MUSCULOSKELETAL INJURIES

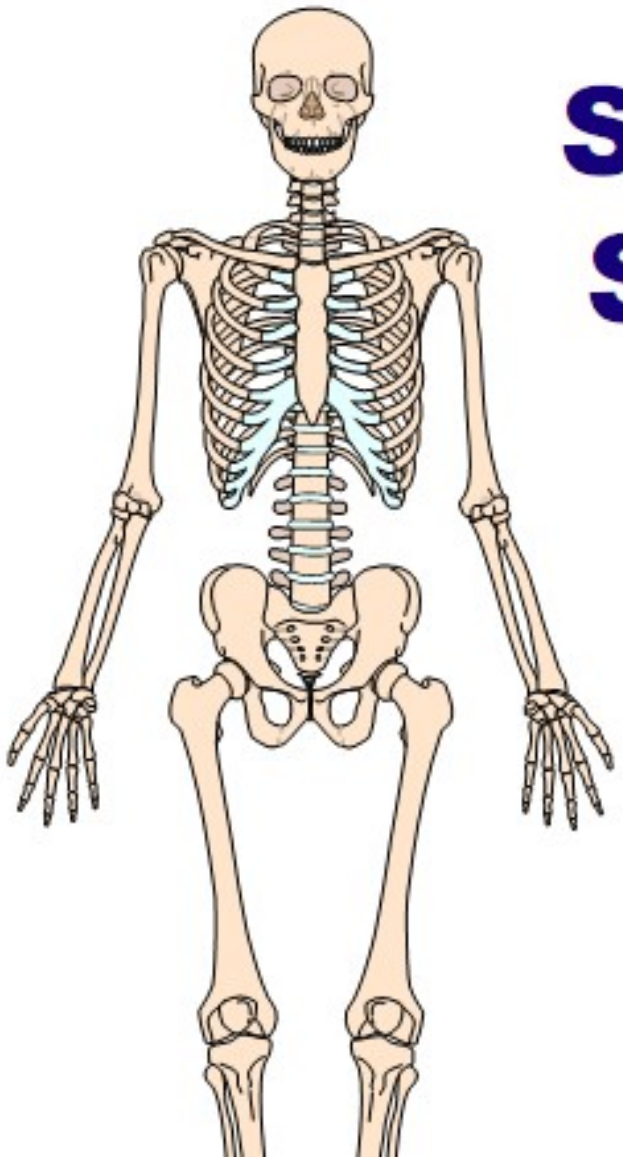
By

Ranjan Kumar

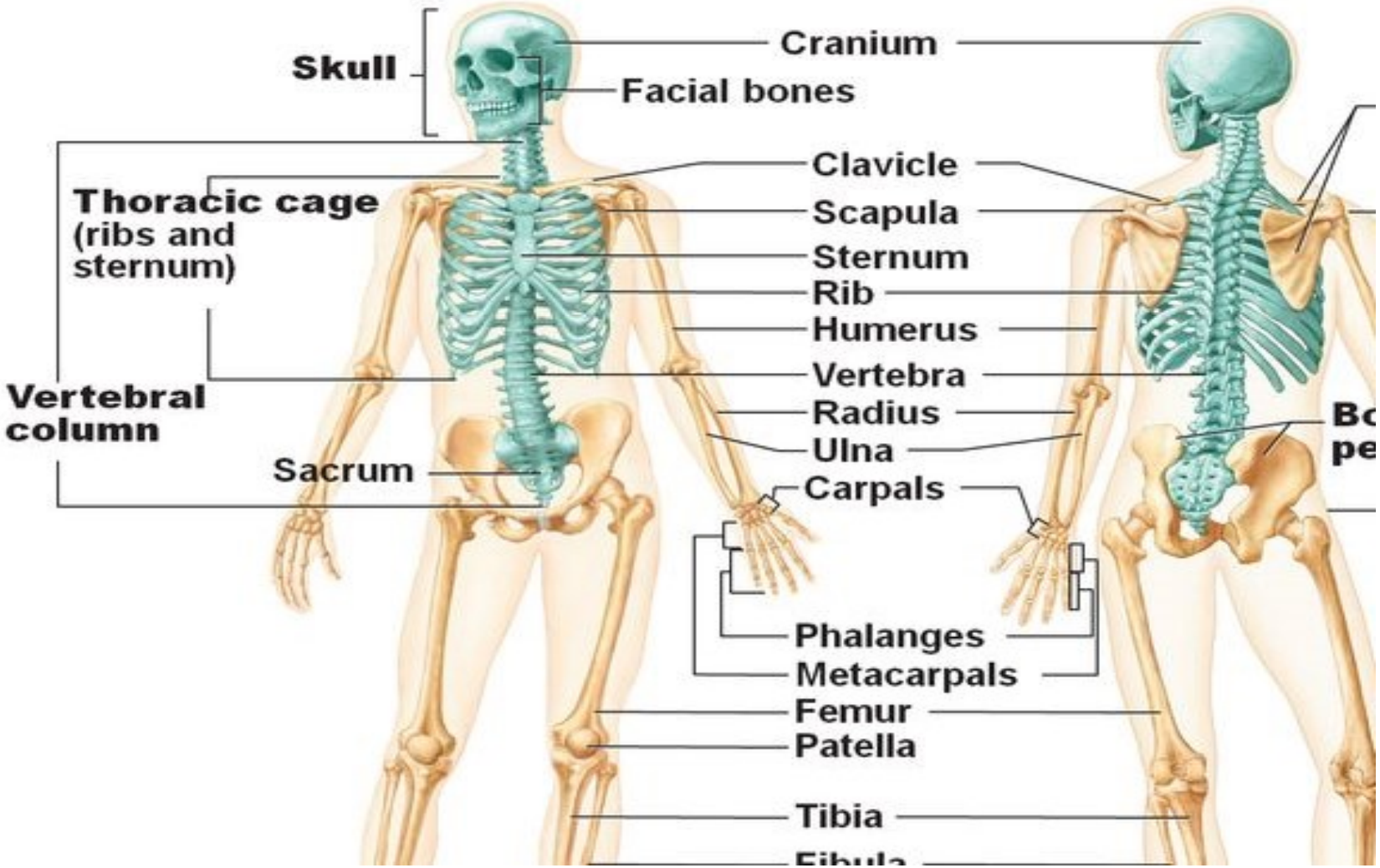
OBJECTIVES

- Define an open fracture and closed fracture, list four signs and symptoms
- Define a dislocation, a sprain and a strain and list four signs and symptoms
- Give two reasons for immobilizing a fracture, a sprain or a strain on a patient
- Types of splintings

Skeletal System



Adult skeleton is composed of 206 bones.



