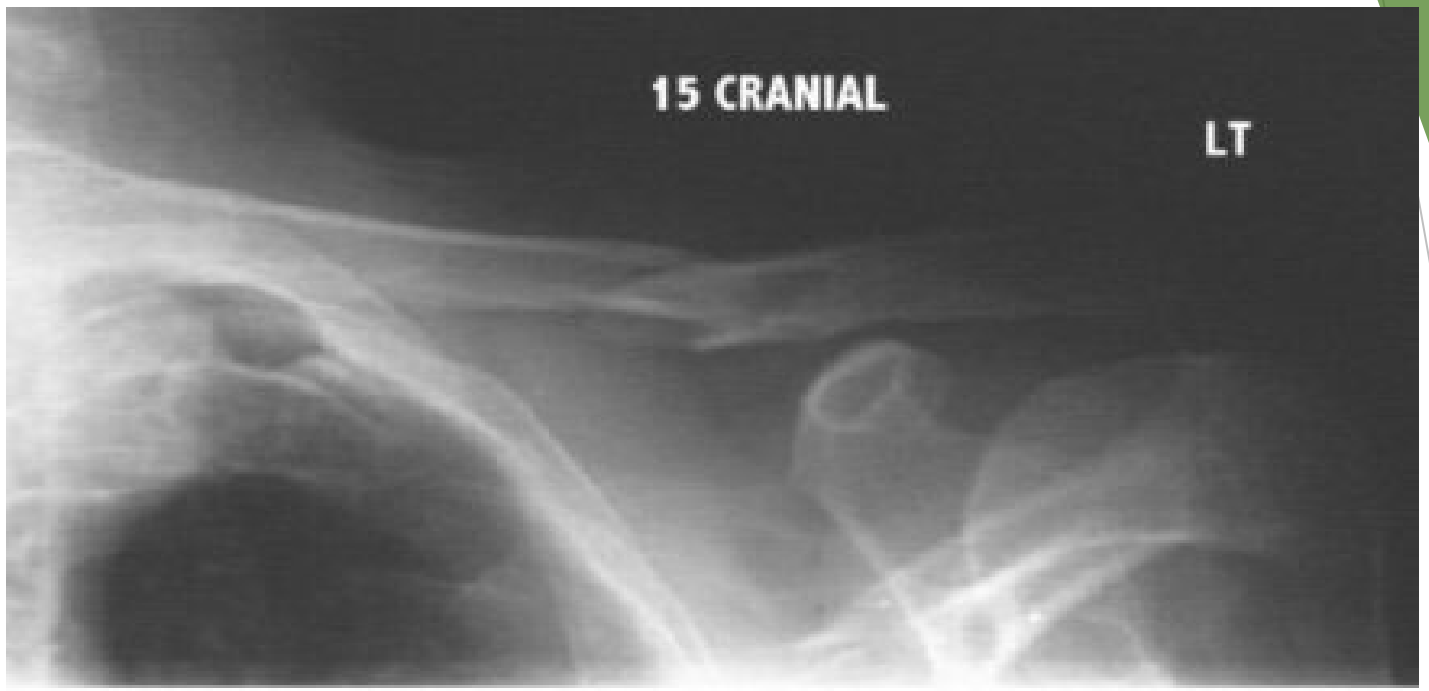
- Severe pain
- Fat embolization
- acute respiratory distress syndrome:
- DVT - prolonged bed rest, and prophylaxis is often contraindicated

Late:

- Infection-second most common cause of death
- Disability/immobility/instability
- Incontinence
- Chronic pain

