INJURIES
CHEST, ABDOMEN, LIMBS

FN Brno

November 2011

Injury

- Chest
- Abdomen
- Limbs

Injury to the rib cage

Fractured one or more ribs

- Sharp pain at the site of fracture
- Pain on taking a deep breath
- Shallow breathing
- Paradoxical breathing
- Open wound
- **Features of shock**

Injury to the rib cage

Cave:

- Area of fractured ribs can lead to **fail chest** with paradoxical breathing
- Open wound over the fracture through which air can be sucked into the chest cavity (**open or tension pneumothorax**)
- Fractured rib can pierce a lung (**closed PNO**)
- Injure of internal organs - **internal bleeding**

Injury to the rib cage

First aid

- Support the chest wall and transport to a hospital
- **Penetrating chest wound** – cover and seal the wound along three edges
- Do not remove embedded objects !
- Help victim settle into the most comfortable position and call for transport to a hospital

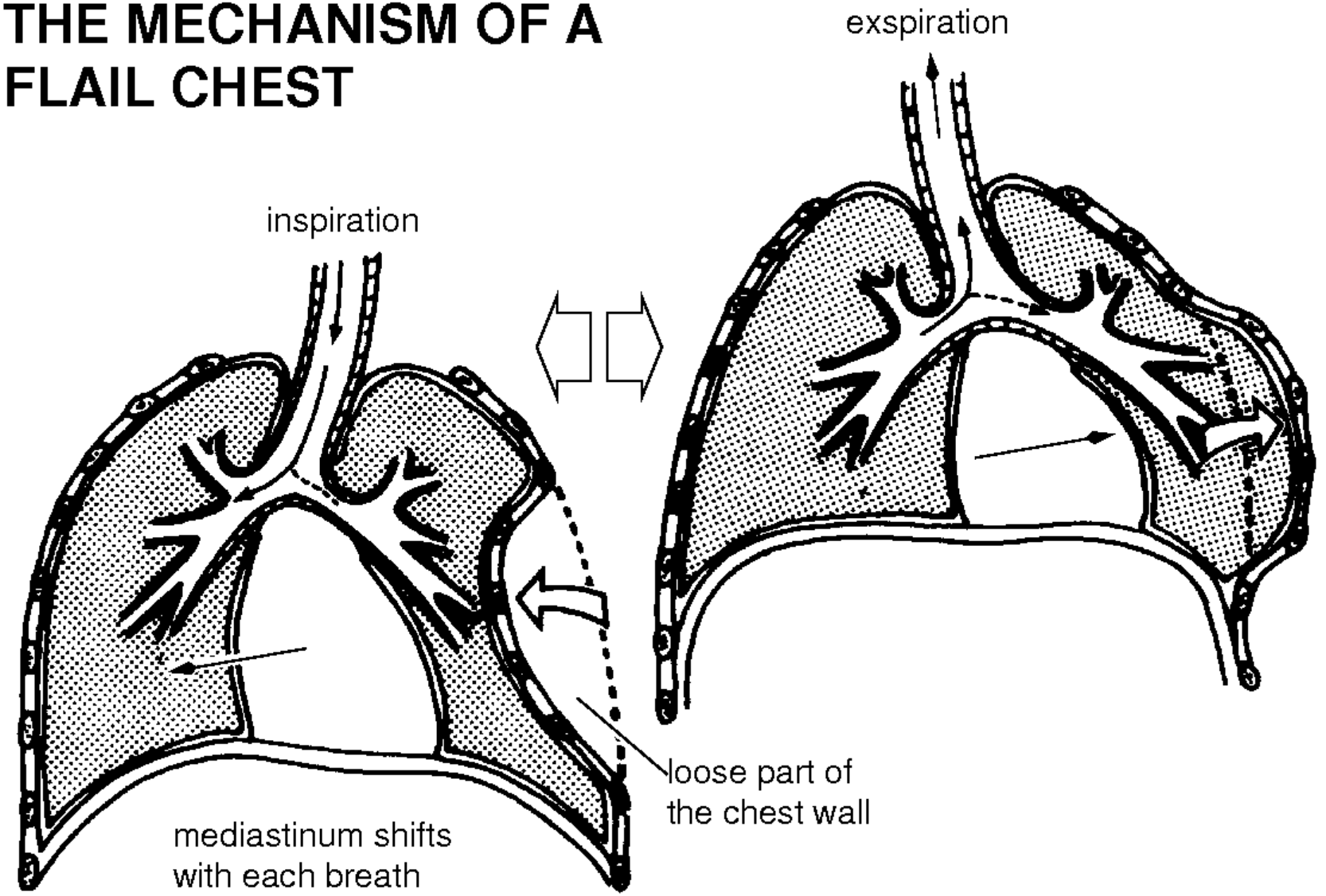
Fracture of ribs

- The most common thoracic injury
- **Pain on inspiration** is the principal symptom
- **Chest x-ray** should be obtained
- **Therapy** - analgetics, intercostal nerve blocks, muscle relaxants
- Rib belts and adhesive taping should be avoided - retained secretions, atelectasis

Flail chest

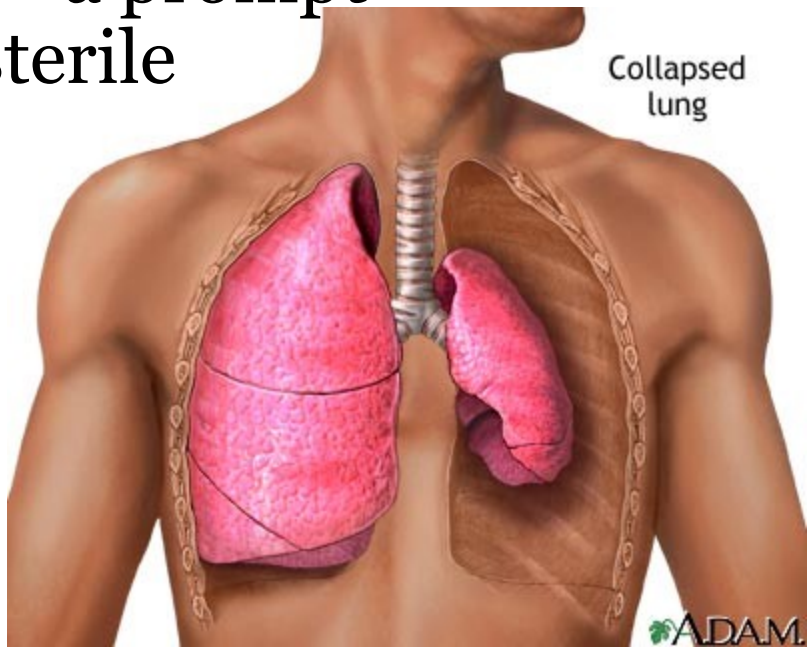
- Unilateral **fractures of** four or more **ribs** or bilateral
- **Instability of chest**
  (paradoxical respiratory motion results in hypoventilation)
- Respiratory difficulty is agravated by **pulmonary contusion**

