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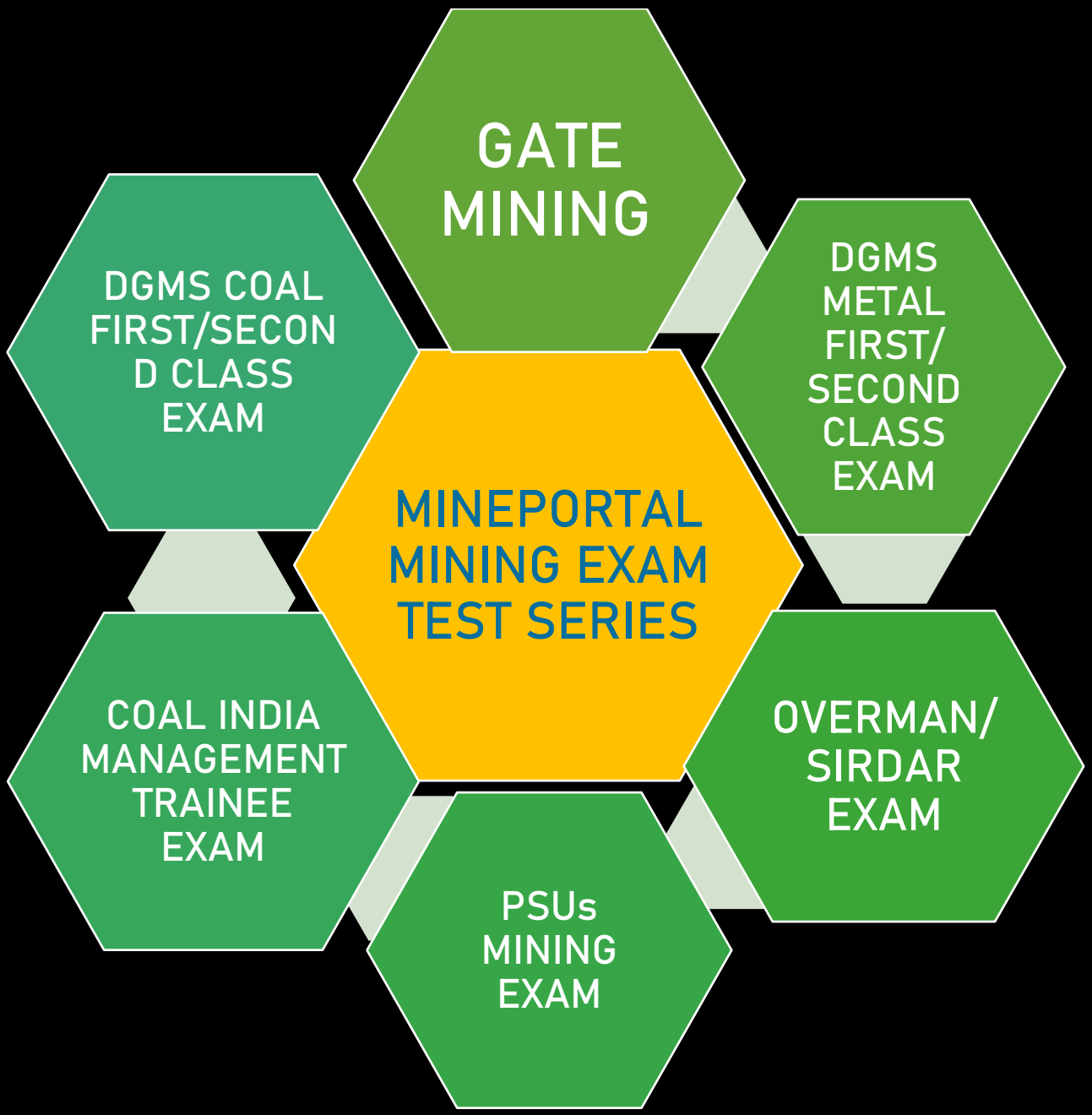

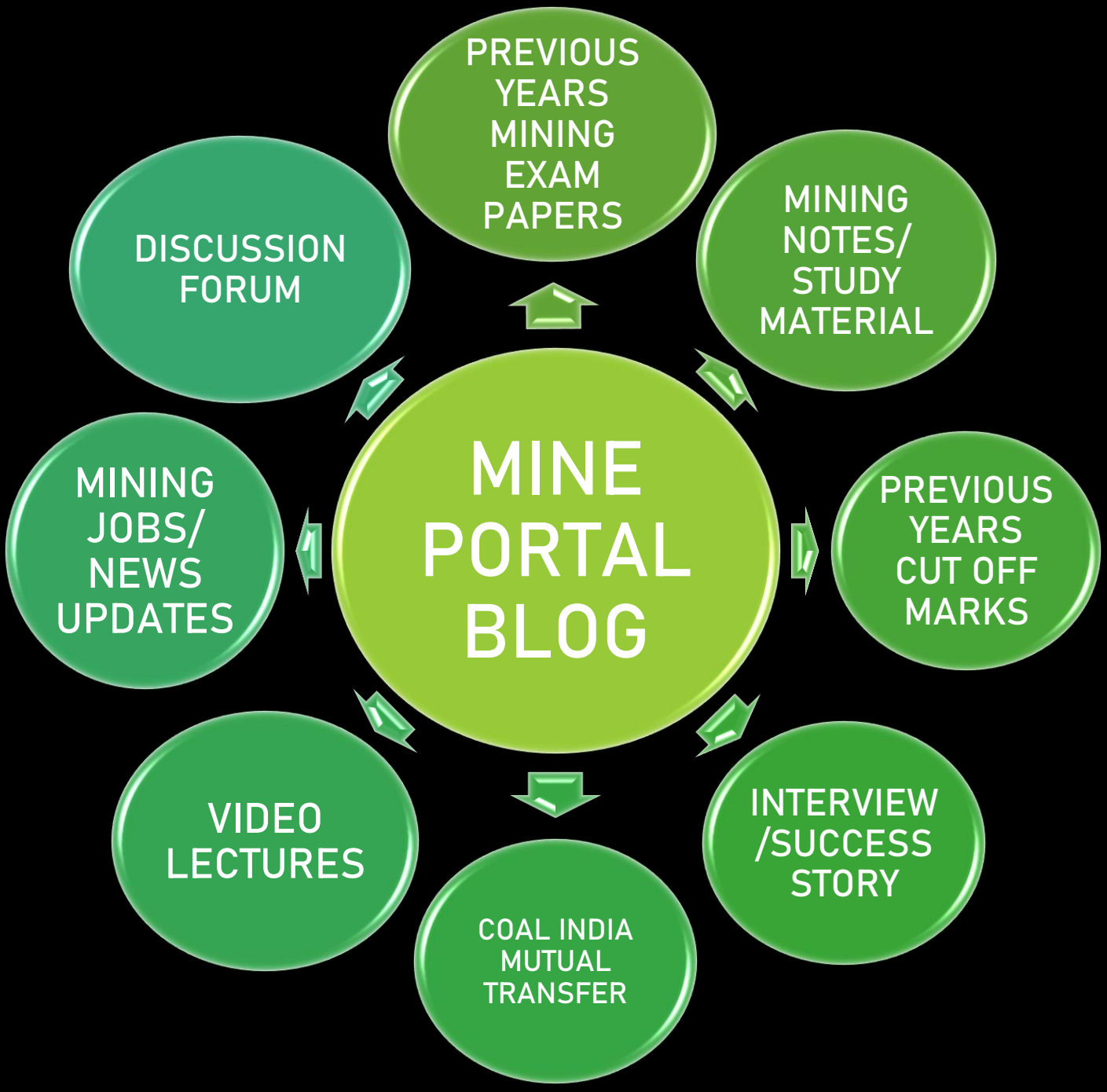

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FIRST AID NOTES

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FIRST AID TRAINING MANUAL

First Edition - 2022

Ashritha Mines & Minerals Association

First Aid Training Institute

ASHRITHA MINES & MINERALS ASSOCIATION
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:: I N D E X ::

F O R E W O R D
From the Author

As unpleasant as it is to talk about, accidents and emergency situations are not completely preventable or unavoidable. Accidents always happen despite any measure of preventative procedure and care. If an accident happens in the workplace, in your home or in a public space, being a helpless witness to an emergency situation can potentially worsen the situation. Because of this, individuals who are properly trained and with the correct equipment, are a huge help in ensuring better safety for everyone. Without proper First Aid, a simple injury could become severe and in some cases fatalities can occur as a result of lack of immediate medical treatment. First Aid does not just promote faster recovery, it helps save lives.

First Aid knowledge is invaluable for both you as the individual and for your community. It enables you to assist persons who become injured in the event of an accident or emergency situation until help arrives. First Aid skills can be applied in the home, the workplace or in public locations, therefore the more First Aid certified people there are in a community the safer that community becomes.

At any moment, you or someone around you could experience an injury or illness. Using basic first aid, you may be able to stop a minor mishap from getting worse. In the case of a serious medical emergency, you may even save a life.

That's why it's so important to learn basic first aid skills. To build on the information you learn here, considering taking a first aid course. Many organizations offer first aid training, including the ASHRITHA MINES & MINERALS ASSOCIATION FIRST AID
TRAINING INSTITUTE. This course is suitable for professionals of any level. This module should provide you with the basic knowledge to help someone in an emergency.

This book provides a valuable window on information assurance and covers the necessary components – the key aims of first aid, how to react, and what to do in an emergency situation.

- Author

UNIT 1

INTRODUCTION TO FIRST AID

A. INTRODUCTION TO FIRST AID

1.0 FIRST AID is the first assistance given to a casualty for any injury or sudden illness before the arrival of an Ambulance or a qualified Paramedical/Medical person. It may involve improvising with facilities and materials available at the site.

2.0 AIMS OF FIRST AID:

- ➔ Preserve Life
- ➔ Prevent worsening of Casualty's medical condition
- ➔ Promote recovery

GOLDEN RULES OF FIRST AID:

Do the first thing first; this includes assessing the situation for any immediate danger, quickly and methodically without panicking, giving priority to the most urgent situation / condition.
Remove the victim from the cause of injury or the cause of injury from the victim.
Resuscitate the victim, if necessary and carry out general treatment of unconsciousness.
Loosen all tight clothing or materials around the victim's neck waist, wrist, etc.
Arrest bleeding, cover all wounds, burns or scalds and immobilize all fractures.
Do not allow people to crowd a victim and do not move a victim unless you really have to (dangerous environment, risk of falling debris, explosion etc.)
Reassure the victim and get help as soon as possible.
Improvise all necessary materials, which are not readily available.
Guide against or treat for shock.
Dispose/transport the victim properly.

4.0 FIRST AIDER: Any person who has received a Certificate from an Authorized Training Body indicating that he/she is qualified to render First Aid is deemed to be a **FIRST AIDER.**

5.0 INSTRUCTIONS TO THE FIRST AIDER:

- ➔ Reach the spot as-fast-as possible and carry out the appropriate First-Aid quickly.
- ➔ Reassure and encourage the casualty.
- ➔ Work calmly and efficiently.
- ➔ Pay attention to any remark or requests that the casualty makes.
- ➔ After giving the necessary First Aid place the casualty in the appropriate position.
- ➔ Keep a watch until help arrives.

RESPONSIBILITIES OF THE FIRST AIDER:

- ➔ Assess the situation.
- ➔ Identify the disease or condition (Provisional diagnosis).
- ➔ Give immediate and appropriate assistance.
- ➔ A casualty may have more than one injury and some may require more urgent attention than others (prioritization).
- ➔ According to the seriousness of the casualty's condition arrange to shift to a medical centre.