Upper Limb

Clavicular Fractures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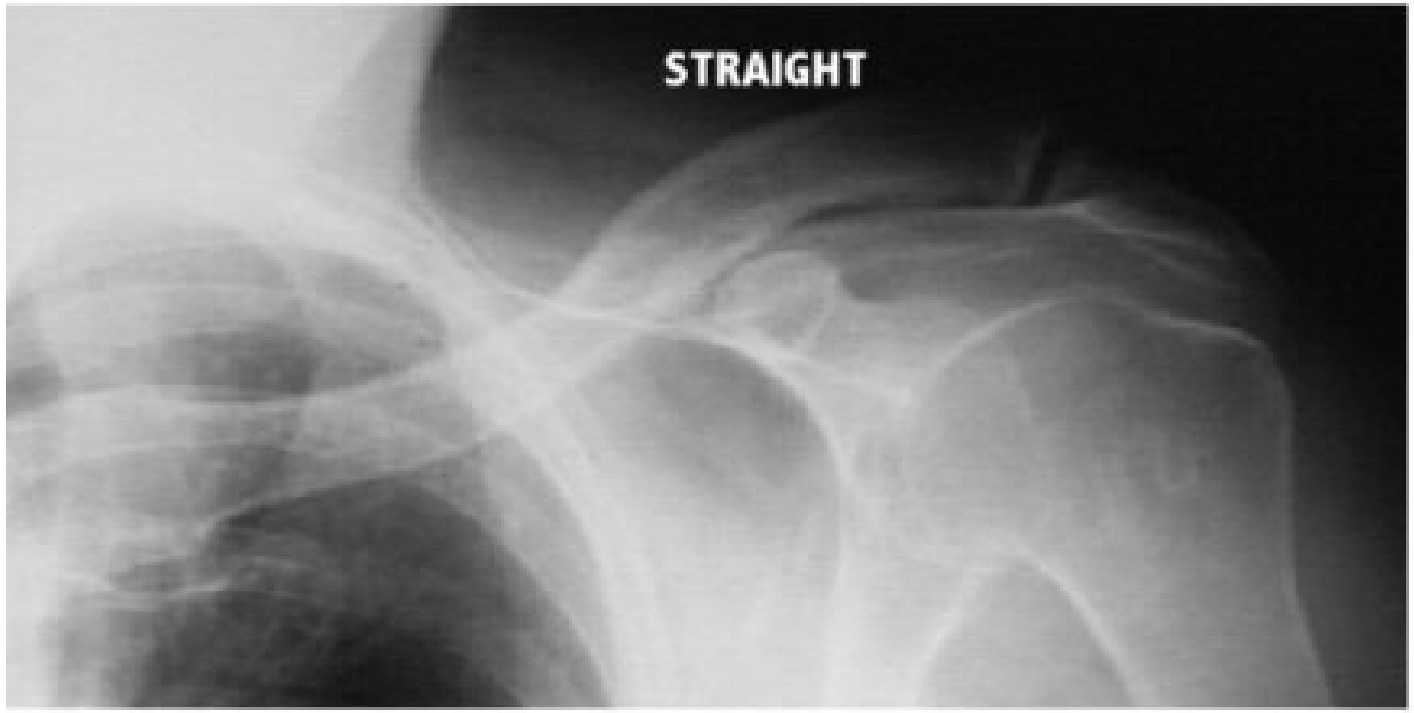
STRAIGHT

Shoulder dislocations

Anterior sh

Elbow trauma

- Fractures
- Dislocations
- Ligament sprains
- Look for compartment syndrome
- Rule out neurovascular injury

Elbow fractures

- Supracondylar, epicondylar
- Radial head/neck
- Olecranon
- Coronoid process

- Defense wounds
- ‘offensive’ injuries
- Fractures
- Potentially lethal complications
    - Infection
    - Haemorrhage
    - Traumatic amputations

Lower Limb

Hip Fracture

- Typically results from high-energy forces
  - Automobile crashes
  - Falls from heights
    - 3X more common in women
    - Increases significantly with advancing age

Hip Luxation

- Rare
- High forces
  - Motor vehicle accidents
  - Falls from heights
  - Skiing accidents
- Usually accompanied by fracture (acetabulum, proximal femur, both)

Femoral Fracture

- Not just femoral neck
- Winquist et al.: of 520 femoral fractures, 78% from:
  - Automobile crashes
  - Motorcycle crashes
  - Automobile-pedestrian accidents

Falls from heights

- Proximal femoral fractures
  - Risk increases with age
  - 4.5/100 people 70 or older
- Femoral neck fracture
  - Direct impact to greater trochanter
  - Lateral rotation of leg while body falls backwards

Knee

- Cruciate ligament sprain
- Meniscus injury
- Collateral ligament sprain
- Knee extensor disorders

- Case: Patellar tendon rupture

Traumatic fracture of tibia and fibula

- Most common mechanisms
  - Vehicle-pedestrian accidents
    - Direct impact / crush
  - Sports
    - Torsion, bending

Lower-leg injuries

- Compartment Syndrome
- Tibial Stress Syndrome
- Stress Fracture
- “Shin Splints”
- Traumatic fracture of tib/fib

Foot and Ankle Injuries

- Ankle sprain
- Achilles tendon
- Plantar fasciitis
- Toe Injuries

Possible complications of lower limb injuries

- Haemorrhagic shock
- Pulmonary embolus
- Fat embolization – pulmonary distress
  - cerebral signs
  - petecheal rash

Limb injuries

Traumatic amputation will lead to functional loss.

It will also effects the life style and working capacity.

Amount of disability depends on the severity of the injury and the anatomical part involved.

Involvement of the joints might later cause scar formation and strictures affecting the functions of the limb.

Compartment syndrome is another complication of limb injuries.

Prolonged immobilization of limbs could cause disuse atrophy and weakness of the limbs.

Spinal injuries:

One can have spine injury without spinal cord injury.

- Many people suffer transient loss of function.
- Cord injury either may be complete or incomplete.
- This gives rise to sensory and motor dysfunction depending on the severity and the location of the injury.

Other complications:

- Bowel and bladder Dysfunction
- Infections of the bladder
- Anal incontinence, after traumatic injury.
- Sexual function is also associated with the sacral spinal segments, and is often affected after injury.
- Injuries at the C-1/C-2 levels will often result in loss/impairment of breathing,
- Inability or reduced ability to regulate Heart rate, blood pressure, sweating and body temperature.
- Spasticity (increased reflexes and stiffness of the limbs).

- Neuropathic pain.

- Abnormal increases in blood pressure, sweating, and other autonomic responses to pain or sensory disturbances.

- Atrophy of muscle.

- Osteoporosis (loss of calcium) and bone degeneration.

Discuss different mechanisms and causes of death in a victim who has received a karate kick to the abdomen;

Elderly

Child

Pregnant woman

Individual with an enlarged spleen

Thank you