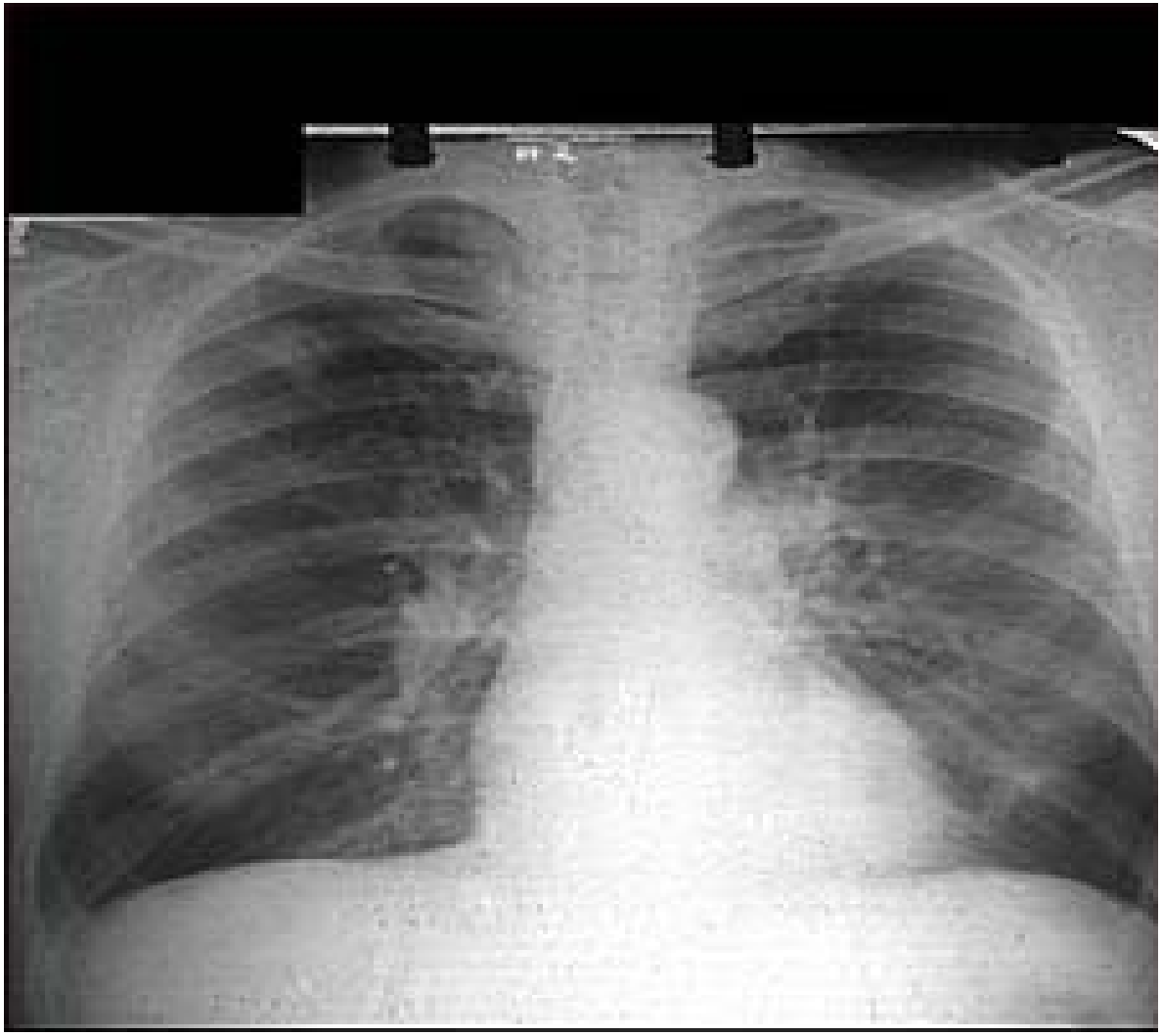
THE MECHANISM OF A FLAIL CHEST



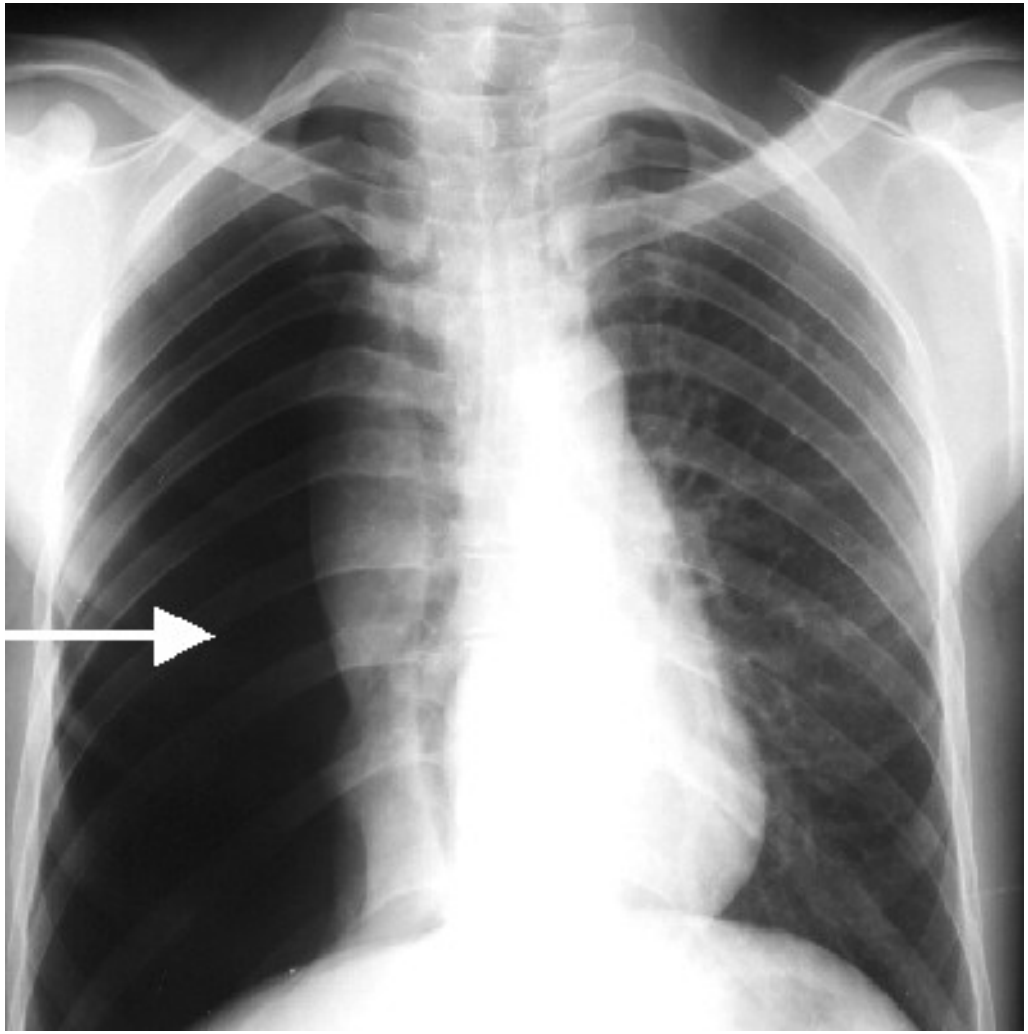
Pneumothorax

- **Pneumotorax** results from the lacerations of the chest wall or lung
- **Open** pneumothorax- a defect in a chest wall - it is a sucking chest wound - a prompt closure of the defect with a sterile dressing is necessary
- **Chest tube** insertion
- Intubation, artficial ventilation





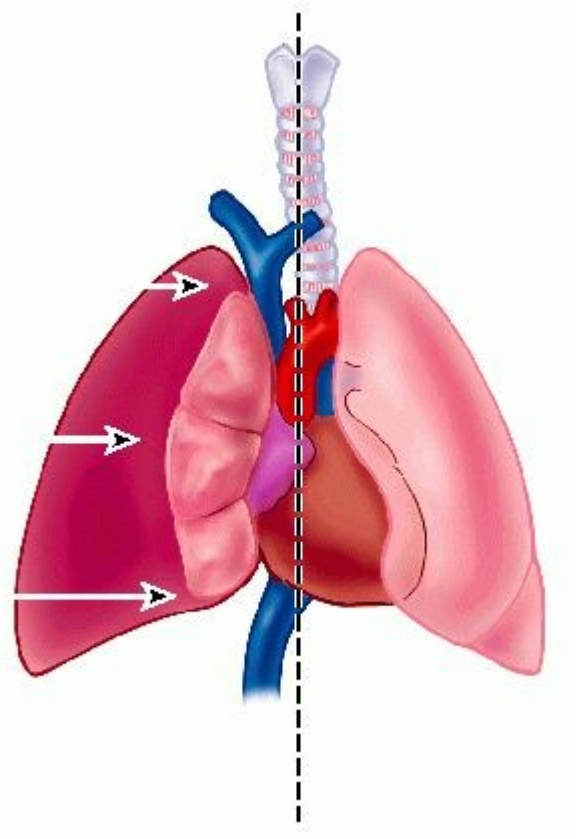
Normal Chest X-ray



Pneumothorax

Tension pneumothorax

- Develops when a flap valve leak allows air to **enter the pleural space** but prevents its escape