FUNCTION OF SKELETAL SYSTEM

- Provide *framework* for the body.
- Protects *vital organs*.
- Provide for *body movement.* ⟶
- Produces *red blood cells.* ⟶

The human skeleton consists of two main divisions

1. The axial skeleton:

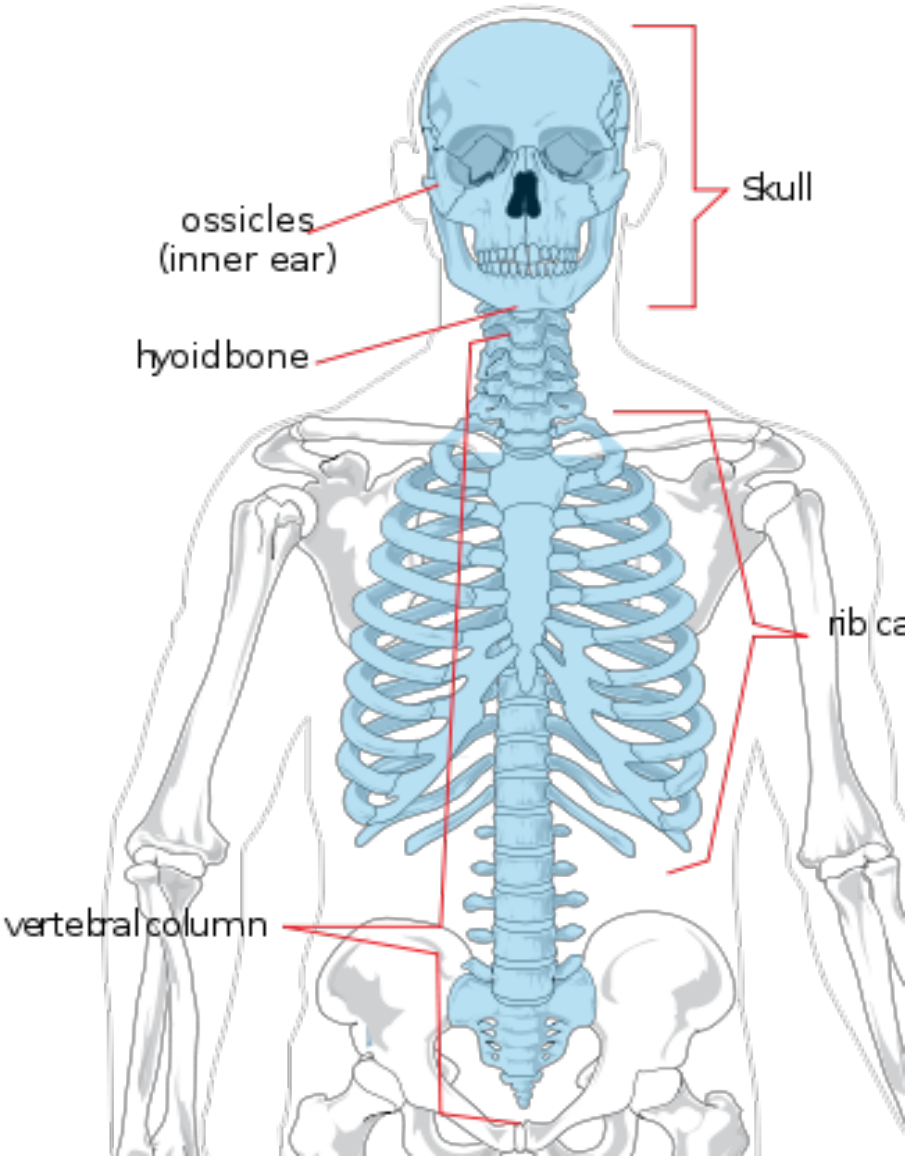
   consists of *80 Bones*

   including

   – skull

   - thorax

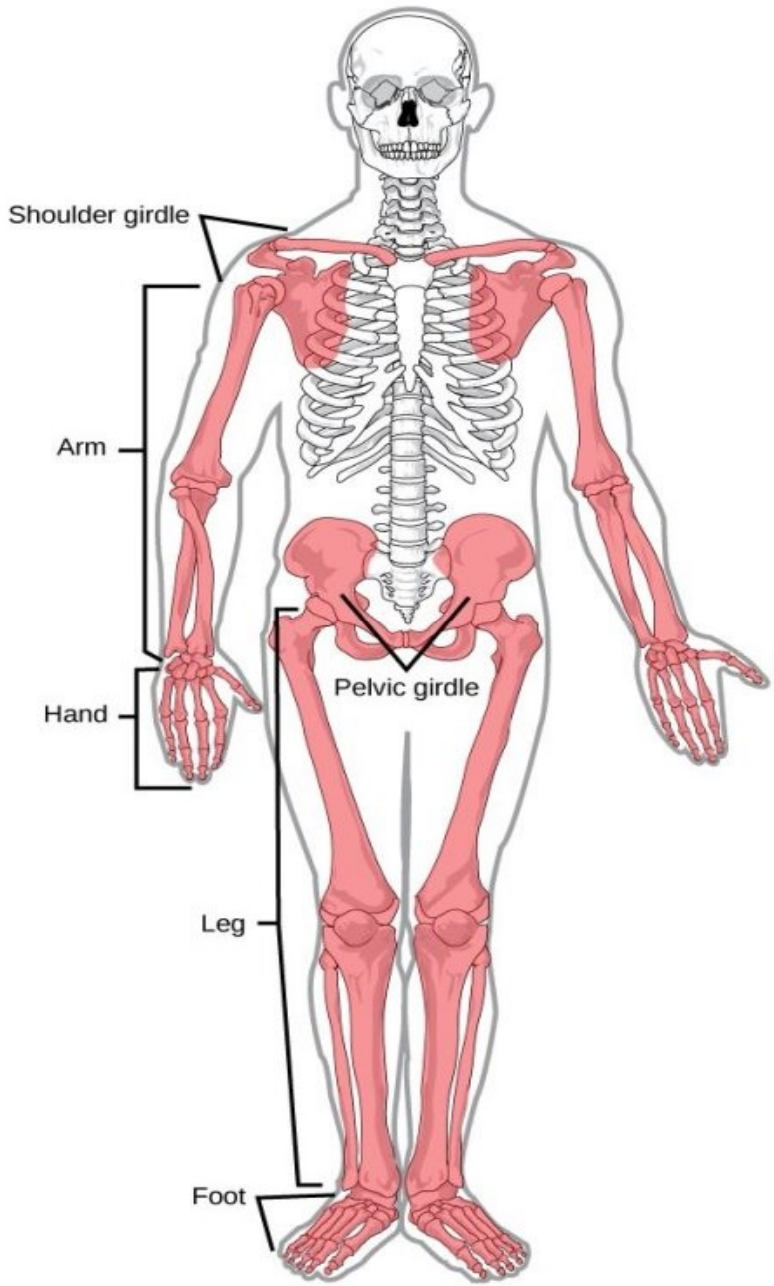
   - Vertebral spinal (column)



2. Appendicular skeleton.

Consist of *126 bones*:

- Shoulder (clavicle & scapula)
- Upper extremities (arms hands finger)
- Pelvis (Hips)
- Lower extremities (legs, feet, toes)

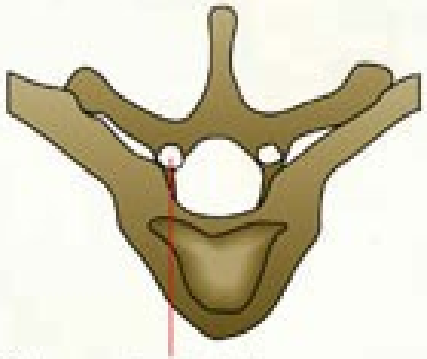


JOINTS (ARTICULATIONS)

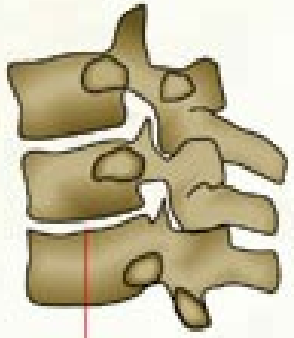
- Joints are bone ends that fit into each other.
- There are several types of bones-

- Immovable joints (skull)
- Slightly movable joints (spine)
- Freely movable joints (elbow or knee joints or hip joints)