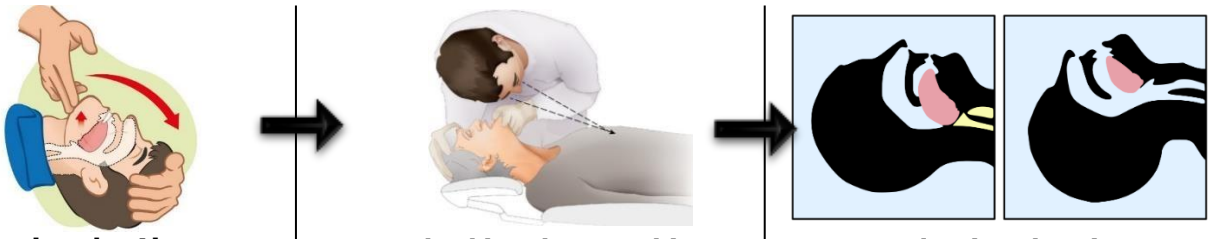
The responsibility of the First aider ends when the casualty is handed over to the care of a doctor, a nurse or a paramedic. One should not leave the incident/site, until somebody takes charge.

7.0 A-B-C RULE:

A – An Open Breathing Airway

When checking for breathing, ensure the victim's airway is open. Perform a head-tilt, chin-lift to open the airway. Once the airway is open, check for normal breathing by placing the side of your cheek just above the victim's mouth. Look at the chest wall, listen for breath sounds and feel for exhaled air on

the side of your cheek. You should check for no longer than 10 seconds. If you cannot detect normal breathing then immediately call EMS and commence CPR.

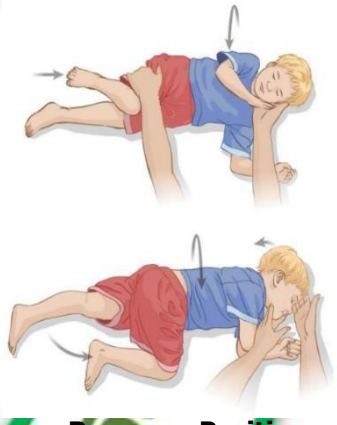


Opening the Airway **Checking the Breathing** **Clearing the Airway**

1. **Opening the Airway:**
   - Open and clean the airway.
   - If the casualty's breathing is noisy, his/her airway maybe obstructed and can lead to the death of the casualty; so it is essential to establish a clear airway immediately.
   - Hook your first two fingers covered with clean cloth/gloves and sweep round inside the mouth/ throat.
   - One should not spend time searching for hidden obstructions.
   - Care should be taken not to push any object further down the throat.
   - Kneel beside the casualty
   - Lift the chin forwards with the index and middle fingers of one hand while pressing the forehead backwards with the palm of the other hand.
     This manoeuvre will lift the tongue forward and clear the airways.
   - Once the airway is cleared the casualty may begin breathing spontaneously. Once breathing starts, place the patient in the Recovery Position. If the casualty still does not breathe, begin artificial respiration immediately.

2. **Checking the Breathing:**
   - **Look** for the chest/abdominal movement.
   - **Listen** to the breathing sounds.
   - **Feel** the air coming out of the nose or mouth.

3. **Clearing the Airway:**
   - Turn the casualty's head to the side, keeping it well back.
   - Hook first two fingers and sweep round inside the mouth. One should not spend time searching for hidden obstructions. Care should be taken not to push any object further down the throat.
   - Check the breathing again.



Recovery Position

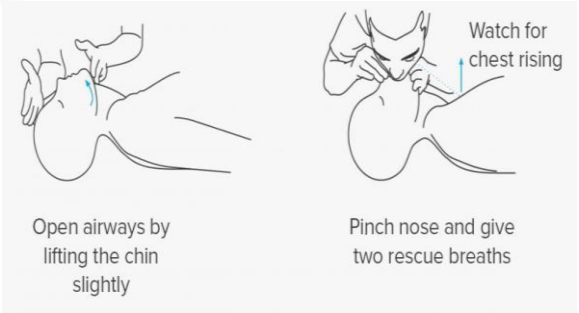
B – Breathing Adequacy

Breathing Restoration:

The technique of restoring breathing in a casualty who has stopped breathing is known as Artificial Respiration.

The most efficient method is to transfer air from the rescuer's lungs into the casualty's by blowing air through the mouth (mouth-to-mouth respiration) or through the nose (Mouth-to-nose respiration), especially in the case of small children and infants.

1. **Mouth-to-Mouth Respiration:**
   - Remove any obvious obstructions over the face or constrictions around the neck; open the airway and remove any debris seen in the mouth and throat.
   - Take a deep breath, pinch the casualty's nostrils with fingers and open the mouth of the casualty and place your mouth on the casualty's mouth.
   - The rescuer breathes out and inflates the victim's chest. Take a deep breath and repeat inflation.



Give two breaths. Each breaths should last one second, with enough volume to make the chest rise, inflation at a rate of 12-16 per minute until natural breathing is restored.

2. **Mouth-to-Nose Respiration:**
   - To carry out Mouth-to-Nose Respiration, close the casualty's mouth while placing the rescuer's mouth on the nose of the casualty, and proceed as was carried out for Mouth-to-Mouth Respiration.

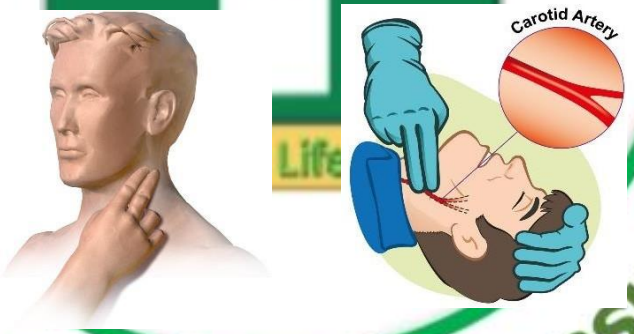
:: NOTE::

- If the casualty's chest fails to rise, first assume the airway is not fully open.
- Adjust the position of the head and jaw and try again Give two breaths, each breath should last one second, with enough volume to make the chest rise.
- After two inflations, check the pulse to make sure the heart is beating. If the heart is beating and a pulse is felt continue to give inflations at a rate of 12-16 times per minute until natural breathing is restored, assisting it when necessary and adjusting it to the casualty's breathing rate.
- When the casualty is breathing independently place the person in the Recovery Position. If the heart is not beating one must perform External Chest Compression immediately.

C – Circulation Sufficiency

Before commencing External Chest Compression it is important to establish that there is no circulation.

If the heart is not pumping the only reliable way of establishing a lack of circulation is to check the pulse at the neck (Carotid Pulse). This pulse can be felt by placing the finger tips gently on the voice box and sliding them down into the hollow between the voice box and the adjoining muscle. (The pulse at the wrist is unreliable).



ASSESSING THE CONDITION:

Assess the situation by asking questions if the causality is conscious.

- **History of the case** is the story of the accident i.e. how the accident actually occurred. The casualty will give the history if conscious. If he is unconscious, someone who saw the accident will help. The surroundings will add to the information, like an abandoned vehicle or a damaged area near the place and its condition.
- **Symptoms** are what the casualty tells the First Aider like pain, deformity, fainting etc. Pain described by the casualty will lead the First Aider to the region of injury without wasting time.
- **Signs** are what the First Aider feels and finds out for himself- like paleness, swelling of parts injured, bleeding, deformity of the limbs etc. Training helps in making these observations accurately.

Assessing the Symptoms – These are what a Victim can convey –

1. Pain: Loss of normal movement

2. Loss of Sensation: Cold, Heat, Thirst, Nausea, Weakness, Dizziness, Fainting, Temporary Loss of Consciousness, Loss of Memory
3. Sensation of Breaking Bone

Assessing the Signs – Signs are to be observed by the First-Aider –
1. By checking for breathing, bleeding, color of face, lips, wounds etc.;
2. By feeling temperature, pulse, deformity;
3. By smelling gas, alcohol;
4. By hearing breathing sound.

PROCEDURE AFTER FIRST AID:

Observations in respect of the casualty must be sent in writing to the Doctor/Hospital.
First, take the casualty to the nearest shelter/ health facility. The carefully worded communication to the relatives about his condition and also to which place he is being taken, must be sent.

RULES OF FIRST AID:

Reach the accident spot quickly. Immediate help is important to save lives.
Be calm, methodical and quick. By doing so, you can lessen the pain and the effects of injuries, which may in turn save lives. Do not handle the casualty clumsily; eventual recovery might become difficult.
Look for the following:

(a) Is there failure of breathing?
(b) Is there severe bleeding?
(c) Is the heart beating?

Use the First Aid equipment, if available. Otherwise you will have to depend on the material at hand and improvise it as per your requirements.
Inspect the area. Take the casualty away from live wires, fallen wall beams, fire, broken gas chambers, moving machinery etc. to a safer place.
Do not allow people to crowd around the casualty. The casualty needs fresh air. Any other First Aider must be asked to help, or the assistance of the bystanders may be taken.
Reassure the victim. Soft words and encouraging talk will make the casualty take things easy and lie quietly. This will help in recovery.
Arrange for dispatch of the patient to the nearest health facility. At the same time intimate the relatives where the casualty is being taken to.
Do not attempt too much. Restrict yourself to giving First Aid.

11.0 D-R-S-A-B-C-D TECHNIQUE:

D	**DANGER**	Check for Danger. Ensure safety.
R	**RESPONSE**	Check for Response. Ask name, squeeze shoulders.
S	**SEND**	Send for help. Call an Ambulance or ask a bystander to call.
A	**AIRWAY**	Open Mouth-look for foreign material. Maintain Airway.
B	**BREATHING**	Check for Breathing. Look-Listen-Feel
C	**CPR**	Start CPR – 30 Compressions, 2 Breaths. Perform Chest Compressions only if unwilling or unable to perform breaths
D	**DEFIBRILLATION**	Apply Defibrillator (AED) as soon as available. Follow the Voice prompts

12.0 EMERGENCY SCENE MANAGEMENT:

Emergency scenes usually begin with a lot of confusion as people realize there is an emergency unfolding in front of them; no one knows what to do first, who should be in charge or how they can help. In this situation, the first aider needs to follow a sequence of actions that ensure safe and appropriate first aid is given and everyone's safety is protected.

ESM has four steps:

Step 1	Scene Survey	Take control of the scene, get an idea of what has happened and what is going on, and get things organized so you can start helping any casualties.
Step 2	Primary Survey	Assess each casualty for life-threatening injuries or illnesses and give the needed life-saving first aid.
Step 3	Secondary Survey	Assess the casualty for injuries or illnesses that are not life threatening and give appropriate first aid; sometimes you don't have to do this.
Step 4	Ongoing Casualty Care	Stay with the casualty until medical help arrives and takes over.

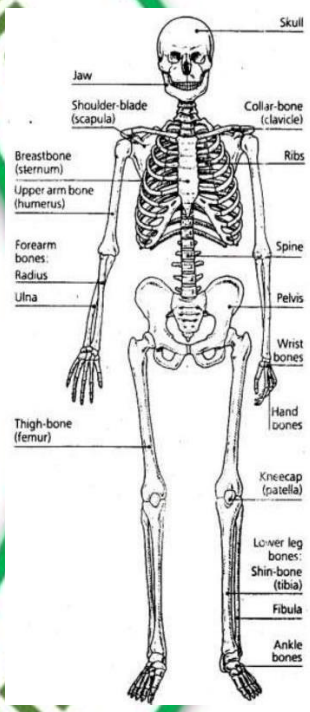
B. PATIENT ASSESSMENT

STRUCTURE OF THE HUMAN BODY: To assess a Patient, the First Aider must be aware of the structure and functioning of human body.