- Intrapleural pressure rises, causing total **lung collapse** and a **shift of the mediastinum** to the opposite side

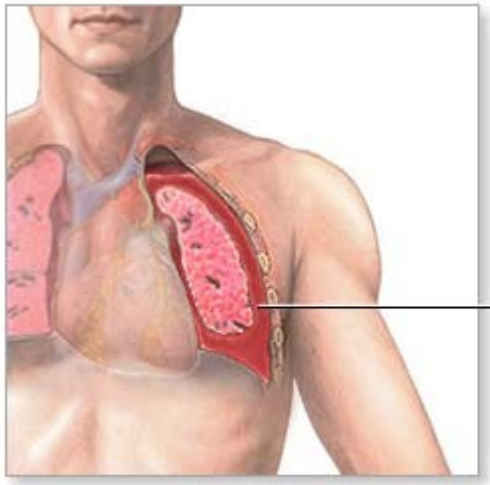


Tension pneumothorax

- This pressure must be relieved immediately to avoid interference with ventilation on the opposite side and **impairment of cardiac function**
- Treatment - chest tube insertion

Hemothorax

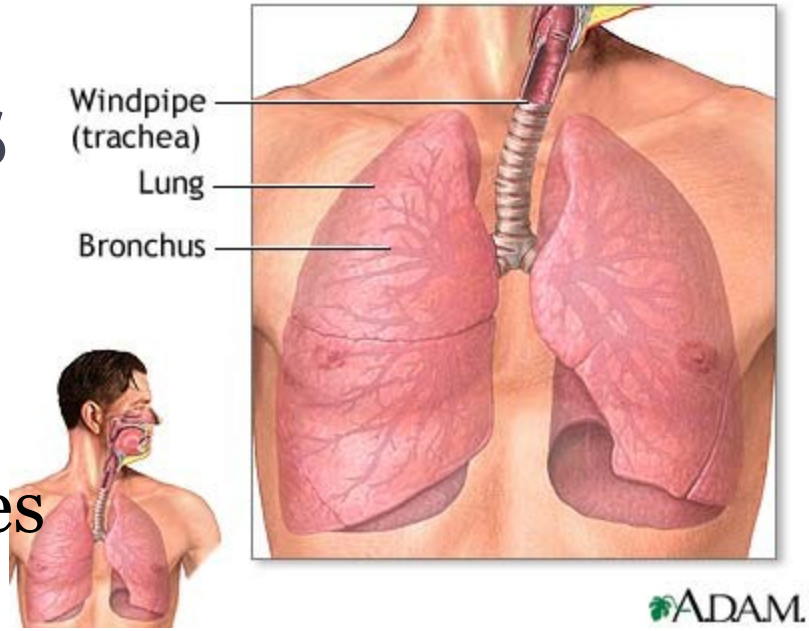
- **Haemorrhage into pleural space**
- Occurs in some quantity in almost every patient with a chest injury
- Blood loss can vary from slight to extensive
- Treatment - **chest drain**
- In some cases - **thoracotomy** / acute hemothorax of 1500ml