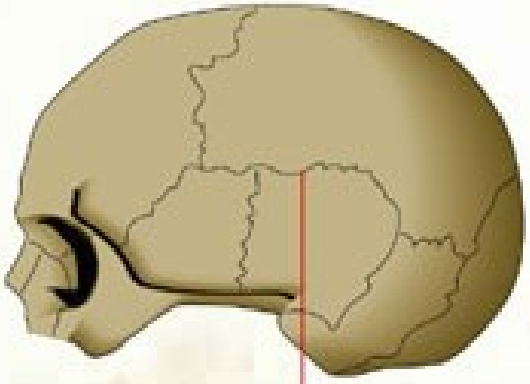
TYPES OF JOINTS FOUND IN THE HUMAN BODY



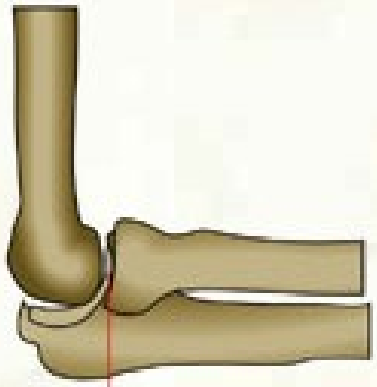
ribs and vertebrae =
semi-mobile joints



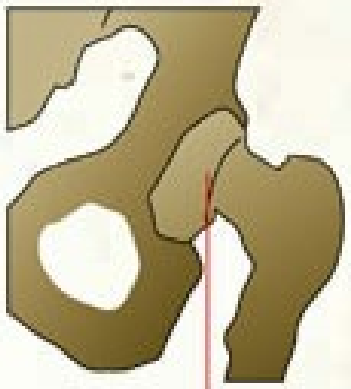
vertebrea =
cartilagenous joints



skull=
immovable joints



elbow=
hinged joint

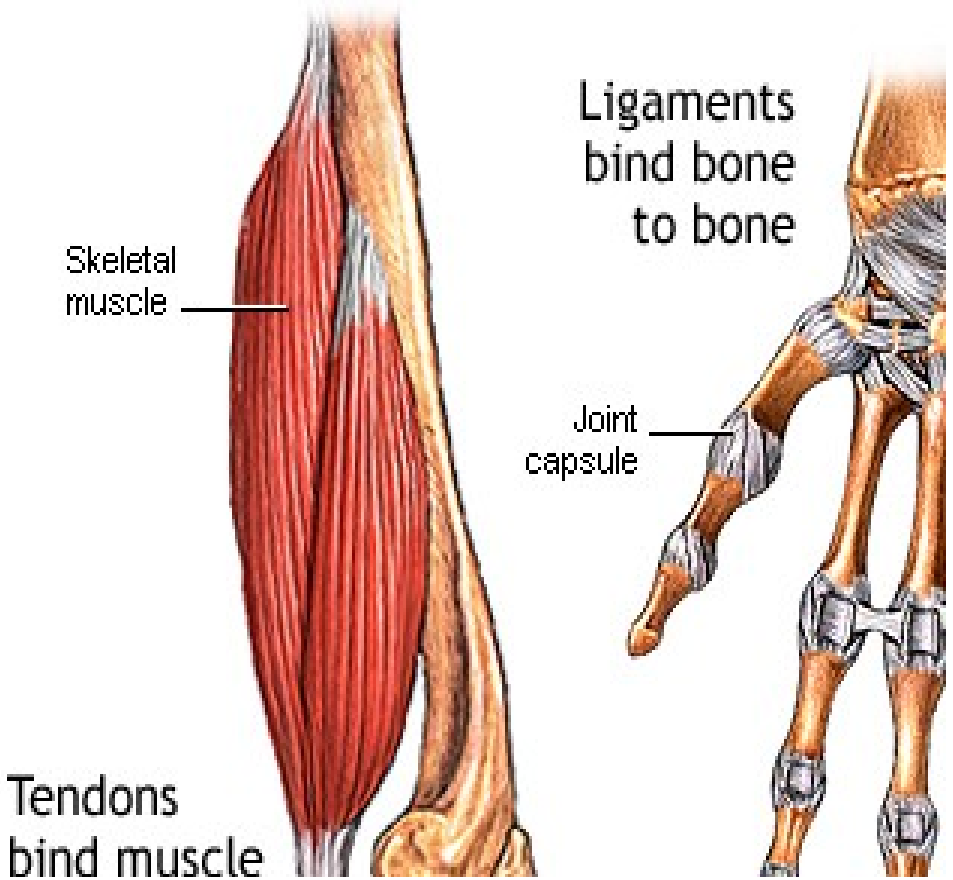


hip=
ball and socket joint

LIGAMENTS AND TENDONS

- LIGAMENTS- *connects and hold* bones together at the joints.

- TENDONS- Attach the skeletal muscles to the bone, they control the movement of the joints.



FRACTURES

Any break in the continuity of a bone.

- CLOSE FRACTURE:

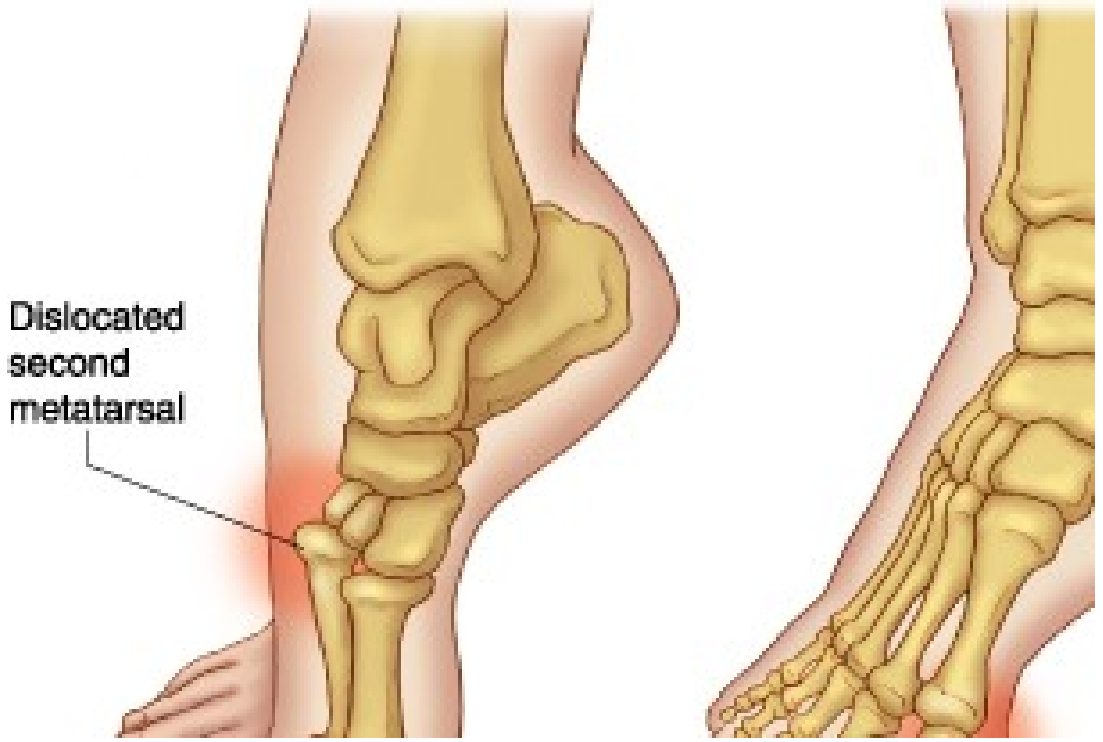
- The overlying skin is intact.
- Proper splinting helps prevent closed fracture from becoming open fracture.