The Human Body Frame:-

(a) The **Skeleton** forms the supporting framework of the body and consists of separate bones joined together by means of cartilage, ligaments and muscles. The bones in different parts:

1. Head & Face : Skull, Two Cheek Bones and Lower Jaw Bone
2. Body : Backbone or Spine, the Ribs and Breast Bone
3. Upper Limbs : Arm, Forearm (Long Bones), Palm (Short Bones)
4. Hip : The Pelvis
5. Lower Limbs : Thigh and Leg; Long Bones, Feet - Short Bones

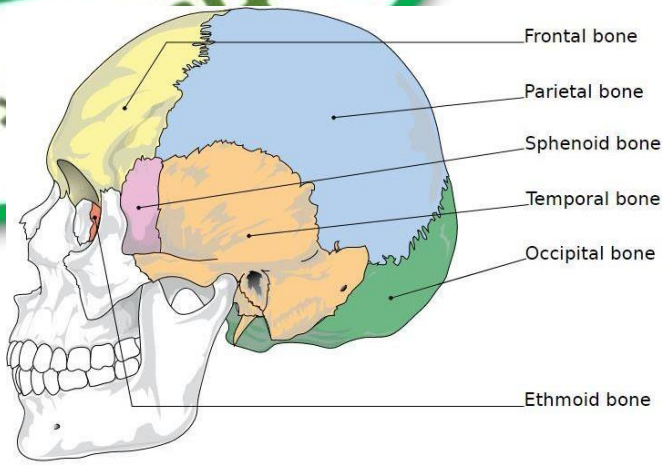


- **THE SKULL –** The bone of the head forms the skull and protects the brain inside. Injury to the head causes bleeding from blood vessels inside the closed box; the blood is unable to escape and gets collected and presses the soft brain tissue. This leads to headache, irritability, unconsciousness and may cause death. To avoid this it is important to place all persons of head injury under care of medical supervision at the earliest.

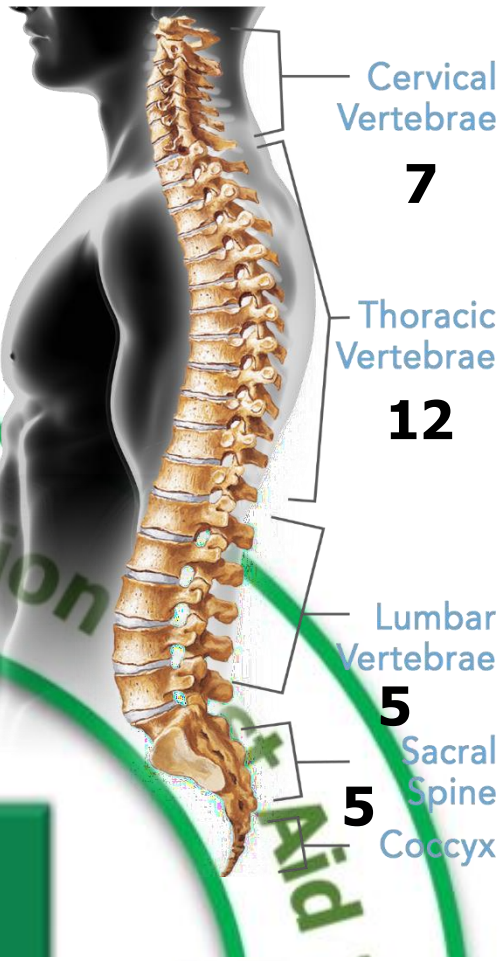
One has to be familiar with the positions of the angle of the jaw because this has to be pressed forward in case of an unconscious victim to prevent the falling back of the tongue which obstructs the airway.

The Skull is made of the following bones:

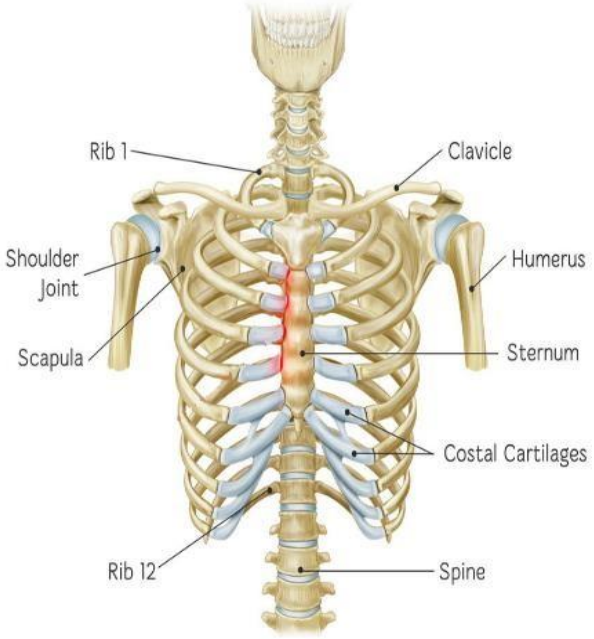
- One in the front, corresponding to the face, called **Frontal**
- Two-One on either side called the **Parietals**
- Two-One on either side below the Parietals at the level of ears called the **Temporal**.
- One behind corresponding to the back of the head called the **Occipital**.
- Two cheek bones and lower jaw bone all joined together form the skull.



- **THE BACK BONE OR SPINE (VERTEBRAL COLUMN) –**
  - It consists of **thirty three** small rounded pieces of bones. The distribution in different region is as follows:
  - 07 in the **Neck** Region (Cervical)
  - 12 in the **Back** Region (Thoracic or Dorsal)
  - 05 in the **Waist** Region (Lumbar)
  - 05 in the **Hip** Region (Sacral)
  - In between each pair of vertebra there is a thick piece of cartilage called **Disc**, which allows movement as well as acts as a shock absorber.
  - There is a **Central Canal** through which the spinal cord passes and carries nerve impulses to and from the brain.
  - If there is any injury, one vertebra may be displaced thus the spinal cord is pressed or cut causing paralysis due to interruption in the pathway of nerves. This damage may occur immediately at the time of injury or may be caused by careless handling the person after the accident. It is therefore extremely important to handle with care all persons who have suffered severe injury to their back or neck.



- **THE RIBS & BREAST BONE (STERNUM) –**
  - This is called the **Thoracic Cage** which protects the heart and the lungs.
  - The chest is covered with **twelve pairs of ribs** which are attached to the corresponding Vertebrae at the back.
  - The **first seven pairs** of these ribs are **attached to the breast bone** in front.
  - **Eighth, Ninth and Tenth ribs** are **attached to the rib above**.
  - Last two pairs of ribs i.e. **eleventh and twelfth have no attachment** in front and are known as **'floating ribs'.**
  - The ribs and breast bone are liable to be fractured in accidents due to either direct or indirect causes. An injury of the rib should be taken seriously and requires urgent hospitalization.



- **THE UPPER LIMBS & SHOULDER –**
  - The Bones are:

(i) the **Collar Bone** (Clavicle) one on each side between upper part of the breast bone on the front and shoulder blade and

(ii) the **Shoulder Blade** (Scapula).

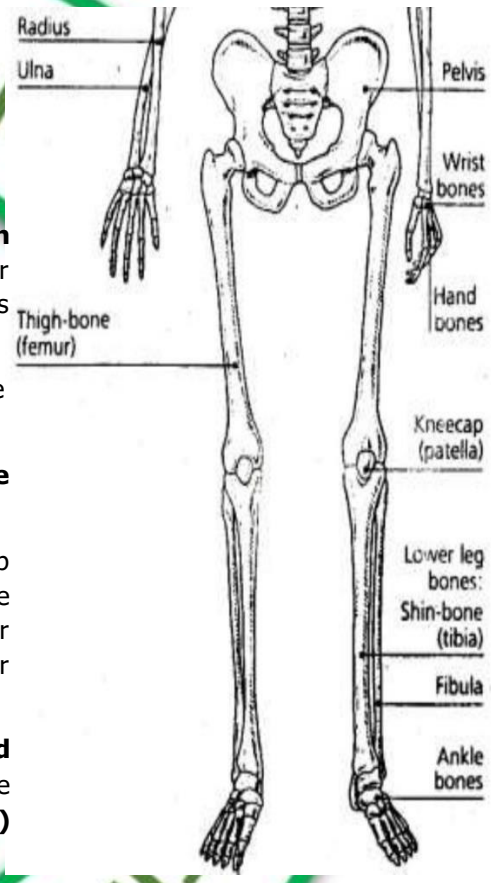
  - The Clavicle is a very brittle bone and is the common site of fracture. Shoulder Blade (Scapula) one on either side in the upper and outer part of the back of the chest.

- The **bones of the Upper Limbs** are:-

(i) Upper arm bone (Humerus)
(ii) Forearm bones
(iii) Radius (outer side of forearm)
(iv) Ulna (inner side of forearm)

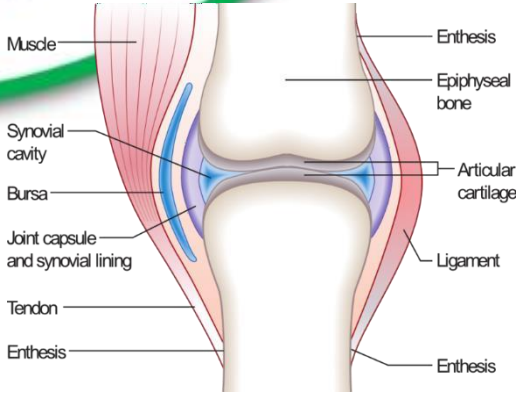
- The **joint between Upper Arm and Forearm is called Elbow Joint**.
- There are **8 carpal bones at the wrist** and **5metacarpal bones in the palm of the hand**.
- There are **3 small bones in each finger** and **2 bones for each thumb, called Phalanges.**

- **THE PELVIS & LOWER LIMBS –**
  - The two hip bones one on either side, join together to form the Pelvis.
  - The hip bones are attached at the back with the lower part of the vertebral column. At the front, it is attached together with ligament called **Symphysis Pubis**.
  - The pelvis forms a basin shaped cavity which contains Intestines, Urinary Bladder and Reproductive Organs.
  - There are two sockets one on either side of the pelvis, where the thigh bones join forming the hip joint.
  - **Femur, the thigh bone is the longest and strongest bone in the body**. Its upper end forms a part of the hip joint while its lower end forms a part of the knee joint. The upper end of the femur is easily liable to fracture in old age even to minor falls.
  - The **Knee Joint** in the front is covered with a small bone called the **Knee Cap (Patella)** which is easily felt under the skin.
  - The **two bones of the leg** are the **Shin Bone (Tibia) and the outer bone (Fibula).**
  - The Tibia extends from the knee joint to the ankle joint. Its sharp edge can be felt immediately beneath the skin of the front of the leg. The Fibula lies on the outer side of the Tibia. It does not enter into formation of the knee-joint but its lower end forms the outer part of the ankle-joint. Both joints play an important role.
  - The **bones of the foot** comprise **7 irregular bones called Tarsal**. It is the largest, and the uppermost (heel bone) forms the lower part of the ankle joint. **5 long bones (Metatarsals) support the toes in front**.



  - The **toe bones (phalanges) are 14 in number;** 2 in the big toe and 3 each of the other four toes.

- **JOINTS –** Joints are at the junction of two or more bones. There may be no movement, as in skull or there may be free movements, as in knee, elbow, shoulder and hip Joints. In movable joints, the ends of the bones are covered by cartilage and joint is overall encased in capsule with some lubricant material inside the joint.



- **MUSCLES –**
  - There are two types of muscles: muscles attached to the bones and the muscles of the internal organs.
  - Muscles to the layman mean flesh and meant to produce movement of the limbs and organs.
  - The muscles which are **attached to bones** are called **Voluntary Muscles** which can cause movement under the control of will and involuntary muscles like those found in the heart intestines etc., which continue to work even without the control of the will.

- The muscles go into action (called contraction) by stimulation of nerves arising from brain and spinal cord carrying motor impulses. Damage to nerves results in paralysis of the muscles.

- **LIGAMENTS –** Thickened portions of the joint capsule are called ligaments. They check movements beyond normal permissible limits. If there is simple injury to the ligaments of the joints it is called "Sprain".

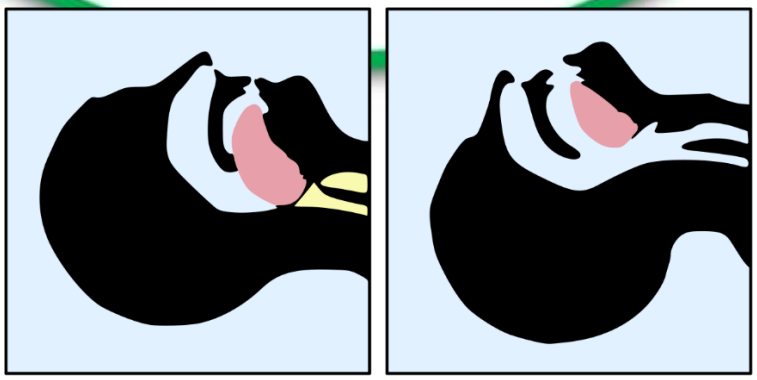
- **CONNECTIVE TISSUE** – Connective tissue consists of yellow elastic and white fibrous tissue intermixed in varying proportions. It is present in many parts of the body and forms a layer between the skin and underlying flesh. All over the body fat is being contained between its meshes, often in large quantities. The chief use of connective tissue is to bind parts together.