ADAM

Hemothorax

Trachea and Bronchus Injuries

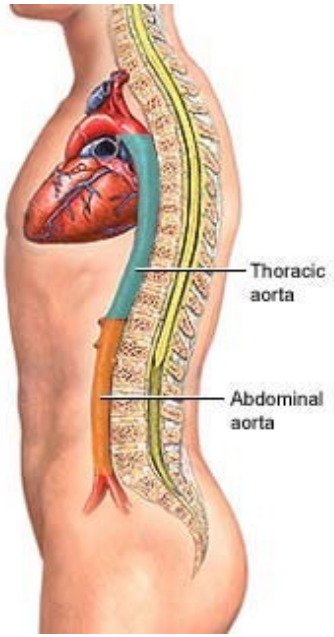


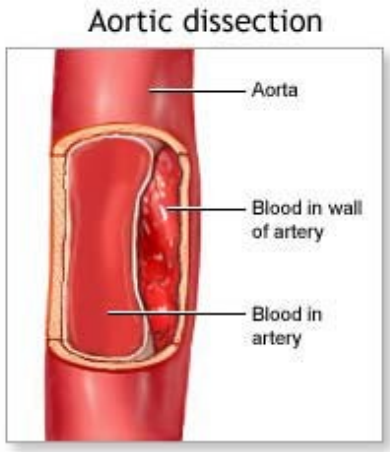
- **Emphysema** – presence of air in subcutaneous tissues
- **Crepitance** – sound of 'walking on frozen snow'
- Often accompanied by **PNO** with a **massive air leak**
- **Respiratory distress**
- Treatment - endotracheal tube insertion and definitive surgical management /stents/

Heart and Aorta

Blunt cardiac injury

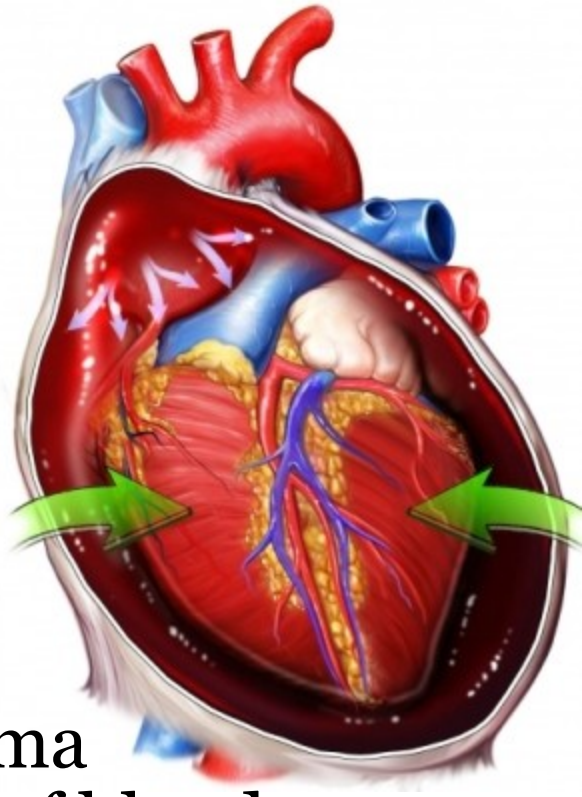
- Spectrum of cardiac changes - from wall bruise to ventricular, septal or valvular rupture
- Diagnosis is difficult
- Arrhythmia can occur
- Many cardiac contusions are unrecognised





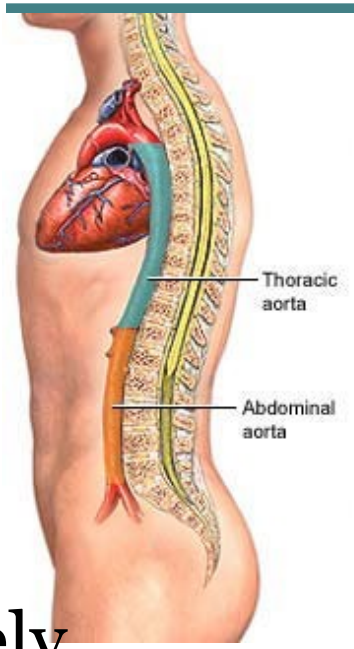
A.D.A.M.

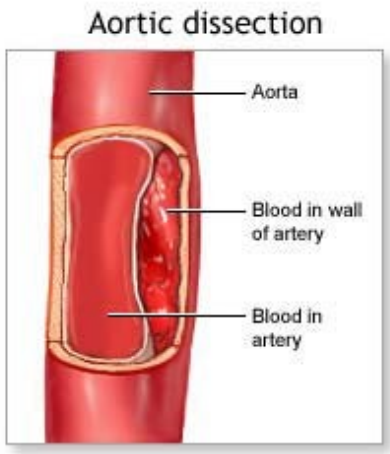
Tamponade



- Cardiac tamponade is most frequently caused by **penetrating thoracic injury**
- Occasionally in blunt thoracic trauma
- Accumulation of as little as 150 ml of blood in pericardial sack may **impair cardiac filling**
- Can lead to shock
- Therapy – **pericardiocentesis** – needle aspiration of blood in pericardiac sack

Aorta

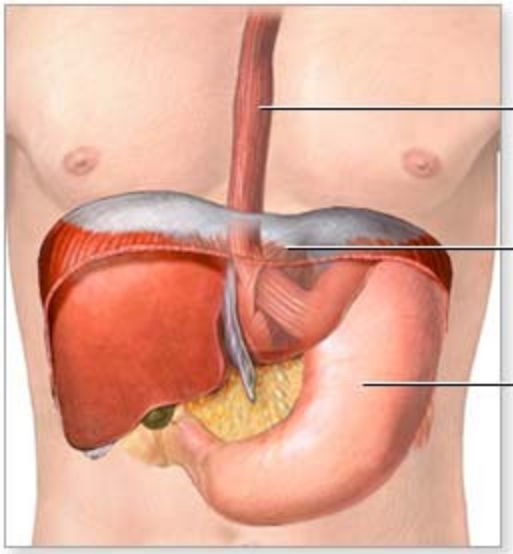




A.D.A.M.