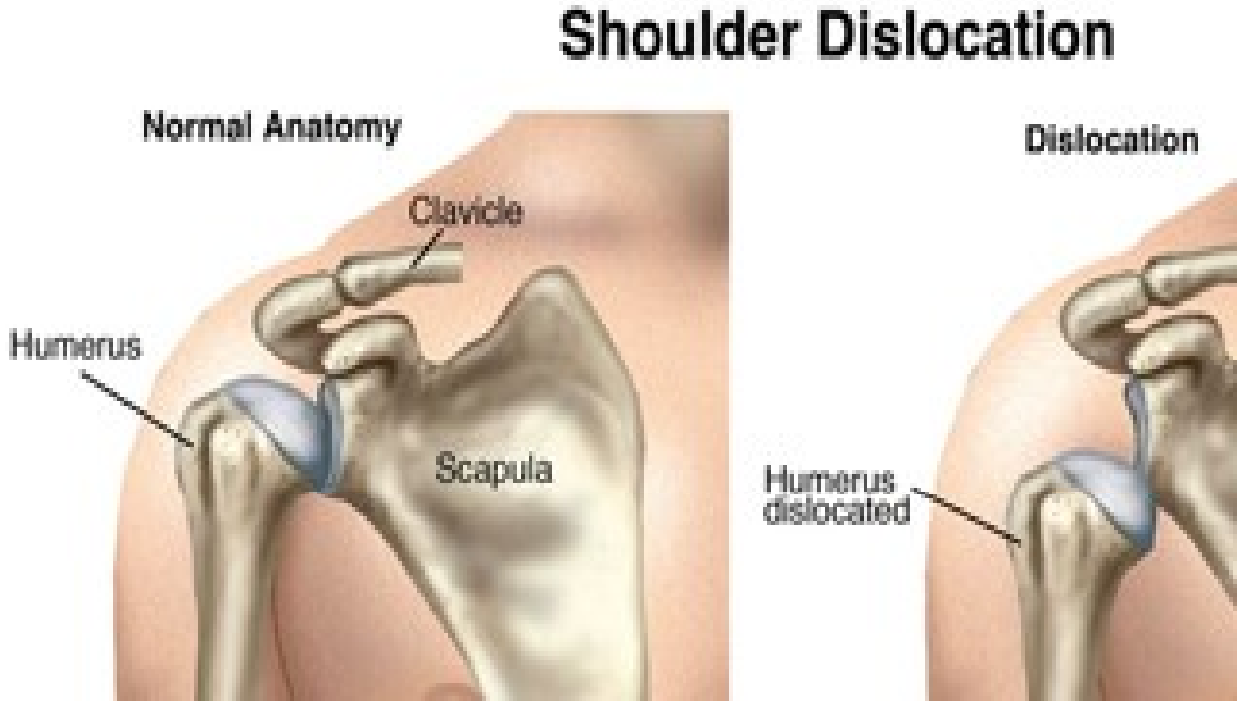
- OPEN FRACTURE:

- Skin has been broken or torn either from the inside or from the outside.
- Bone may or may not protrude through the wound.
- There is a risk of contamination/infection.

DISLOCATION

- Injury in which a bone is moved out of its normal position in a joint and remains in that way.

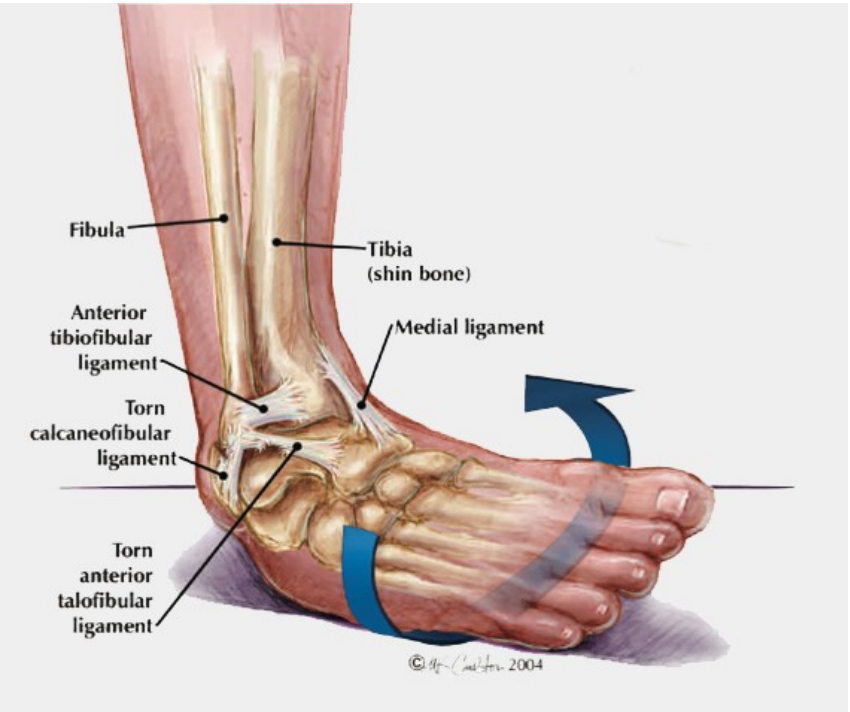




- Dislocation sometimes causes the tearing of ligaments and soft tissues if stretched far beyond the normal range of motion.

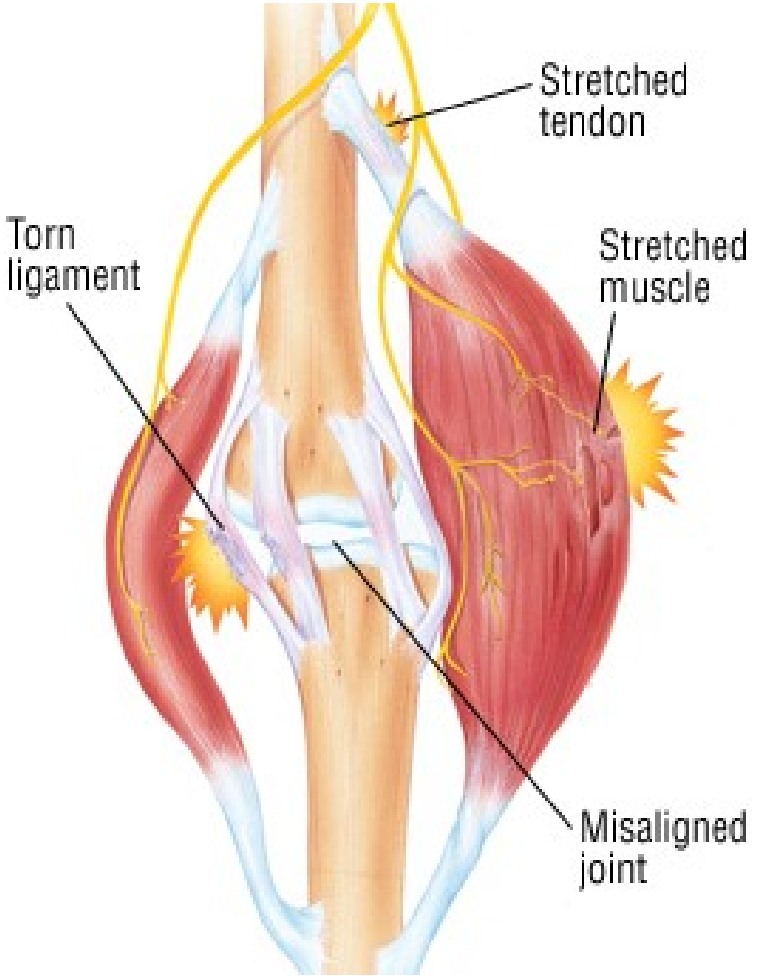
SPRAINS

- Injury in which ligaments are stretched or partially torn, commonly associated with joint injuries.



STRAINS

- Injury in which a muscle, or a muscle and tendon, are over-extended.



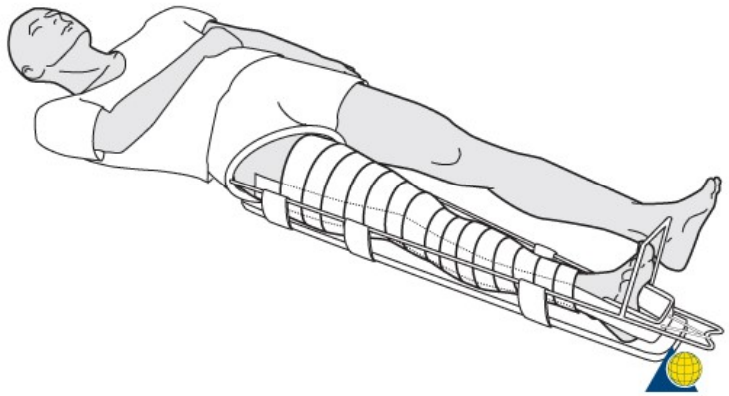
SIGNS AND SYMPTOMS OF MUSCULOSKELETAL INJURY.