- **SKIN –** The skin is a **sensory organ** as it gives sensation like pain, touch and temperature. It covers the whole of the body and protects the underlying structures. It consists of two layers, the outer or hard layer (Epidermis) and the inner layer (true skin or Dermis). In the latter are numerous glands which secrete sweat (consisting of water and impurities from the blood). The evaporation of which from the surface of the skin cools it and helps to regulate the temperature of the body.

- **EYE –**
  - The eyeballs are covered with folds of skin (the eyelids) from which the eyelashes project.
  - The outermost parts of eyes are covered by a smooth membrane (conjunctiva) and are kept moist by tear produced by the tear-glands.
  - The transparent portion of the eye is called cornea through which the light from the object passes and forms the image at the back of the eye. Behind the Cornea are seen a coloured circular diaphragm (the iris) with a round opening (hole), the pupil. The latter varies in size with the amount of light passing through it.
  - Behind the pupil is the lens of the eye which focuses rays of light on to the light sensitive part of the eye (retina).

- **EAR –**
  - The Ear consists of three parts:
    - The **Outer Ear** is that part which can be seen projecting from the side of the Skull, together with the canal which leads to the eardrum.
    - The **Middle Ear**, situated inside the skull, receives and transmits sound waves concerned in hearing to the inner ear. It also communicates with the back of the nose and throat through the Eustachian tube, which opens during swallowing.
    - The **Inner Ear** is embedded inside the skull and is concerned with the sense of balance in addition to the sense of hearing.
  - The **Outer Ear** is **separated** from the **Middle Ear** by the **Eardrum**.

- **TONGUE –** The tongue is the muscular organ which lies on the floor of the mouth; it assists in tasting, and swallowing of food. In an unconscious casualty, by falling back on the throat, the tongue tends to obstruct it and thus prevent breathing.



FUNCTIONS OF THE HUMAN BODY: To assess a Patient, the First Aider must be aware of the structure and functioning of human body.

The study of the normal function and activities which go on in living beings is known as **PHYSIOLOGY**.

The body consists of distinct parts such as the heart, lungs, kidneys, etc. which carry on the special kinds of work. **Such a distinct part is called an Organ** and its **special work is called a Function**.

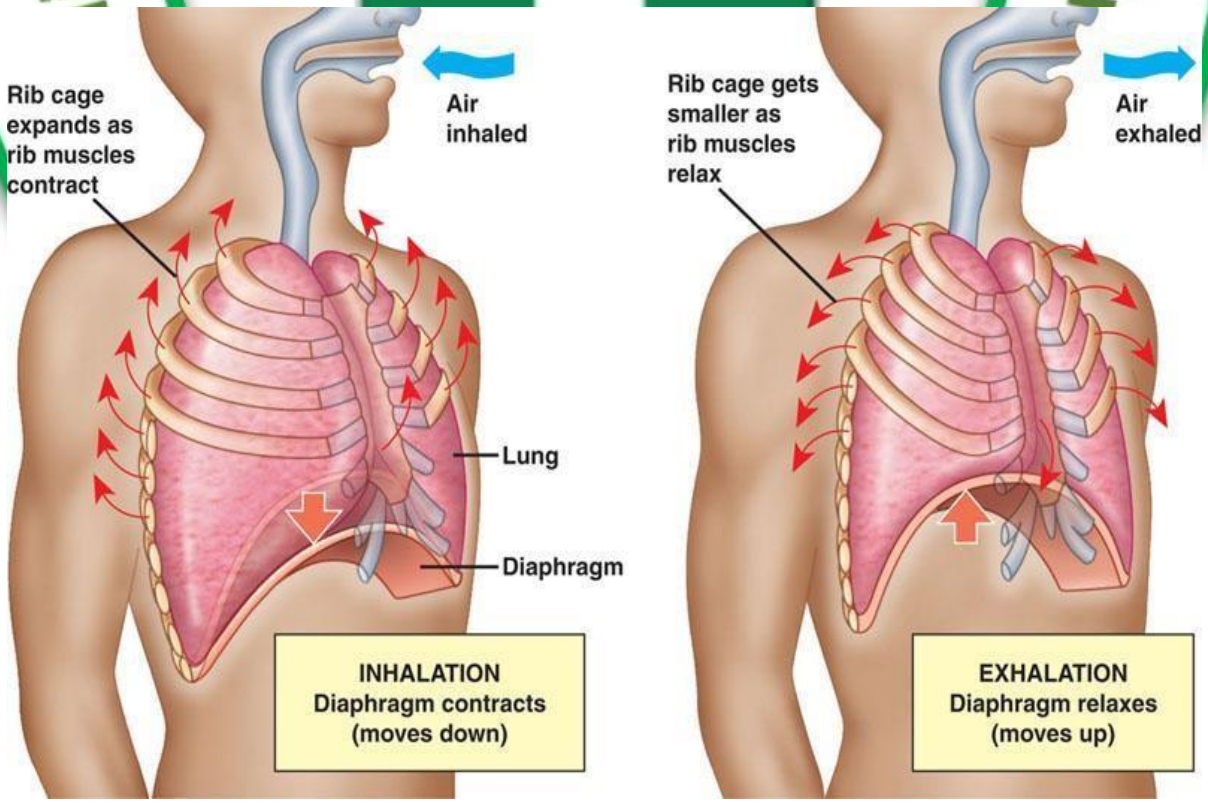
The essential functions of the life such as respiration, circulation, digestion, excretion, etc. are carried on by a set of organs of closely related parts that form a system e.g. the digestive system which includes the mouth, the gullet, the stomach, the liver, the pancreas and the intestines.

The **Cell is the smallest functional unit** of the body. A group of cells performing similar function form a **Tissue**. The cells are continually undergoing changes and become worn out, dying and being replaced. During its life a cell undergoes change and gives off carbon dioxide and other waste products and has to be supplied with glucose and oxygen.

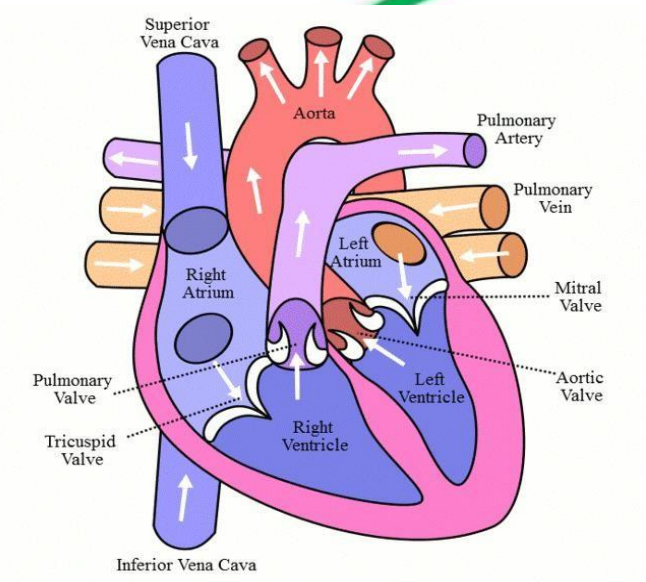
Oxygen is essential for the support of life and is obtained from the air while we breathe. It is carried to the lungs through the air passage into the blood stream and is circulated throughout the body to the tissue level where exchange of gases takes place and oxygen is absorbed.

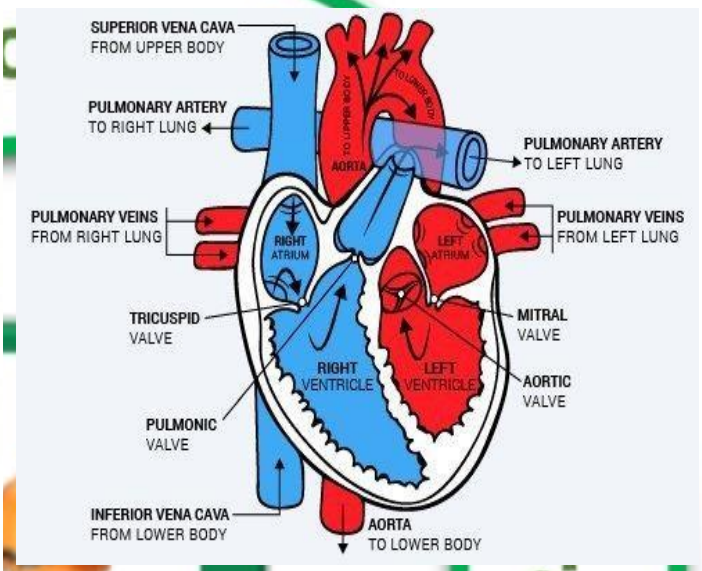
Oxygen along with the glucose from the digested materials is carried by the blood stream to the tissues to supply for their growth, repair and to produce heat and energy.

- **RESPIRATION –**
  - The objective of respiration is to provide oxygen to the body and wash out carbon-dioxide. The oxygen provided by breathing is utilized in the combustion of end products of the digested food which, in its turn generates carbon dioxide.
  - With **each inspiration** we take in **approximate ly 500cc of air** with higher contend to oxygen and lesser content of carbon-dioxide and **give out 500cc of air** with higher content of carbon-dioxide and lesser content of oxygen.
  - During the process of inspiration the chest cavity expands creating a negative pressure which inflates the elastic lungs, which are two in number and are situated in the chest cavity on either side of the heart. When the chest and abdominal muscles relax the chest cavity becomes smaller and the lungs go back to their normal position due to their elasticity.
  - Interference with the respiration may cause serious consequences like asphyxia and unconsciousness due to lack of oxygen and increase in Carbon dioxide accumulation.

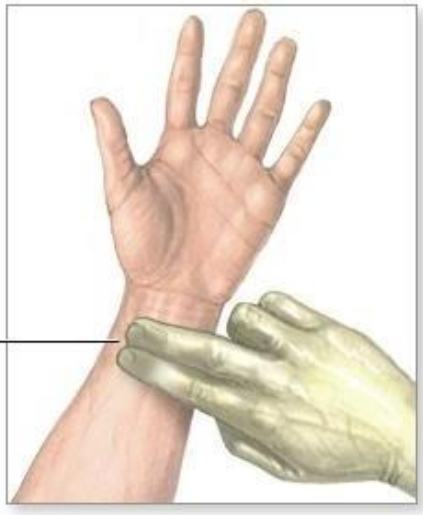


- **HEART AND BLOOD CIRCULA TION –**
  - The heart is a muscular organ situated at the centre of the chest cavity. It acts as a pump.
  - It is divided into **4 Chambers**. The right upper chamber, called the **Right Atrium** receives impure blood from all parts of the body through blood vessels called **Veins**.
  - When the heart beats this impure blood is passed into the Right Lower Chamber called **Right Ventricle**, and finally finds its way to the lungs where it is purified.
  - The blood so purified finds its way into the **Left Upper Chamber** called **Left Atrium**. It then passes to the **Left Lower Chamber**, called **Left Ventricle**, and from there, in the course of the beating of the heart the purified blood is discharged into various blood vessels called Arteries and Capillaries which convey this purified blood for the nourishment for the body as a whole. Thus each Heart has two pumps put together.





  - The pressure in the arteries varies with the beating of the heart. When the heart, contracts the pressure in the arterial system increases; when the heart relaxes the pressure in the arteries decreases. This pressure exerted on the arteries known as the **'Blood Pressure'** and is recorded by the blood pressure instrument or a rough estimate made by feeling the pulse.
  - With each heartbeat blood is ejected into the arterial system. Most of the arteries are placed deep in the body except on the wrist, elbow, neck, groin and ankle. So Arterial Pulse is normally felt over the lateral side of the wrist, in the neck, temples, and groin and near the ankle.
  - The average adult has a Pulse Rate of 72 per minute.