- Rupture of a thoracic aorta is the most lethal injury
- Most patients die immediately from **exsaquination**
- Who survive the initial period develop a false aneurysm/false lumen that can slowly enlarges over a period of months to years

Other injuries of chest



- **Ruptures of diafragm** – may result of herniation of viscera
- **Esophagus** - blunt injury of oesophagus is rare

Abdomen

- Motor vehicle accidents
- Pedestrian accidents
- Penetrating trauma - knife wounds are more common than gunshot wounds
- External bleeding, protruding abdominal contents
- Signs of shock

Abdominal wound

First aid

- Help injured person to lie down on a firm surface
- Loosen tight clothing, belts
- Apply dressing over the wound
- Transport to hospital

Abdominal wounds – hospital management

Diagnosis

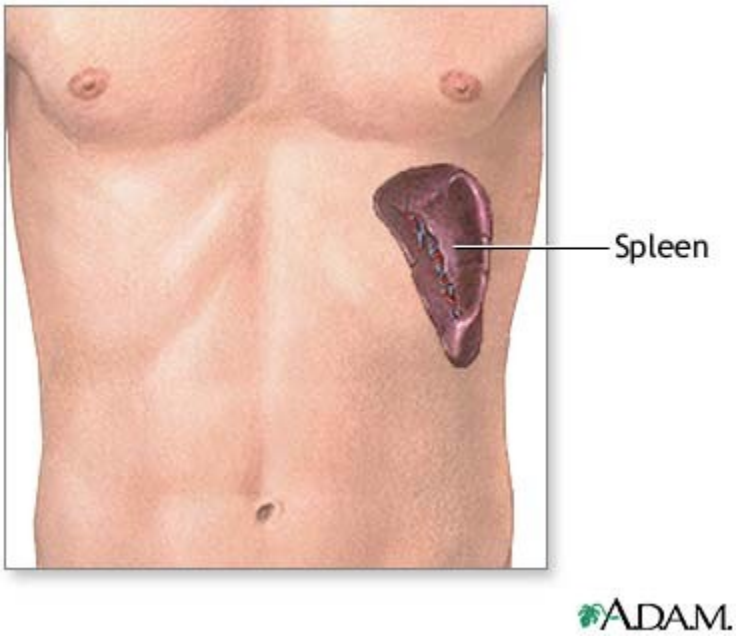
- Ultrasonography
- CT

Treatment

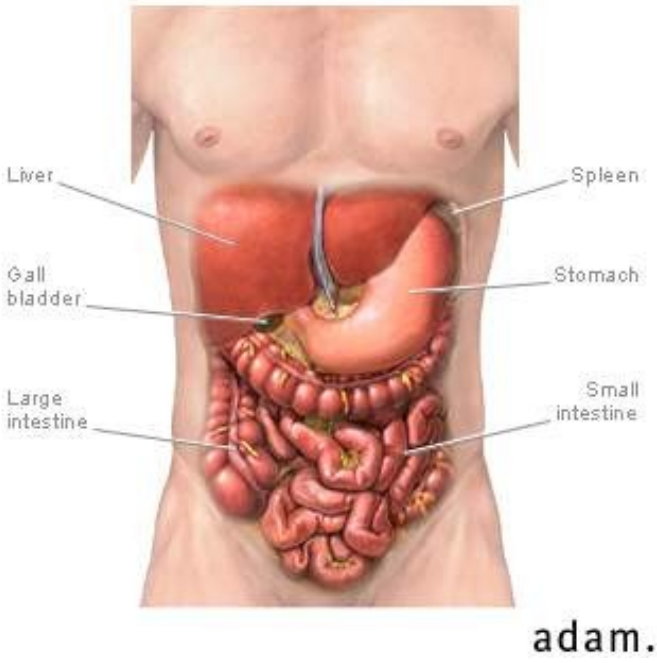
- Surgery - laparotomy

Spleen

- Is the most commonly injured intraabdominal organ
- Diagnosis is confirmed by **CT scan**
- **Therapy - splenectomy**



Liver and Biliary Tree



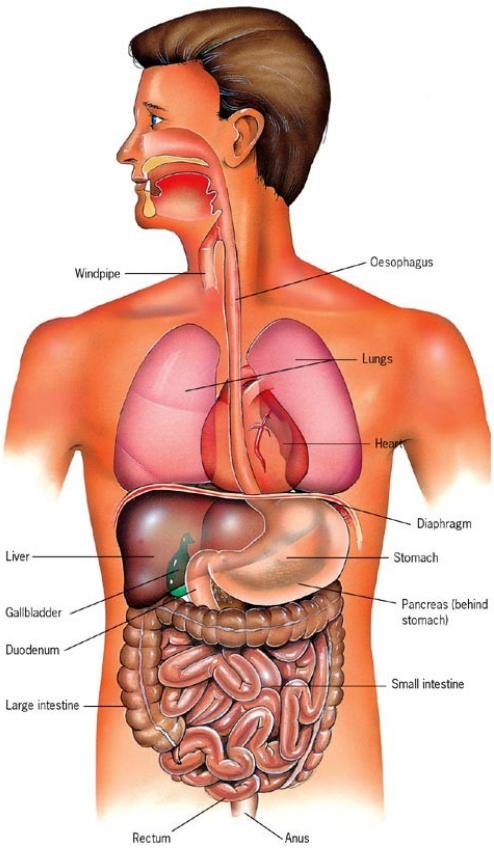
- The **liver** is the most commonly injured organ.
- **CT** examination
- Therapy - **surgical** (suture, resection)

Stomach

- Most gastric injuries are due to **penetrating trauma**
- Blunt trauma is rare
- If **vomitus** or gastric aspirate is **bloody**, an injury to the stomach should be suspected.
- Therapy: **laparotomy**

Other injuries of abdomen

- Duodenum
- Pancreas: pancreatic trauma is relatively uncommmen
- Intestines
- Colon and rectum
- Major abdominal vessels
- Urinary tract: blood in urine