- Deformity or angulation.
- Pain and tenderness upon palpation or movement
- Crepitus – a sound or feeling of broken bone ends rubbing together.
- Swelling.
- Bruising or discoloration.
- Exposed bone ends.

- Joint locked in position- reduced motor ability or reduced ability to move a joint.
- Numbness and paralysis – may occur distal to site of injury caused by bone pressing on a nerve.
- Compromised circulation distal to injury evidenced by alteration in skin colour, temperature, pulse or capillary refill.

SPLINTING

- Applying a device to stabilise any painful, swollen or deformed body parts.
- Its primary objective of splinting is to prevent further movement of body parts.



REASONS FOR SPLINTING

- Prevent motion of bone fragments or dislocated joints.
- Reduce pain and suffering.
- Minimize damage to soft tissue
- Prevent a closed fracture from becoming an open one.
- Minimize blood loss or shock.

TYPES OF SPLINTS

- RIGID SPLINT: requires limb to be in anatomical position. Ideal for long-bone injuries.

Conforming splint: can be moulded to different angles or surrounds the extremity.

Conforming splint air/vacuum splint

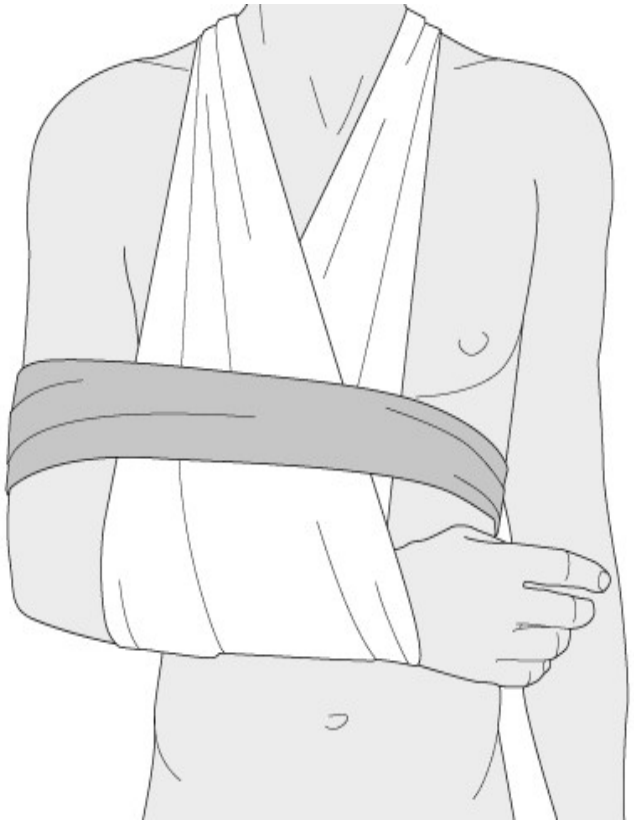
- TRACTION SPLINT

- Used specifically for femur fractures.

SLING AND SWATHES

Sling:

Sling and swathe



IMPOVERISED SPLINT

Book, cardboard, pillow or blanket

REVIEW

- Define an open fracture and closed fracture, list four signs and symptoms
- Define a dislocation, a sprain and a strain and list four signs and symptoms
- Give two reasons for immobilizing a fracture, a sprain or a strain on a patient
- Types of splintings

UNCONSCIOUSNESS & GENERAL RULES FOR THE TREATMENT

By

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Cardiopulmonary Resuscitation (CPR)

- During respiratory arrest, the heart can continue to pump for several minutes and circulate oxygen.
- Without early intervention(Obustruction), respiratory arrest may lead to cardiac arrest.
- Once cardiac arrest occurs, circulation ceases and vital organs are deprived of oxygen.

Cardiopulmonary Resuscitation (CPR)

- When respiratory and cardiac arrest occur together, the patient is considered clinically dead.
- Within 4 to 6 minutes without circulation, brain damage will begin, and after 8 to 10 minutes, the damage is irreversible.

Cardiopulmonary Resuscitation (CPR)

- **CPR involves a combination of chest compressions and artificial ventilations designed to revive a person and prevent biological death by mechanically keeping a person's heart and lungs working.**

Preparing for CPR

- Before providing CPR you must determine unresponsiveness, breathlessness and pulselessness

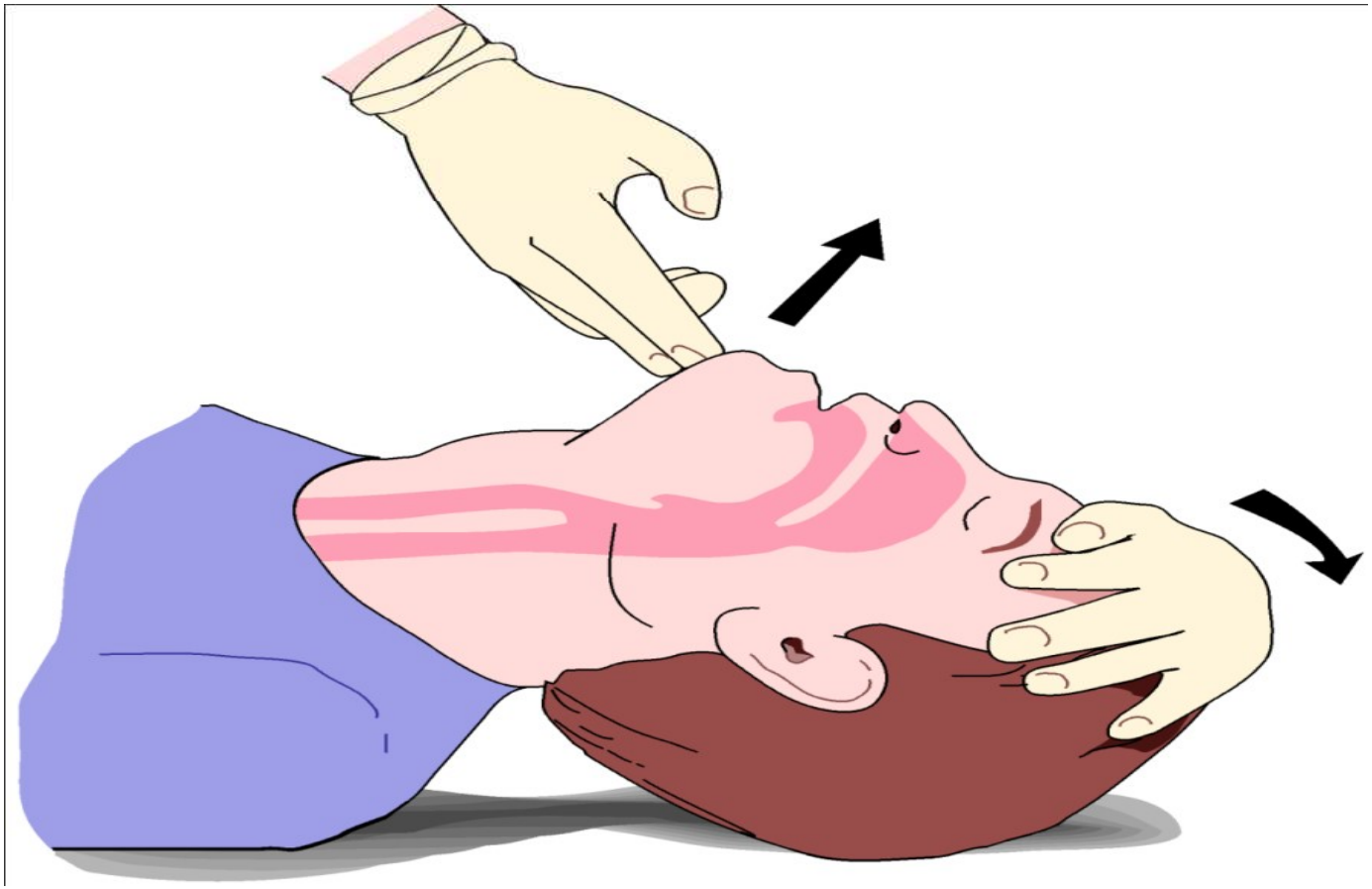
Preparing for CPR

- Establish unresponsiveness
- Activate the EMS
- Check CAB

1. Circulation :Carotid pulse for adult and child and brachial pulse for infants.
2. Airway : Use appropriate method
3. Breathing : check LLF method