PATIENT ASSESSMENT: In any emergency and when it is safe to do so, the First Aider should:

Assess the Area	Before assessing the patient, it is vital to check that the area is safe for you, the patient, and bystanders
Assessthe Patient	Assess the nature of any injury or illness and set priorities for the care required

ASSESSMENT OF THE AREA –

- Before assessing the patient, it is vital to check that the area is safe for you, the patient, and bystanders.
- Hazards might include:
  - Vehicles
  - Electricity, both High and Low Voltage
  - Deep Water or Rough, Fast-flowing Water
  - Poisonous Gases, Chemicals or Fumes
  - Fire
- The general rule is to remove the danger to make the scene safe.
- Where this is not possible, the patient may need to be moved to a safe area.

ASSESSMENT OF THE PATIENT –

- Assess the nature of any injury or illness and set priorities for the care required.
- If the patient appears collapsed, first check their response to a shouted command and to a firm squeeze of the shoulders. If the collapsed patient does not respond, then CPR may be required.
- If the patient responds to your voice, then it is possible to obtain important information and plan any emergency treatment required.
  1. Ask the patient and any bystanders for the history of the problem, outlining what happened, the time of onset, and whether there is any known underlying health problem, such as asthma, diabetes, epilepsy or a heart condition.
  2. Ask the patient to describe any symptoms, including pain, soreness or discomfort, and any other unusual sensations such as numbness or tingling in the fingertips.
  3. Check the patient carefully, looking for any signs of injury or illness, basing your observations on the history and any symptoms described. After an injury, look for bleeding, bruising, wounds, swelling, deformity (when one side is compared with the other), loss of power or function.
- The **OBSERVATIONS** shall be:

1. **Conscious state:** If help is going to be delayed, check the conscious state every few minutes and note any changes. Use the 'AVPU' code:

A	**ALERT**	Is the patient alert and responding to you?
V	**VOICE**	Does the patient respond to your voice?
P	**PAINFUL**	Does the patient respond to a painful stimulus?
U	**UNRESPONSIV E**	Is the patient unresponsive?

2. **Airway**: Ensure that it is clear and open and that the patient does not have any secretions that might obstruct breathing.

3. **Breathing**: Check for normal breathing – note the rate and rhythm for any changes. Check whether the breathing is deep or shallow, quiet or noisy, and whether there are any abnormal sounds such as wheezing on breathing out. This is especially important with the unconscious patient because any change may be a warning of deterioration.

4. **Skin**: Look at the skin and note the colour (whether tinged with blue), and feel whether it is hot (with fever) or cold and clammy (as in shock).

THE PRIMARY SURVEY –

➢ The objective of the **Primary Survey** is to ensure your own safety and to determine any immediate life-threatening impairments. The process is best described using the helpful acronym **DRABC** which you have learnt in Chapter 1.

D	**DANGER**	Before making any attempt to assist, your own safety must come first. You cannot help if you become ill or injured yourself. The most common precaution is to simply put on a pair of latex gloves to protect from body fluids. Nevertheless it will always remain a case of 'Safety First'.
R	**RESPONSE**	Check the Patients response. A Patients level of responsiveness can be gauged using the AVPU scale. At this point it is helpful to note that if the patient responds in an alert fashion, able to speak, this means that their airway is open and they are breathing – a good sign.
A	**AIRWAY**	If the patient is unresponsive you can ensure their Airway as learnt in Chapter 1. However do not perform a blind finger sweep. Only take something out of the Patients mouth if you can see it and it is easy to do so.
B	**BREATHING**	Watch the Patients chest to see if they are breathing. Take a minimum of 5 but no longer than 10 seconds to check for chest rise.
C	**CIRCULA TION**	Is the patient bleeding heavily? If so we need to treat immediately by calling Emergency & applying direct pressure to the wound.

THE SECONDARY SURVEY –

➢ The objective of a **Secondary Survey** is to identify any further illness or injury that may require treatment. There are several components to help first aiders conduct a successful secondary survey as part of their patient assessment:

1. S-A-M-P-L-E
2. Vital Signs
3. Head-to-Toe Survey

S	**Signs & Symptoms**	**Signs** relate to what can you see, hear, feel or smell to indicate the persons condition. **Symptoms** refer to what the patient can tell you about how they feel i.e. dizzy, cold, nauseous.
A	**Allergies**	This could explain difficulty breathing in relation to a bee sting or after eating a food they have an allergy to. It may also reveal a contraindication to medication, for example aspirin.
M	**Medications**	This could be an inhaler to relieve an asthmatic episode or tablets to relieve angina. We can help by getting them for the patient.
P	**Pertinent Medical History**	Does the patient suffer from any known medical condition e.g. epilepsy or has the patient experienced the same symptoms before e.g. chest pain.
L	**Last Meal**	What did they last eat or drink & when?
E	**Events that led to Accident**	Can the patient tell you what led to their condition or was anyone else around that can tell you?

HEAD-TO-TOE SURVEY → The title 'head to toe' survey can feel quite daunting for the First Aid Responder. Contrary to assessing the patient fully from head to toe, a better description is to assess visually and physically as the event history dictates. Depending on the events leading to the injury or illness as well as the signs and symptoms, you may feel it helpful to examine a particular area of the patients body to determine if there are any further signs indicating the need for treatment.

These can include:

Head & Neck Area	Deformities, blood, cuts or any sign of trauma. Fluid oozing from ear or mouth. Pupil size and reaction.
Torso & Extremities	Again checking visually for deformities, blood or any sign of trauma. A physical check may include very gently checking tenderness appropriately or asking the patient to clench fingers and toes in order to check sensation or motor control.

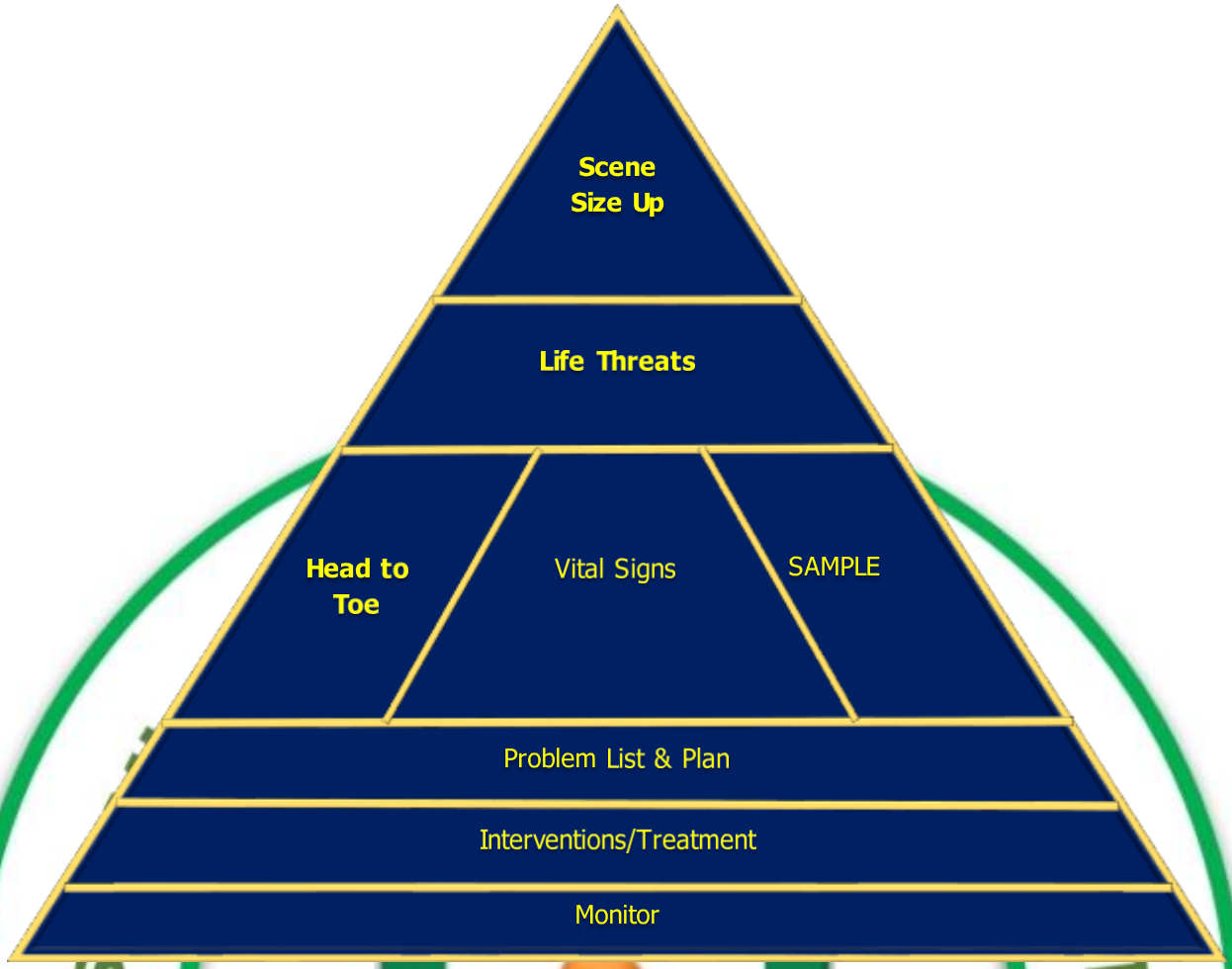


Figure: Patient Assessment Triangle

DRESSING & BANDAGES

A. DRESSING →

Definition: A **dressing** is a protective covering applied to a wound to:

- Prevent infection
- Absorb discharge
- Control bleeding
- Avoid further injury

Types of Dressing:

1. Adhesive Dressing - Band Aids
2. Non-Adhesive Dressing - Gauze Dressing, Improvised Dressing

1. ADHESIVE DRESSING (Band Aid) –

These sterile dressings are of different kind and consist of a pad of absorbent gauze of cellulose held in place by a layer of adhesive material. The Surrounding skin must be dry before application and all the edges of the dressing pressed firmly down. Sterile adhesive dressings are supplied in paper or plastic covers.

2. NON-ADHESIV E DRESSING –

Ready-made sterile dressing the dressing consists of layers of gauze covered by a pad of cotton wool and with an attached roller bandage to hold it in position. The dressing is enclosed and sealed in protective covering and is supplied in various sizes.

(A) Gauze Dressing

Gauze in layers is commonly used as a dressing for large wounds, as it is very absorbent, soft and pliable. It is liable to adhere to the wound; however this may assist the clotting of blood. The dressing should be covered by one or more layers of cotton wool.

(B) Improvised Dressing

These can be formed from any clean soft absorbent material such as a clean handkerchief, a piece of linen, a clean paper, or cellulose tissue. They should be covered and retained in position by such materials as are available.

Applications of Dressing:

- You should always cover a wound with a dressing because this helps to prevent infections. If possible carry protective disposable gloves.
- Great care must be taken in handling and applying dressing.
- Wash your hands thoroughly with soap and water.

- Avoid touching any part of the wound with the fingers or any part of the dressing which will be in contact with the wound.
- During dressing do not talk or cough over the wound.
- The dressing must be covered with adequate pads of cotton wool, extending well beyond them and retained in position by a bandage or strapping.
- If a dressing adheres to wound do not try to remove it. Cover it with sterile dressing after cutting away whatever can be removed. Badly injured tissues should be removed after wetting them with sterile saline solution.

B. BANDAGES →

These are made from flannel, calico, and elastic net or special paper. They can be improvised by any of the above material, or inception stocking or ties. Bandages are used to:

- Maintain direct pressure over a dressing to control bleeding.
- Retain dressing, slings and splints in position.
- Prevent or reduce swelling.
- Provide support for a limb or joint.
- Restrict movement.
- Assist in lifting and carrying casualties.
- Bandages should not be used for padding when other materials are available.

Bandages should be applied firm enough to keep dressing and splints in position but not so tight as to cause injury to the part or to impede the circulation of the blood. A bluish ting of the finger or nails may be a danger sign indicating that the bandages are too tight. Loss of sensation is another sign; such bandages should be loosened or removed.