Injuries - limbs

Limbs

- **Bones and soft tissues**
- **Hemorrhage** can be also life-threatening
- Soft tissue injuries: complete debridement of all devitalized tissue is a preventation of infection.
- Primary amputation
- **Tetanus**: prophylaxis is recommended

Fractures

- **Break** or crack in a bone
- **Considerable force** is needed to break a bone unless it is diseased or old
- **Force**: direct
  indirect
  (twist or wrench)

Fractures

Open x Closed

Stable x Unstable

Open fracture

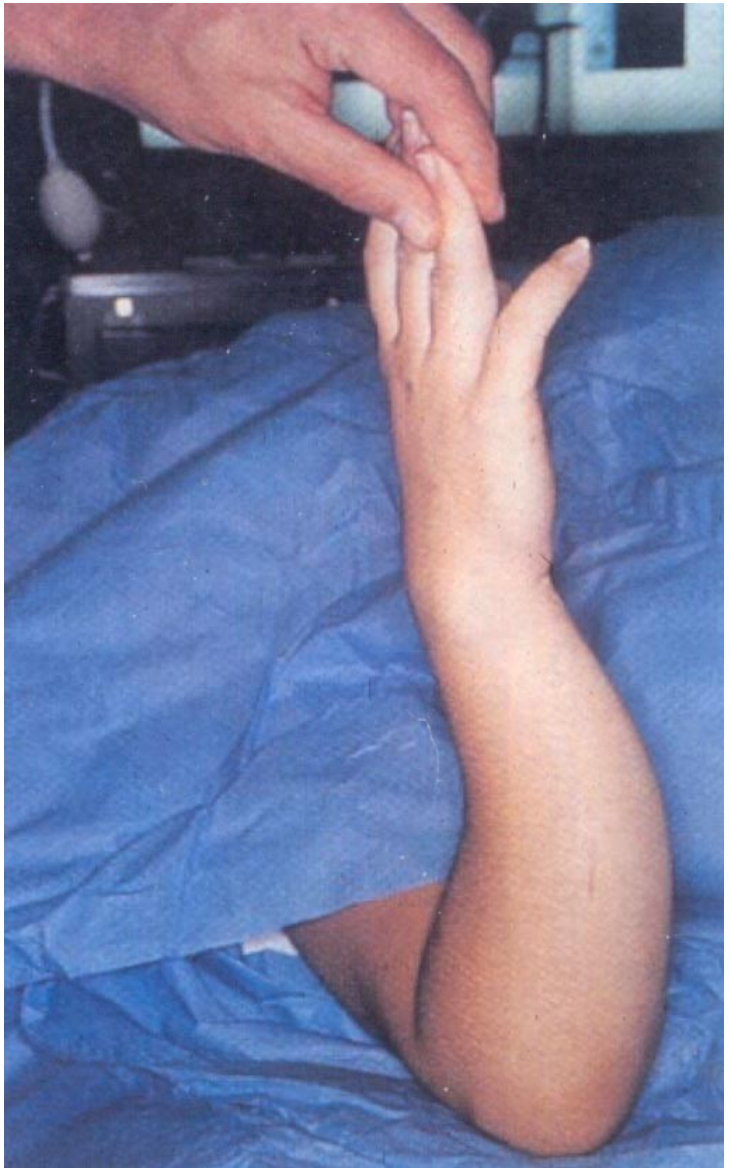
- Broken bone ends can pierce the skin surface or wound over the fracture

Open fracture – first aid

- Dresssing over the wound, pressure to stop bleeding
- Immobilize, treat for shock
- Transport to a hospital

Closed fracture

- Skin is intact
- Bones may be displaced
- Damage to other internal tissues
- Internal bleeding, shock!
- FA – **immobilize** to an unaffected part of the body
- Transport to a hospital



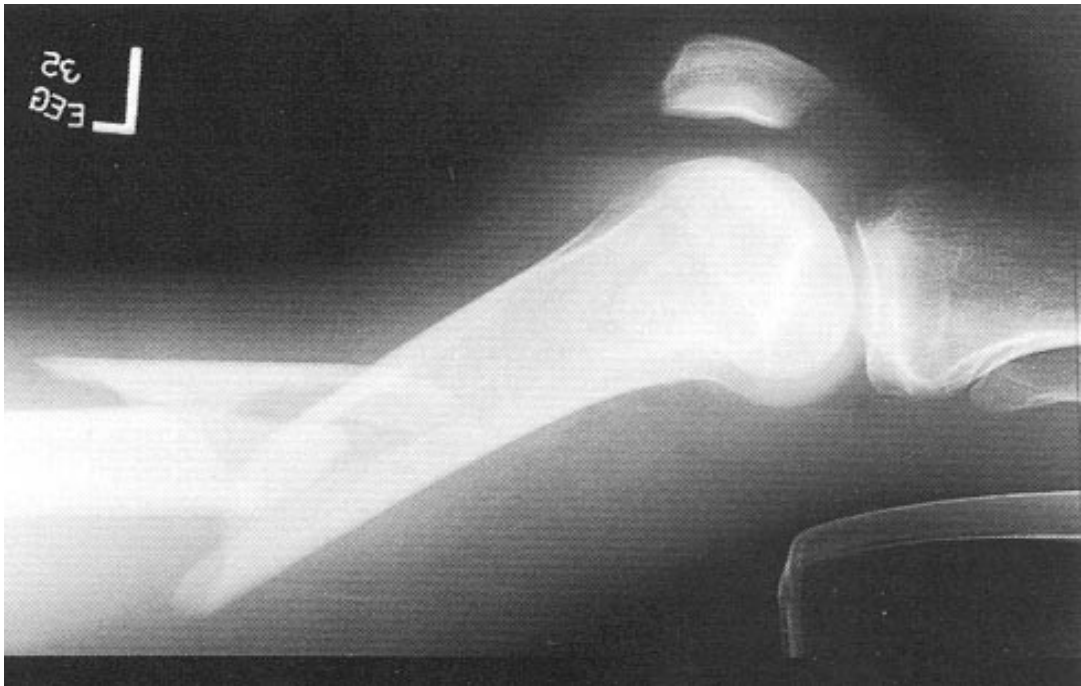
Stable fractures

- The broken bone ends do not move (incompletely broken, jammed together)

  Wrist
  Shoulder
  Ankle
  Hip

Unstable fractures

- The broken bone ends can easily move out of position
- The bone is completely broken or the ligaments are torn (ruptured)
- Damage to blood vessels, nerves, organs!