METHOD OF AIRWAY OPENING

Head-Tilt Chin-Lift



Head-Tilt Chin-Lift

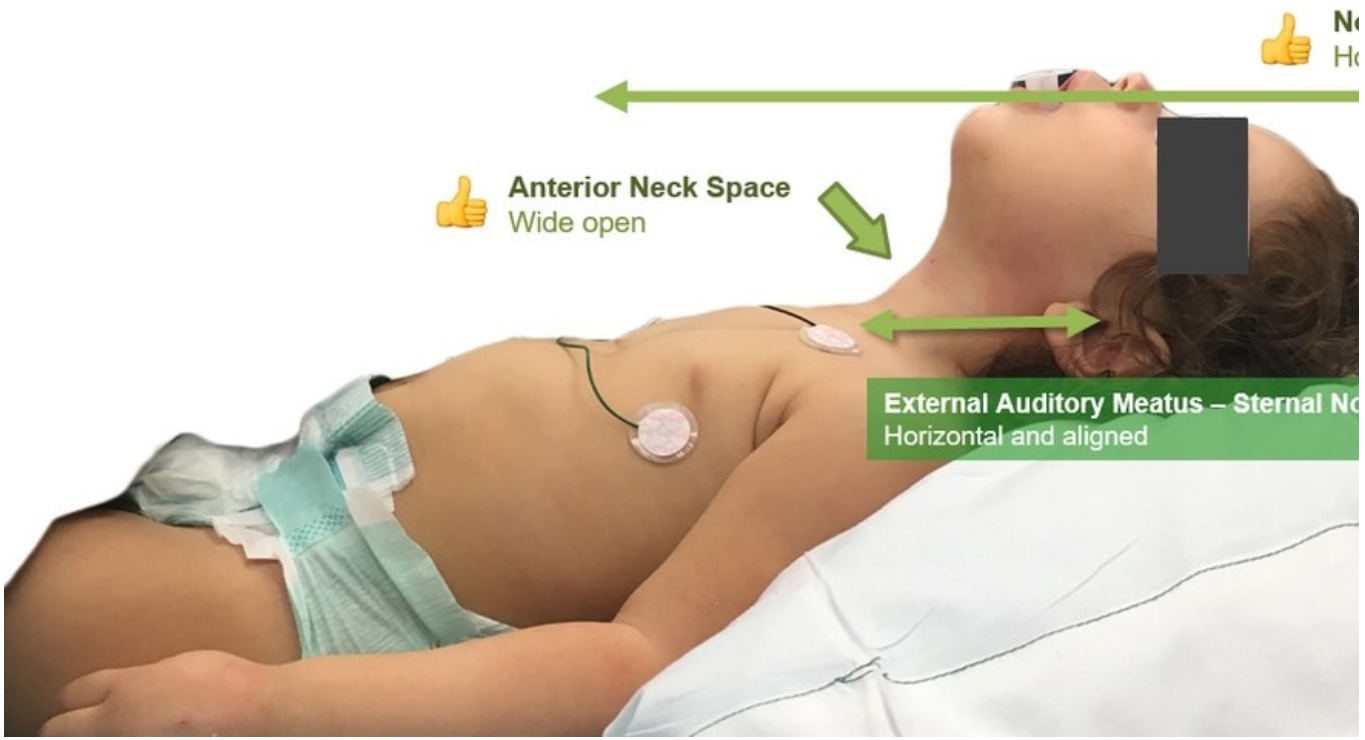
- Position the patient lying face up.
- Kneel by the patient's shoulders towards the head.
- Place one hand on the forehead and place the fingertips of your other hand under the bony part of the patient's jaw.

Head-Tilt Chin-Lift

- **Lift up on the chin, supporting the jaw, and at the same time, tilt the head back as far as possible. For infants and children: Place in the "sniffing" position – do not overextend.**

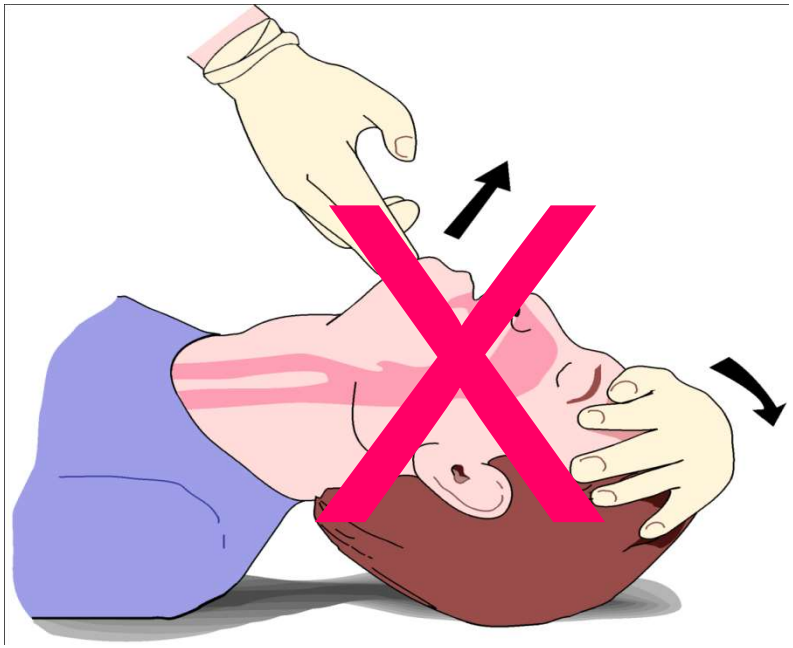
Sniffing position

Using a pillow to position a toddler into optimal “sniffing posi



METHOD OF AIRWAY OPENING

Head-Tilt Chin-Lift



DO NOT USE THIS METHOD IF YOU SUSPECT HEAD,NECK OR SPINAL INJURY.

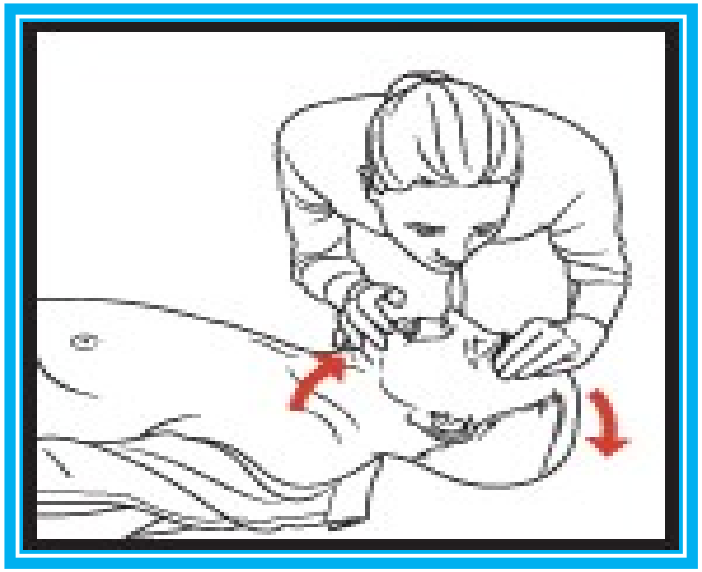
METHOD OF AIRWAY OPENING

Jaw thrust

The jaw thrust is the only maneuver recommended on an unconscious patient with suspected head, neck or spinal injury.