TYPES OF BANDAGES:

- There are a number of different First Aid uses for bandages: they can be used to secure dressings, control bleeding, support and immobilize limbs, and reduce swelling in an injured part.
- There are three main types of bandages:

Roller Bandages	Secure dressings and support injured limbs
Tubular Bandages	hold dressings on fingers or toes or support injured joints
Triangular Bandages	used as large dressings; as slings; to secure dressings; or to immobilize limbs

Roller Bandages –

- Roller Bandages are used in hospitals and First Aid Posts. They are made out of cotton material with loose mesh. They are of various lengths and widths.
- Roller bandages are also meant to keep dressings in position. The rolled part is called the Head, the unrolled portion the Tail. The Roller bandages should be applied firmly and evenly.
- Width of Roller Bandages:

PART	WIDTH
Finger	2.5cm (1 Inch)
Hand	5.0cm (2 Inch)
Arm	5.0cm/6.0cm (2 Inch/2.5 Inch)
Leg	7.5cm/9.0cm (3 Inch/3.5 Inch)
Trunk	10cm/15cm (4 Inch to 6 Inch)

- **General Rules for application of Roller Bandages:**

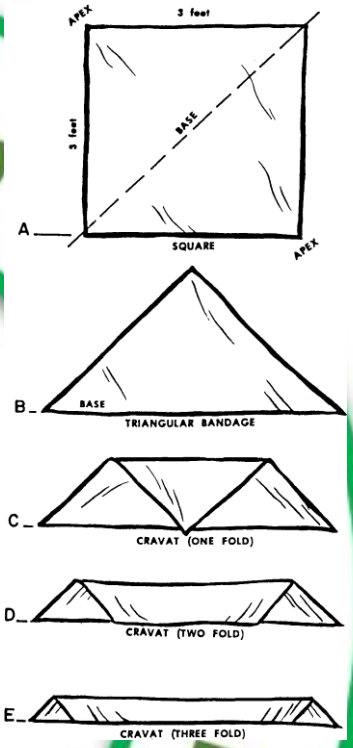
1. Face the patient.

2. When bandaging left limb, hold the head of the bandage in the right hand and vice versa.
3. Apply the outer surface of the bandage over the pad and wind it around the injury twice so that it is firm.
4. Bandage from below upwards over the limb. Also make it a rule to apply bandage from the inner side to the outer side.
5. See that the bandage is neither too loose nor too tight.
6. Roll bandage so that each layer covers two thirds of the earlier layer.
7. Fix the bandage by pinning it up or using adhesive plaster. The usual practice of tearing the final end into two long tails and tying them up is quite satisfactory and practical.

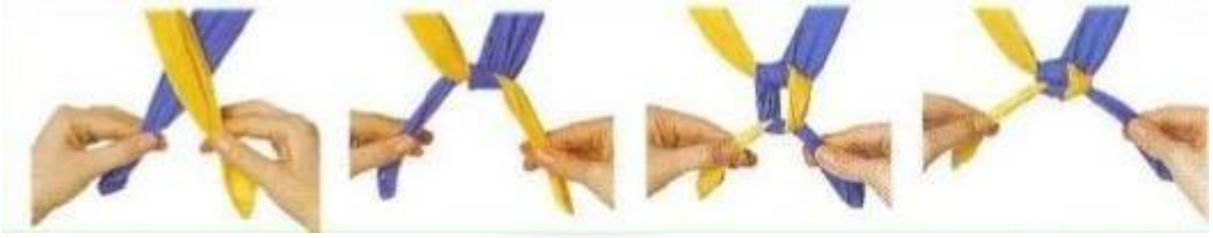
Triangular Bandages –

- A **Triangular Bandage** is made by cutting a piece of calico 100cm square comer to corner so as to give two triangular bandages.
- It has **three borders**. The **longest** is called the **BASE** and the **other two** the **SIDES**. There are three Corners. The one opposite the base is called the POINT and the other called the ENDS.
- **Uses of Triangular Bandage:**

1. As a whole cloth (spread out fully).
2. As a broad bandage. Bring the point to the center of the base and then fold again in the same direction.
3. As a narrow bandage. Fold broad bandage once again.
4. When a smaller size bandage is needed fold the original so as to bring the ends together. The size is now reduced by half the original.



- For tying bandages a 'Reef Knot' must always be used. To make a Reef Knot, take the ends of the bandage one in each hand; cross the end in the right hand under and then over the end in the left hand thus making a turn. Then cross the end now in the right hand over and then under the end in the left hand thus making a second turn.
- The usual 'Granny Knot' should not be used as it is likely to become loose.
- The knot should be made where it does not hurt the skin or cause discomfort.
- Tuck the loose ends of the bandage out of sight.
- The triangular bandage should be folded narrow when not in use. Bring the two ends to the center and fold.
- It becomes a packet which measure 16cm x 9cm handy to carry.



- **Slings:**

❖ **Uses of Slings-**

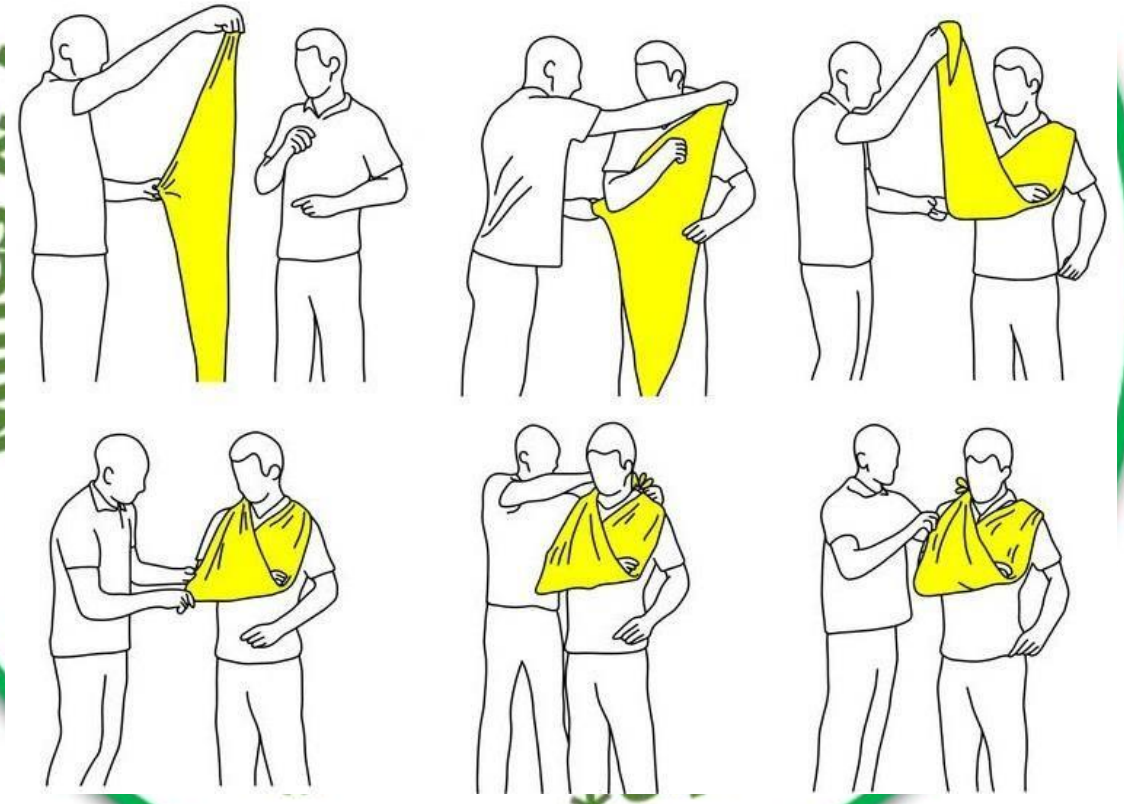
1. To support injured arms, and
2. To prevent pull by upper limb to injuries of chest, shoulder and neck.

❖ **Different types of Slings-**

1. Arm Sling
2. Collar & Cuff Sling
3. Triangular Sling

1. ARM SLING: It is used in cases of fractured ribs, injuries of arm, wrist and hands after application of splints or plaster casts and bandaging.

- Face the casualty, put one end of the spread triangular bandage over the uninjured shoulder with point on the injured side.
- Pass the end around the neck and bring it over the injured side shoulder. The other end will now be hanging down over the chest.
- Place the forearm horizontally across the chest and bring the hanging end up. The forearm is now covered by the bandage.
- Tie the two ends in such a way that the forearm is horizontally or slightly tilted upward in the knot is placed in the pit above the collar-bone.
- Tuck the part of the sling which is loose at the elbow behind the elbow and bring the fold to the front and pin it up to the front of the bandage.
- Place the free base of the bandage in such a way that its margin is just at the base of the nail of the little finger. The nails of all the fingers should be exposed.
- Inspect the nails to shows find if there is any bluish colour. A bluish colour shows that there is a dangerous tightening of splints or plasters and therefore free flow of blood is not possible.
- If the casualty is not wearing a coat, place a soft pad under the neck portion of the sling to prevent rubbing of the skin in that place.

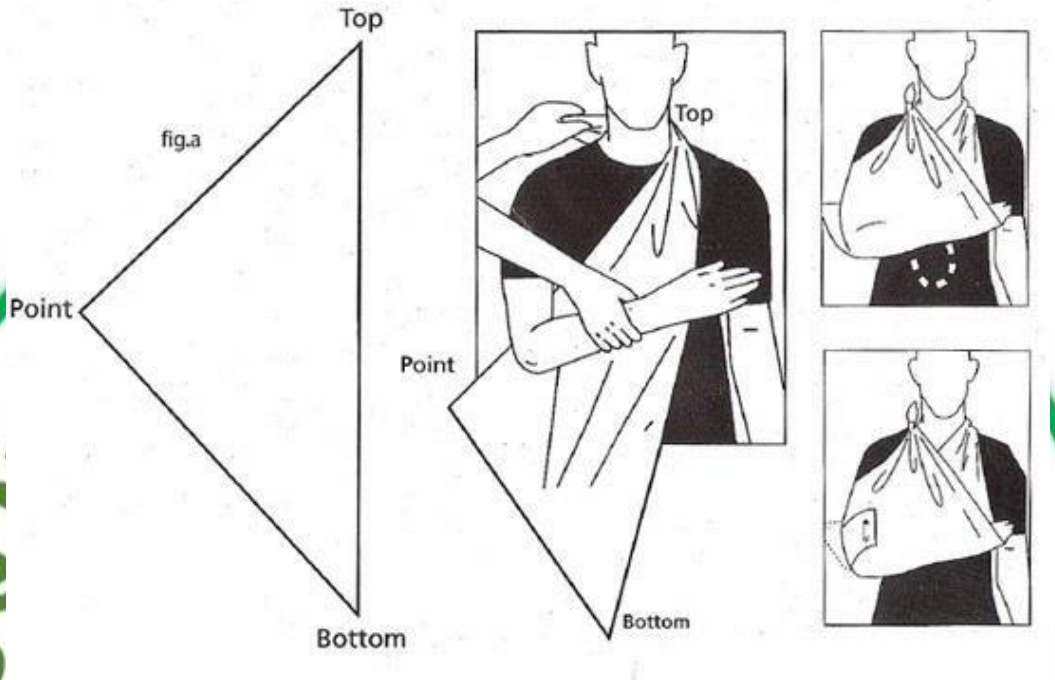


2. COLLAR & CUFF SLING: This Sling is used to support the **<u>WRIST</u>** only.

- The elbow is bent; the forearm is placed across the chest in such a way that the fingers touch the opposite shoulder. In this position the sling is applied.
- A clove hitch is made with narrow bandage. Two loops are made and are laid on top of the other the front loop is laid behind the back loop without turning.
- A clove-hitch is passed round the wrist and the ends tied in the hollow above the collar bone on the injured side.

3. TRIANGULAR SLING: It is used to support the fracture of the collar bone, arms or injured shoulder. It helps to keep the hand raised high up giving relief from pain due to the fracture.