Signs of fractures

- Deformity, swelling and bruising at the fracture site
- Pain and difficulty in moving the area
- Inability to walk, false motion, inability to use the limb
- Shortening, bending or twisting of a limb
- Crepitus (heard or felt)
- Open wound with the bone ends
- Signs of shock

Signs of fractures

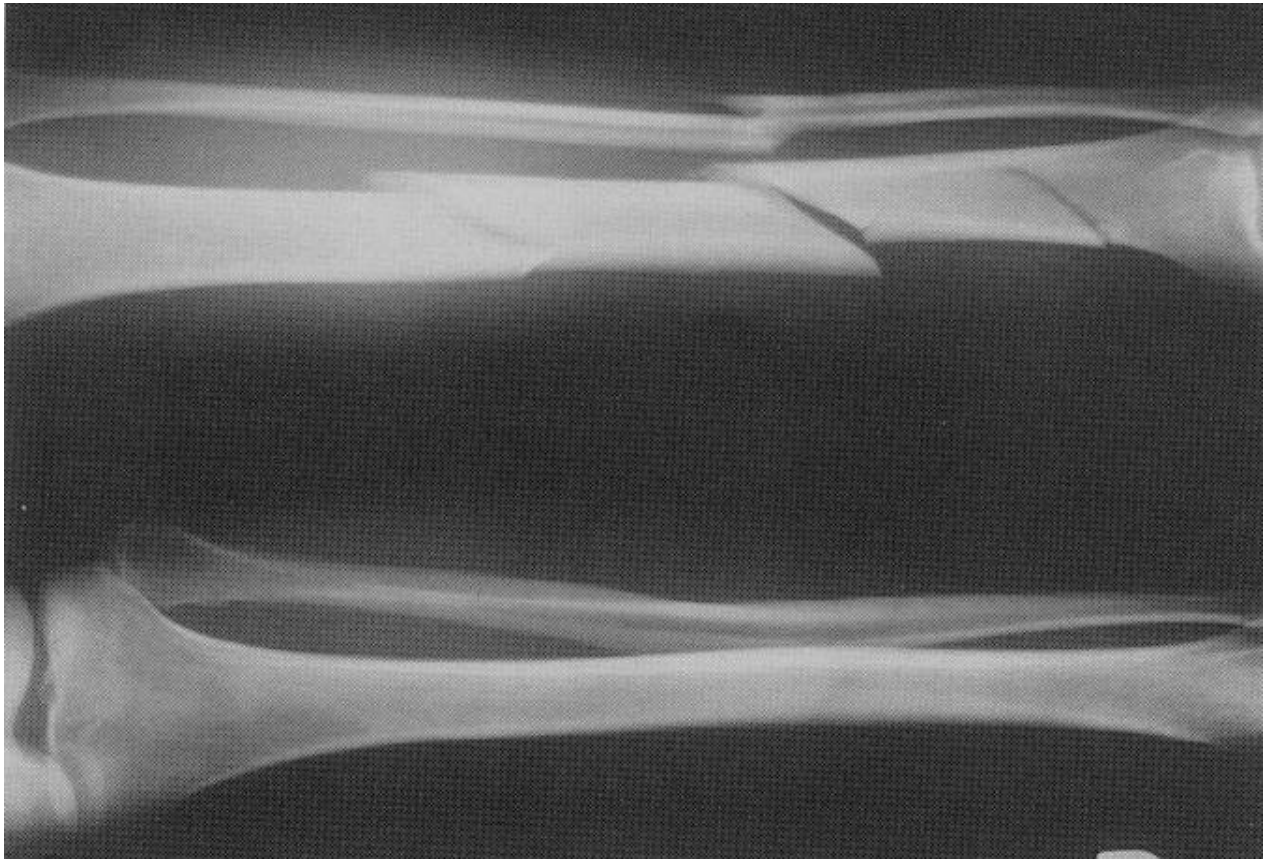
Crepitus - the sounds of bone ends clicking or rubbing against each other

Signs of fractures

Fractured Patella

Fractures - diagnosis

X ray



Management of common fractures

- **Evaluation** of mechanism of injury and the reason how and why it happened
- **Diagnosis** and treatmnet of all bony deformities and injuries of associated soft tissue - sprains, strains, lacerations , injuries of nerves and vessels
- Systemic evaluation of the trauma victim before providing any specific care of the fracture.

Management of common fractures

- ABC's
- Evaluate circulation beyond fracture/bandage
- Dress all wounds
- Do not press on protruding bone
- Splint all suspected injuries
- Elevate injurt part
- Treat shock
- Prepare patient for transport

Evaluation of circulation

- Nail blanch test
- Pulses

Impaired circulation

- Swolen,conjested limb
- Blue skin, painfull stretching of skin
- Pale, waxy skin
- Tingling

Pressure is applied to nail bed until it turns white

Blood returned to tissue

A.D.A.M.

Radial Pulse

Posterior Tibial Pulse

Injury Management

All
open wounds
should be covered with a
dry sterile compression dressing

Splinting Immobilizes the Injury

- Reduces **Pain**
- Facilitates **Transport**
- **Prevents** further damage to blood vessels, nerves and skin adjacent to the injury
- **Decreases Bleeding**

Principles of Splinting

- **Check** and record circulation
- **Dress** all wounds
- **Immobilize** the joints above and below a suspected fracture
- With injuries at or near joints, immobilize the bones above and below the injury
- **Stabilize** the injury site during splint application

Rigid and soft splints

Vacuum splint

Blanket Roll

UPPER EXTREMITY

All fractures can be immobilized by securing the extremity to the chest!

LOWER EXTREMITY

All fractures can be immobilized by securing the injured extremity to the opposite lower extremity!