ARTIFICIAL VENTILATION

Once the patient has an open air way obstruction, you can provide artificial ventilation for a patient breathing inadequately or not at all.



How is it possible to maintain a patient alive with exhaled air ?

TECHNIQUE OF ARTIFICIAL VENTILATION

- **Mouth to Mask**
- **Mouth to Barrier Device**
- **Mouth to Mouth**

Hazards to Rescuers

- Diseases
- Chemicals
- Vomitus

Look Listen Feel

Look-Listen-Feel for signs of breathing

- **LOOK**

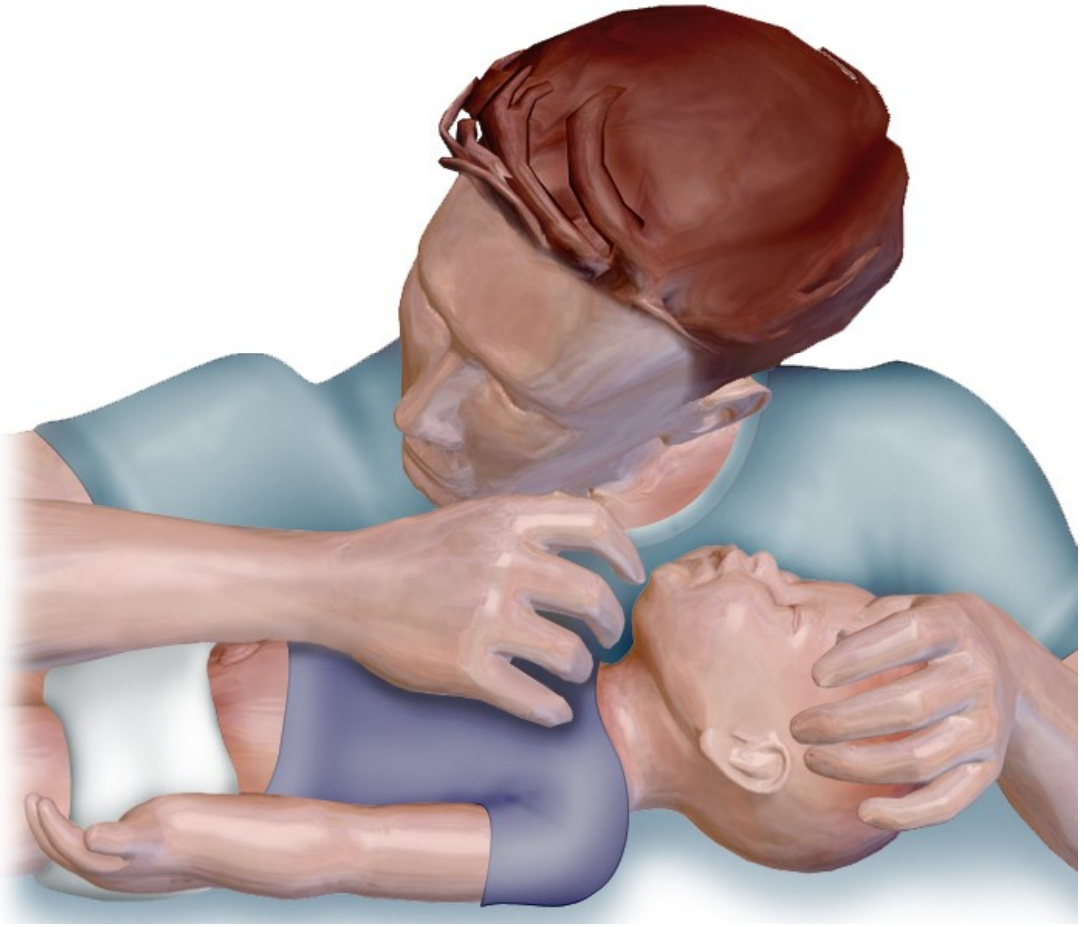
  Rise and fall of the chest

- **LISTEN**

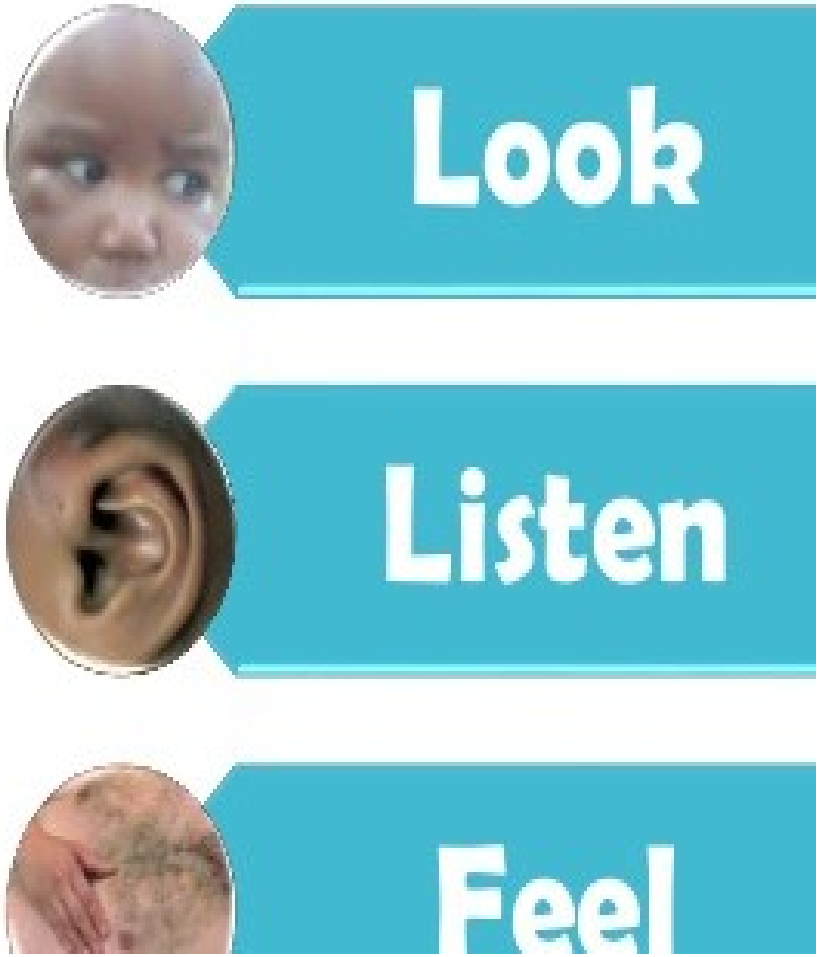
  Air movement

- **FEEL**

Look Listen Feel

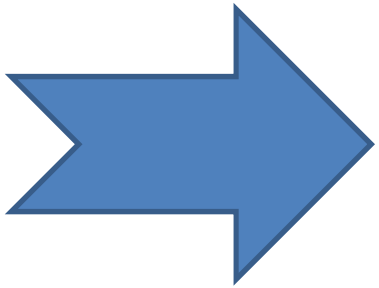


Look Listen Feel

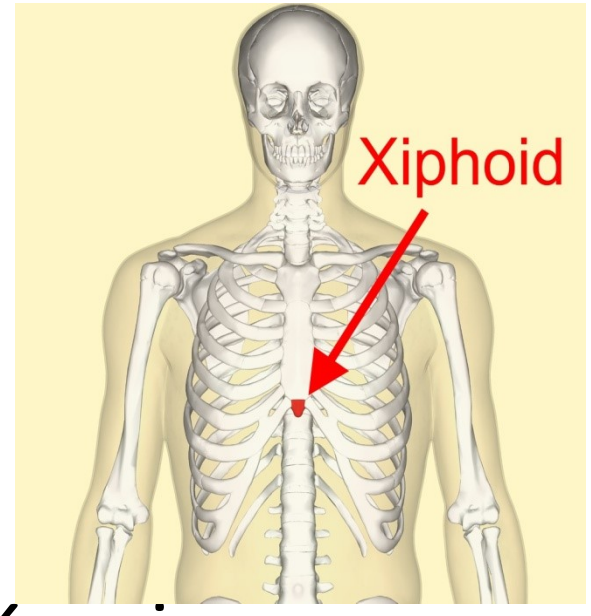


CPR Chest compression

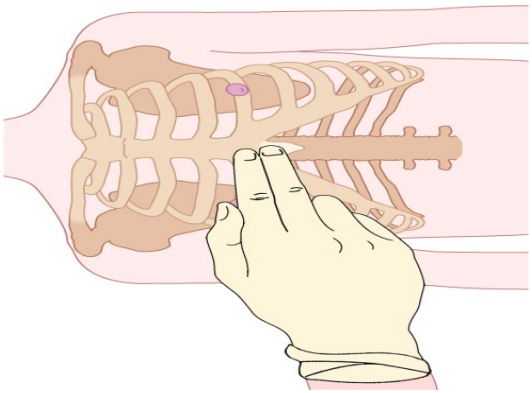
- Chest compressions consist of rhythmic, repeated pressure over the lower half of the sternum
- Position the Patient : Must be supine on firm, flat surface with arm along sides
- Expose the Patient's chest :
- Get in position

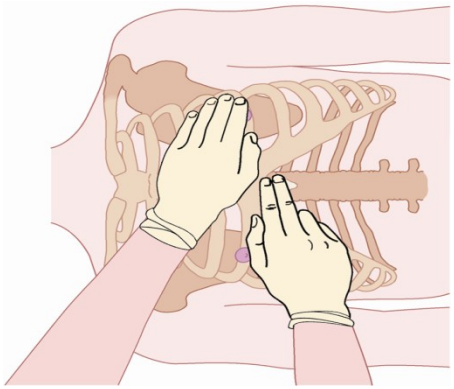


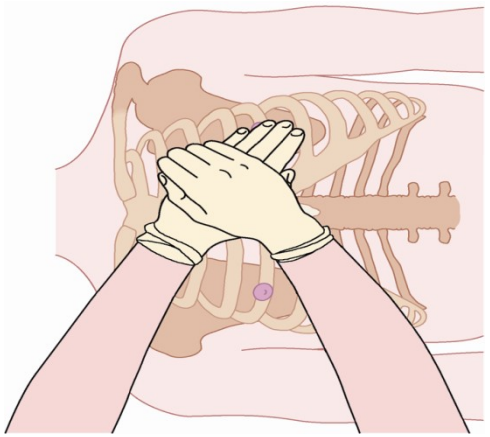
CPR Chest compression



- Locate the xiphoid process
- Locate the compression site
- Position your hands
- Position your shoulders
- Perform Chest compressions : Keeping your arms straight and your elbows locked

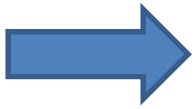






Adult CPR Summary – 9 years and older

- Compression depth : at least 4 -5 cm
- Compression rate : 100 per min
- Each ventilation : 1.5-2 Sec
- Pulse location : Carotid pulse
- 1Man Rescuer Cycle : 30 : 2
- 2Man Rescuer Cycle : 30 : 2



ADULT CPR

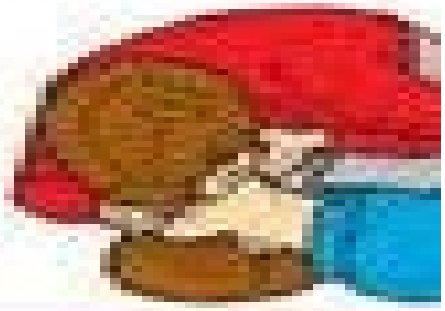
9 YEARS AND OVER

1. Attempt to wake the victim and call for help.

2. Begin chest com

3. Open the airway.

4. Begin rescue br

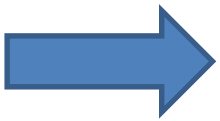


5. Repeat chest compressions.

6. Repeat rescue b

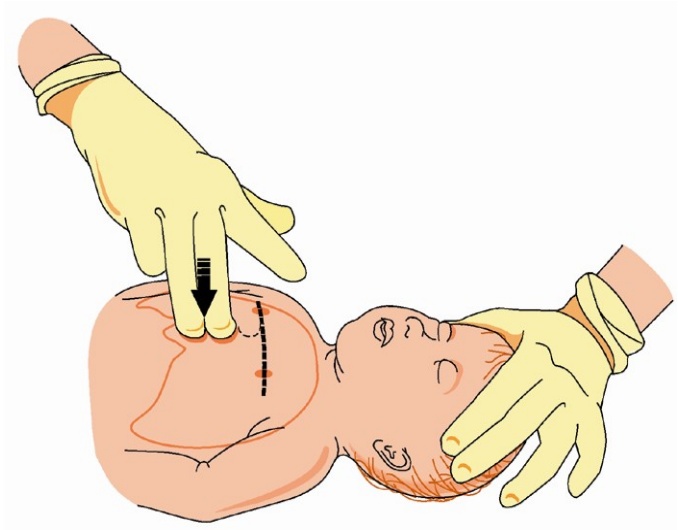