- Place the forearm across the chest with the fingers pointing towards the opposite shoulder and the palm over the breast-bone.
- Place an open bandage over the chest, with one end over the hand and the point beyond the elbow.
- Tuck the base of the bandage comfortably under the forearm and hand.
- Fold the lower end also around the elbow and take it up and across the back over to the injured shoulder and tie it with the other free end into the hollow above the collar bone.
- Tuck the point between the forearm and bandage.
- Tuck the fold so formed backwards over the lower half of the arm and fix it with a safety pin.



4. IMPROVISED SLING: Slings may be improvised –

- By turning the free end of a coat and pinning it to the sleeve.
- By passing the hand inside the buttoned coat or shirt.
- By using mufflers, ties, soft cloth etc.
-

Bandaging with a Triangular Bandage:

❖ **For the Scalp –**

- Fold a narrow hem of the base of an open bandage and place it on the forehead just above the level of the eye-brows.
- Take the two ends backwards, after placing the body of the bandage over the head, the point hanging near the nape of the neck.
- Cross the two ends and take them forward above the ears to meet on tie forehead, where they are tied.

- Press on the head of the patient, draw the point firmly downwards and put it to the bandage after taking it upwards.

❖ **For the Forehead, Eye, Cheek or any part which is round in shape –**

- Use narrow or broad bandage, depending upon the size of the wound.
- Apply the centre of the bandage over the pad and wind the bandage round the part.
- Tie in a suitable place.

❖ **Front or Back of the Chest –**

- Place the center of the open bandage over the dressing point over the sound shoulder.
- Carry the ends of the bandage around the body and tie it in such a way that one end is longer than the other.
- Draw the 'Point' over shoulder and tie to the longer end.
- If back of chest has the wound-reverse all the steps.

❖ **For the Shoulder –**

- Stand facing the injured side.
- Place the centre of the open bandage on the shoulder with the point over the side of the neck reaching the ear.
- Carry the ends, after hemming the base inward around the middle of the arm and tie the knot on the outer side, so that the lower border of the bandage is fixed firmly in position.
- Apply a Sling.
- Turn down the point of the bandage over the sling knot; draw tight and pin it.

❖ **For the Elbow –**

- Bend the elbow to a right angle if it is advisable to do so.
- Folding a suitable hem of the base of a triangular bandage and apply it as follows:
  - Lay the point on the back of the upper arm and the middle of the base on the back of the forearm.
  - Cross the ends in front of the elbow, then round the arm and tie the ends above the elbow.
  - Turn the point down and pin it low down.
  - When the elbow cannot be bent use an ordinary bandage with figure of eight technique.

❖ **For the Wrist –**

- Place the open bandage in such a way that the injury is uppermost.
- The point should be towards the fingers and the base across the wrist.
- Now bring the point over to the wrist.
- Make a narrow inward hem as usual pass the ends around the wrist, cross over and tie it up over the point.
- Turn the point over the knot and pin it.

❖ **For the Hip & Groin –**

- Kneel facing the hip and tie a narrow bandage around the waist with the knot on the injured side.
- Take a second open bandage and pass its point under the knot bring it over the knot and pin it.
- Make a suitably broad hem of the base bring the ends round the thigh, cross and tie a knot on the outer part, so as to hold the lower hemmed border in position.

❖ **For the Knee –**

- Bend the knee to a right angle.
- With a narrow inward hem, place the open bandage in front of the knee with the point upon the thigh.
- Cross the ends, take them upwards on the back of the thigh bring them to the front of the thigh and tie up.
- Bring the point down over the knot and the knee and pin it up.
- In case the knee is not to be bend a figure of eight bandage, using a narrow or a broad bandage is applied.

❖ **For the Foot –**

- Place the foot in the centre of an open bandage with the point beyond the toes.
- Draw the point over the foot on to the leg.
- Cover the heel with the ends.
- Cross the ends around the ankle at the back.
- Bring the ends forward and tie them in front of the ankle.
- Bring the point down and pin it up.

❖ **For the Stump –**

- Place the base of a bandage well up on the inside of the stump hanging downwards.
- Draw up the point over the stump and cross the ends in front, over the point.
- Carry the ends behind the stump cross them and bring them forward, tying off in front.
- Draw the point firmly downwards over the knot and secure with a safety pin.

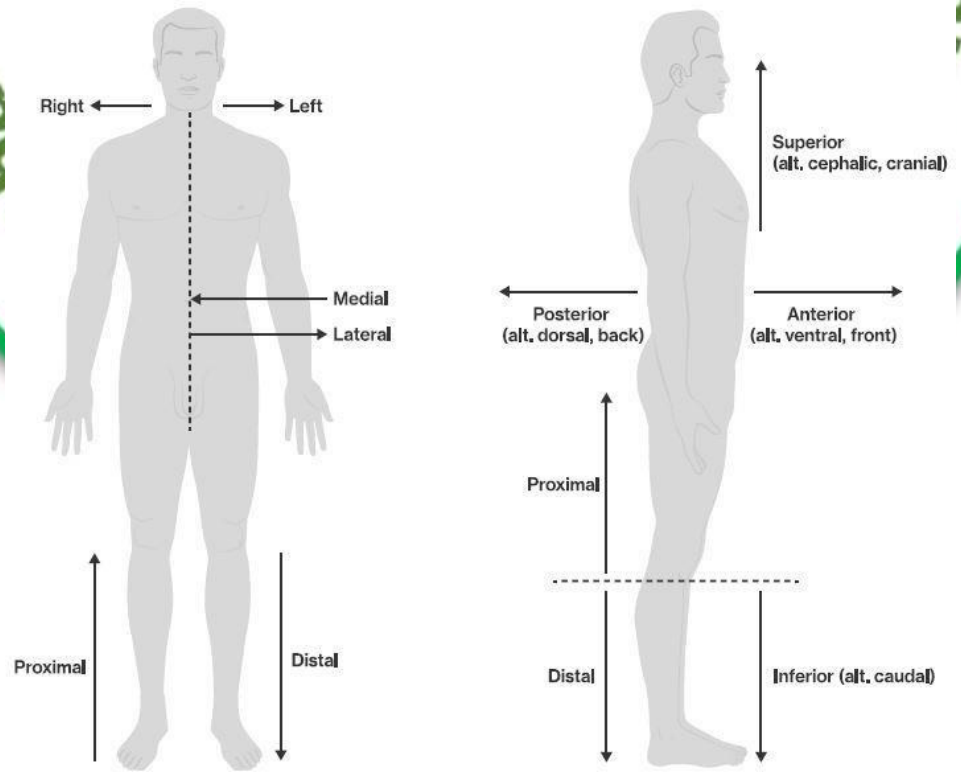
INTRODUCTION TO BASIC ANATOMY

A. INTRODUCTION TO BASIC ANATOMY

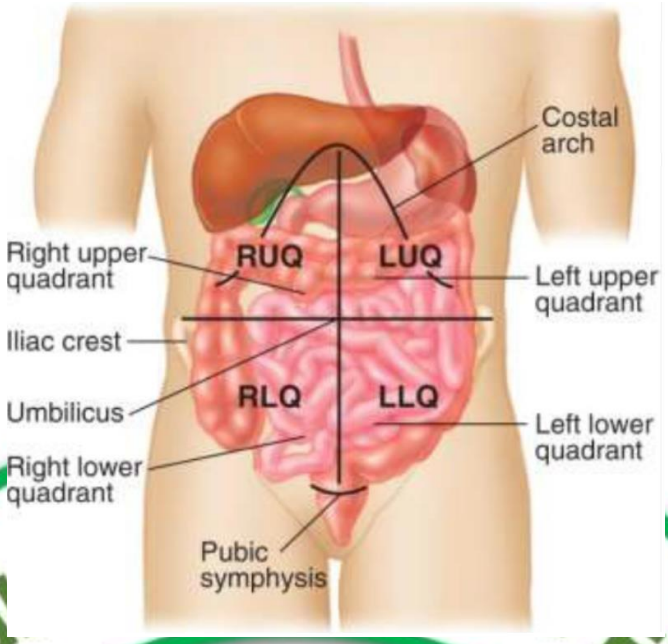
1.0 First Aiders must be familiar with the basic structure and functions of the Human Body. Using the proper medical terms allow you to communicate more effectively with the person and with medical care providers.

2.0 The Directional Terms of Human Body are asfollows:

DIRECTIONAL TERM	AREA
Right and Left	The person's Right and Left
Anterior	Front of Body
Posterior	Back of Body
Superior	Closer to Head
Inferior	Closer to Feet
Lateral	Farther from the Middle
Proximal	Close to where the Limb is attached to the Body
Distal	Distant from the point of attachment
Superficial	Closer to or on the Skin
Deep	Farther inside the Body
Quadrant	Section of the abdominal cavity divided by horizontal and vertical lines intersecting at the umbilicus; four equal areas



Anterior View **Lateral View**



Quadrant View

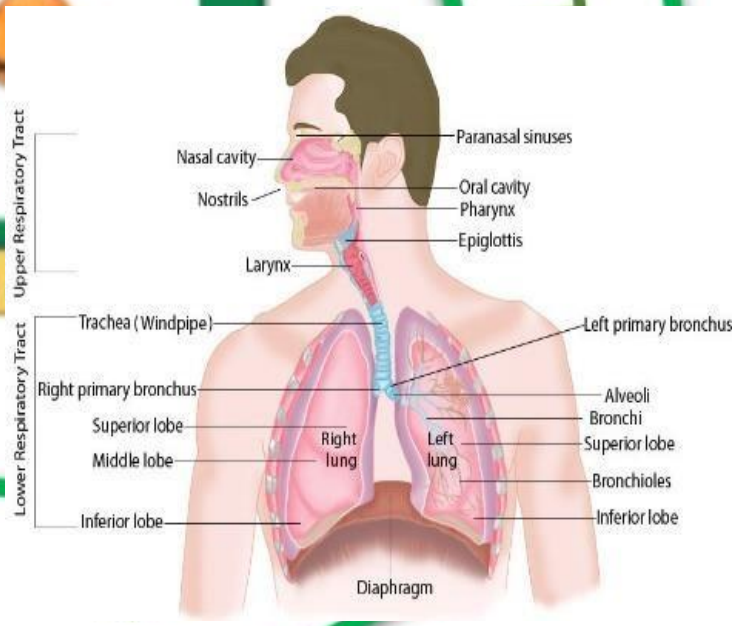
TYPES OF BODY SYSTEMS →

The key body systems are:

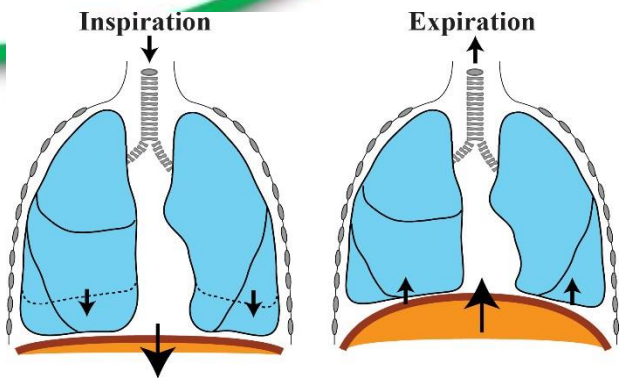
1. Respiratory System;
2. Circulatory System; and
3. Nervous Systems.

Most important and sensitive organs are Lungs, Heart, Brain, Spinal Cord.

1. RESPIRA TORY SYSTEM –



- Oxygen is essential to life. Every time we breathe in, air containing oxygen enters the lungs. This oxygen is then transferred to blood to be around the body. Breathing and transported exchange of oxygen and carbon dioxide (a waste product from body tissues) are described as "Respiration", and the structures that enable us to breathe make up the Respiratory System.
- Respiration means breathing in and out of air. This function is necessary to supply oxygen (from the air) to all the organs in the body. Stoppage of oxygen supply to the organs may result in death. Death will result in about 4 to 6 minutes if the body's Oxygen supply is cut off.
- **Mechanism of Respiration:**
- During Inspiration (breathing in), the diaphragm (the muscle separating the chest from the abdominal cavity) flattens and increases the chest capacity from above downwards.
- The ribs move upwards and forwards increasing the capacity of the chest cavity from front to back by the action of the muscles situated between the ribs; the lungs thus expand and air enters them. This is an active process.