Dislocated joint

- Bones are partially or completely **pulled out of position**
- **Cause**: strong force or violent muscle contraction
- Offten **associated with** torn ligaments or bone fractures
- Risk of major nerve damage result in paralysis

Dislocated joint

- **Signs:**
  - severe pain, difficulty in moving the area
  - swelling and bruising around the join
  - shortening, bending or twisting

Dislocated joint

- **Do not try reposition** a dislocated bone
- **Immobilize** the injured part
- **Check circulation** beyond the bandage every 10 minutes

Strains and sprains

- Injuries to the soft tissues around bones and joints (ligaments, muscles, tendons)
- Frequently associated with sporting activities
- Muscle and tendons may be strained, ruptured, bruised, ligament often sprained

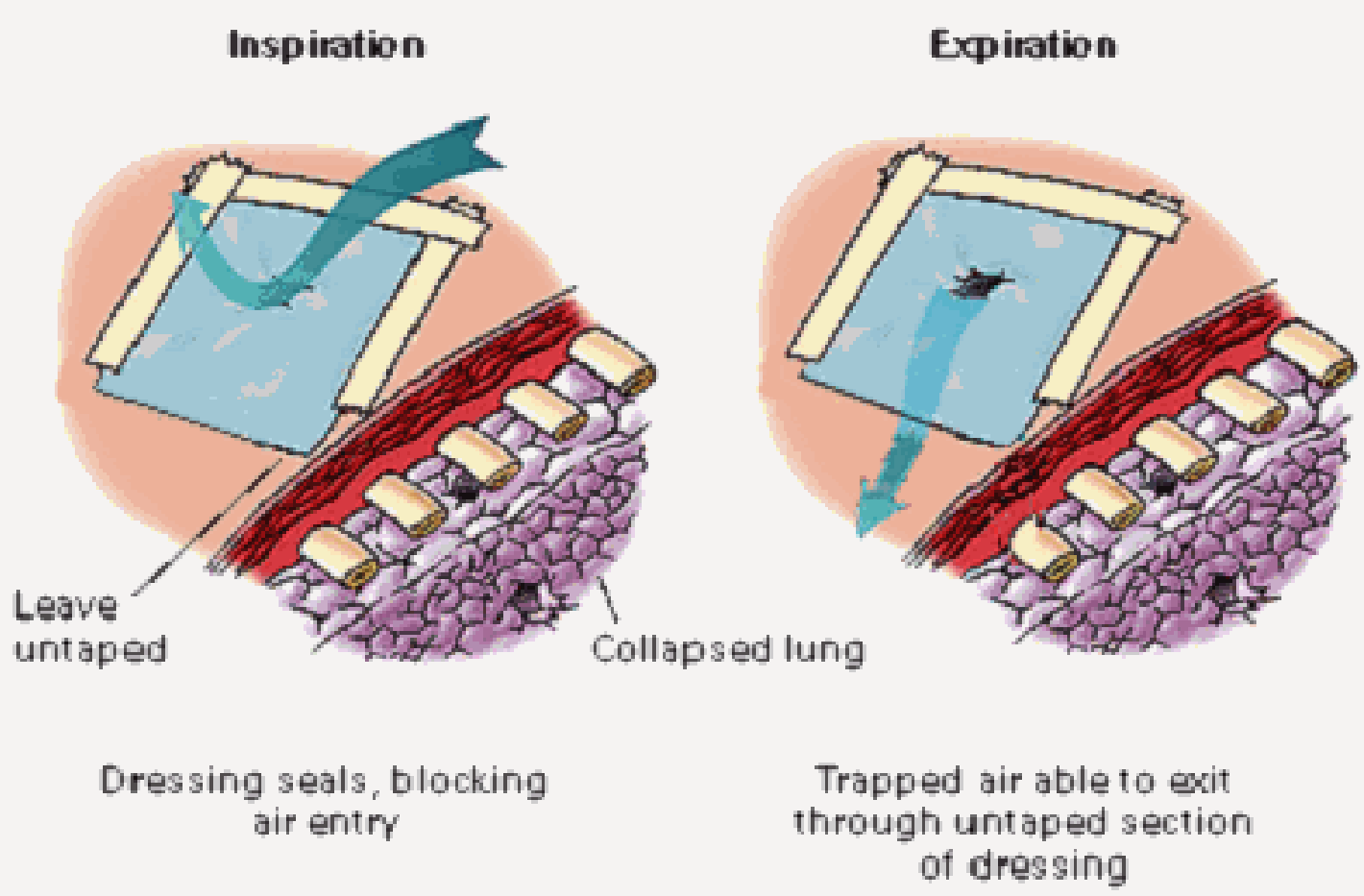
Sprain, Left Ankle

Strains and sprains

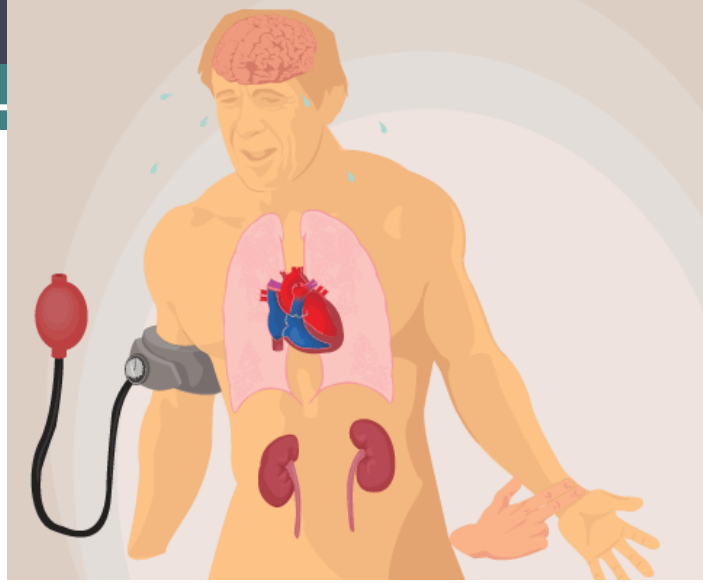
First aid: RICE procedure:

- **Rest** the injury part
- Apply **ice** or cold compress
- **Compress** the injury
- **Elevate** the injured part

Questions ?


Inspiration
Expiration
Leave untaped
Collapsed lung
Dressing seals, blocking air entry
Trapped air able to exit through untaped section of dressing

Signs of shock



- Pale, cold, clammy skin, later grey blue skin (lips)
- Sweating
- Weakness and giddiness
- Nausea, thirst
- Rapid and weak pulse
- Low blood pressure, unmeasured blood pressure
- Rapid shallow breathing, gasping
- Unconsciousness