Child CPR Summary –(1to8years)

- Compression depth : 3-4 cm (or 1/3 to ½ of chest depth). About 2 inches
- Compression rate : 100 per min
- Each ventilation : 1.5-2 sec/breath
- Pulse location : Carotid pulse
- 1Man Rescuer Cycle : 30 : 2
- 2Man Rescuer Cycle : 15 : 2



CPR Chest compression for infants

- Usual cause of Cardiac arrest in infants is hypoxia due to injuries, suffocation etc. You should resuscitate for one minute before alerting EMS

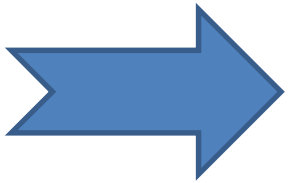


CPR Chest compression for infants

- Position the Patient : Must be supine on firm, flat surface with arm along sides. Place on your forearm, using your palm to support his/her head
- Expose the Patient's chest :
- Locate the compression site
- your Perform Chest compressions

Infant CPR Summary
(1 year old and under)

- Compression depth : About 1.5-2.5cm
  (1/3 – ½ total chest depth)
- Compression rate : 100 per min
- Each ventilation : 1-1.5 Sec
- Pulse location : Brachial Artery
- One man Rescuer Cycle : 30:2



Sign of successful CPR

- Successful CPR does not mean the survival – it only means that it has been performed correctly.
- Very few will survive if they do not receive ACLS. (Advanced cardiac life support)
- The goal is to prevent the death of cells and organs for a few crucial minutes.
- Monitoring is essential to see if CPR is effective.

Sign of successful CPR

- A pulse should be palpable with every compression.
- The chest should rise and fall with each ventilation
- The pupils may begin to react normally.
- Patient’s skin colour may improve.
- Patient may attempt to move and try to swallow.
- Heart beat may return.

Complication caused by CPR

- Fracture of the sternum and ribs
- Pneumothorax -
- Haemothorax
- Cuts and bruises to the lungs
- Laceration to the liver
- Most of these complications are rare. Even if CPR results in complications, the alternative is death.

THANKS