- During Expiration (breathing out) the reverse process takes place. The diaphragm comes back to its original state and the ribs fall back thus forcing the air out of the lungs. This is a passive process.
- Small blood vessels (capillaries) surround the alveoli. The exchange of oxygen and carbon dioxide take place through the blood circulating in these capillaries. Oxygen is absorbed by the red blood corpuscles of the blood, water vapour and carbon dioxide are let out from the blood plasma into the alveoli and expelled out. The lungs are also supplied with nerves which are connected to an area in the brain called respiratory centre. This centre controls respiration.
- The **Organs** connected with respiration are:
  1. **The Air Passages** consist of nose, throat (Pharynx), wind pipe (Trachea) and two air-tubes (Bronchi). The bronchi divide into minute branches (Bronchioles) which end in the lung substance (Alveoli)
  2. **The Lungs** are two in number and are situated on the right and left sides of the chest cavity. Each lung is made up of a number of small sacs, called **"Alveoli"**. The lungs are covered by a membrane called **"Pleura"** which lines the inner wall of the chest cavity.
  3. **The Muscles**, Diaphragm, Intercostals and Abdominal breathing muscles help to contract and expand the lungs to facilitate the breathing.

- **ASPHYXIA (Suffocation):**
  - Asphyxia is a condition in which the lungs do not get sufficient supply of air for breathing. If this continues for some minutes, breathing and heart action stops and death occurs.

  - Causes of Asphyxia:
    1. *Obstruction* - Foreign Body, Food or Water in Air Passage, Irritant Gases in to the Air Passage, Tongue falling back, Swelling of Tissues of Throat.
    2. *Compression* - Type of Rope/Scarf around the Neck, Hanging or Throttling, Smothering like covering face & nose.

  - Conditions affecting the Respiratory Mechanism:
  - Epilepsy, Tetanus, Rabies etc.
  - Nerve diseases causing paralysis of chest wall or diaphragm.
  - Poisonous snake bite (e.g. Cobra).

  - Conditions affecting the Respiratory System:
  - Over doses of Morphia, Barbiturates (Sleeping tablets)
  - Electric Shock.
  - Stroke

  - Compression of the Chest:
  - Caving in of earth or sand, in mines, quarries, pits or compression by grain in a silo or big beam and/or pillars in house-collapse.
  - Crushing against a wall or other barrier or pressure in a crowd (Stampede).

  - Lack of Oxygen at High Altitudes:
  - With low atmospheric pressure where the oxygen content in the atmospheric air is low due to lack of acclimatization.

  - Management:
  - Remove the cause, if possible or remove the casualty to environment where the suffocating agent is not there.
  - Loosening the tight clothing e.g. collar belt etc., and expose the chest and neck.
  - Resuscitations:
    1. Opening the Airway
    2. Checking the breathing
    3. Clearing the Airways
    4. Artificial Respiration mouth to mouth/mouth to nose respiration.
    5. Circulation- External Chest Compressions
  - Gently shake casualty's shoulders and ask what happened.

- Check the breathing by- Observing movement of the chest and also observing air coming out during expiration.
- Clearing the Airways by backward tilt of head and chin lift-opening the air way.
- Providing rescue breath.
- Check for heart beat and movement of chest for recovery of respiration and heart beat, if achieved put the casualty in recovery position; if not start compression activity.
- External Chest Compressions: Lean over the casualty, with your arms straight Press down vertically on the chest, and depress by about 4-5cm. Release pressure and let chest recoil. Compress 30 times at the rate of 100 compressions per minute.
- Mouth-to-Mouth Respiration: If No recovery of respiration and heart beat, close the nose, open the mouth ensuring tilting of head, blow in the air from your mouth to mouth of the casualty. And allow the chest recoil; after 5 times again check for recovery.
- Check the Pulse.

➢ **DROWNING:**

- This is another consequence of disaster especially during flooding. Drowning causes asphyxia by water weeds and mud entering into the lungs. It may also cause the throat to go into spasm (constricting the air passage dry drowning). Congestion of the lungs can occur very quickly but it may be several hours before it is apparent.

- **All casualties rescued from drowning should be sent to a hospital.** If a casualty has been immersed in cold water there is also a danger of hypothermia. It is important that the casualty is kept warm.

- **Symptoms & Signs →**
  1. General symptoms and signs of asphyxia.
  2. Froth around the casualty's lips, mouth and nostrils.

- **Aims →** Get air into the casualty's lungs as fast as possible, even in water. If necessary arrange removal to hospital.

- **Management →**
  1. Quickly remove any obstruction such as weed from the casualty's mouth and begin artificial respiration immediately.
  2. If in deeper water give the occasional breath of air while towing the casualty ashore.
  3. Place casualty on a firm surface, check breathing and pulse and continue Resuscitation.
  4. As soon as the casualty begins breathing place him in the recovery position.
  5. Keep him warm. If possible, remove wet clothing and dry him off. Cover with spare clothes and or towels to keep the body warm.
  6. Arrange shifting to hospital. Transport as a stretcher case, maintaining the recovery position.

:: NOTE ::

If the casualty stops breathing, give two initial rescue breaths and thirty Chest Compressions.
If you are alone, give CPR for 1 minute before calling Ambulance.

➢ **STRANGULATION & HANGING:**

- Strangulation is constriction or squeezing around the neck or throat. Sometimes, hanging or strangulation may occur accidentally – for example, by ties or clothing becoming caught in machinery.

- Hanging may cause a broken neck; for this reason, a casualty in this situation must be handled extremely carefully.

- STRANGULATION is usually the result of throttling by hands or a rope or scarf being tied round the neck.

- In HANGING the fracture of spine at the junction of head and neck causing compression or tear of the spinal cord lending to respiratory failure.

- **Aim of First Aider** should be to restore adequate breathing, to arrange urgent removal to hospital.

:: NOTE ::

Do not move the casualty unnecessarily, in case of spinal injury. Do not destroy or interfere with any material that has been constricting the neck, such as knotted rope; police may need it as evidence.

- **Management →**
  1. Cut or remove the band constricting the throat.
  2. If suspended raise the body and loosen or cut the rope.
  3. Give artificial respiration.
  4. Do not wait for the policeman to arrive, start immediately.
  5. Lay the casualty on the ground. Open the airway and check breathing. If he is not breathing, be prepared to give chest compressions and rescue breaths if necessary for saving life.
  6. If the casualty is breathing, place the person in the **Recovery Position**.

➢ **CHOKING (Asphyxia due to obstruction in Windpipe):** The airway is the passage that connects the nose and mouth with the lungs. If anything blocks the airway, the person chokes and cannot get enough oxygen. This is a life-threatening emergency, and you must give First Aid to remove whatever is blocking the airway.

- **Mild Choking →** Coughing may indicate a mild airway obstruction. Coughing is a natural way to clear the airway, and it is a sign that the person is still getting enough at Encourage the person to keep coughing and stay close by in case you need to help. An object may become more firmly stuck in the airway, stopping the person from breathing.

- **Severe Choking →** Severe choking happens when a foreign object or swelling blocks the airway completely. The object may get stuck at any point in the airway from the throat to the lungs. This is a severe airway obstruction. A foreign object that is stuck at the back of the throat may block the throat or cause muscular spasm. If blockage of the airway is mild, the casualty should be able to clear it; if it is severe he will be unable to speak, cough, or breathe and will eventually lose consciousness. Be prepared to begin rescue breaths and chest compressions. This is most common with children. A marble, a seed or button may get struck in the air passage. In adults, food may go down the airway and choke it.

- **Aim →** Is to remove foreign body or obstruction.

- **Management →** In case of **Adults & Children**

Step 1

If you think someone is choking, ask them **'Are you choking?'** If they can breathe, speak or cough then they might be able to clear their own throat. If they cannot breathe, cough, or make any noise, then they need your help straight away.

Step 2

Cough it out. Encourage them to cough and remove any obvious obstruction from their mouth.

Step 3

Slap it out. If coughing fails to work, you need to give five sharp back blows.

To do this, help them to lean forwards, supporting their upper body with one hand. With the heel of your other hand give them **five sharp back blows between their shoulder blades**. After each back blow, check to see if there's anything in their mouth.

Step 4

Squeeze it out. If back blows fail to clear the obstruction, give **five abdominal thrusts**.

To do this, stand behind them and put your arms around their waist. Place one hand in a clenched fist between their belly button and the bottom of their chest. With your other hand, grasp your fist and pull sharply inwards and upwards up to **five times**. Check their mouth again, each time.

Step 5

If the **blockage has not cleared**, **call for Ambulance** help straight away. **Repeat** five back blows and five abdominal thrusts until help arrives, re-checking their mouth each time.

If they become unresponsive at any point, prepare to start **Adult CPR.**

- **SWELLING WITHIN THE THROAT:** Swelling within the throat may occur as a result of trying to drink very hot liquid or swallowing corrosive poisons or may be due to inflammation.
  - **Management →**
    1. Make the patient sit up.
    2. If breathing continues normally or is restored to normal, give ice to suck, or cold water to sip.
    3. Butter, olive oil or medical paraffin may also be given in small quantity.
    4. Apply cloth wrung out of hot water to the front of the neck.
    5. If breathing has stopped, give artificial respiration.
    6. An early hospitalization is advised.

- **SUFFOCATION BY SMOKE:** Protect yourself by a towel or a cloth (preferably wet) over your mouth and nose. Keep low and remove the casualty as quickly as possible away from the area.

- **SUFFOCATION BY POISONOUS GASES like Carbon Monoxide (Lighter than Air):** This gas which is lighter than air is present in car-exhaust fumes, in house hold Coal gas, during incomplete combustion charcoal stoves and in coal mines.
  - **Management →**
    1. The First Aid treatment consists of removing the person and applying artificial respiration and giving pure oxygen, if available.
    2. Ensure circulation of fresh air before entering the room on doors and windows.
    3. Before entering the enclosed space take two or three deep breaths and your breath as long as you can and hold
    4. Crawl along the floor (as the gas is lighter than air).
    5. Remove the casualty as quickly as possible to the area of fresh air
    6. Loosen his clothes at neck and waist and give artificial respiration casualty is asphyxiated.

- **SUFFOCATION BY POISONOUS GASES like Carbon Dioxide & Others (Heavier than Air):** Such gases are found in coal mines, deep unused wells and sewerage. Various other gases such as leaking refrigerator gases, compressed gasses used for cooking and lighting coul d also cause suffocation.
  - **Management →**
    1. Observe all the precautions mentioned above.
    2. Enter in upright position (as the gas is heavier than air and collects near the floor).
    3. Remove the casualty as quickly as possible to fresh air.
    4. Wherever ventilation is not possible and deadly poisonous gas is suspected use a gas mask for protection.

- **ASTHAMA:** This is a condition where sudden constriction of airways causing difficulty in breathing especially in breathing out occurs. Allergy, infection, anxiety or tension can trigger an attack.
  - **Management →**
    1. Reassure the patient
    2. Make him sit up in bed or chair and allow him to lean forward with a couple of pillows and/or a small table on which to rest his head.
    3. Ensure fresh air by opening the windows.
    4. Seek medical aid from a nearby doctor.

- **Asphyxia of a severe degree with unconsciousness:**
  - This could be due to:
    1. The tongue might have fallen back into the throat.
    2. Vomit might have collected in the throat.
    3. Some foreign material (like weeds, mud etc.) might have collected and obstructed the air passages.
  - **Begin to work immediate ly as every second counts. Do not delay.**
  - Management when not breathing →
    1. Loosen all clothing at waist, chest and neck.
    2. Tilt the head backwards, while supporting the back of neck with your palm. This will lift the tongue to its normal position. Thus the air passage will be cleared and the casualty may begin to breathe after a gasp.
    3. If breathing does not begin after the above treatment. Mouth-to-mouth or Mouth-to-nose breathing should be given.
  - **If the heart is not beating, the following will be noticed →**
    1. The face is blue or pale.
    2. Pupils are dilated.
    3. Heartbeats and pulse at root of neck (carotid) are not felt.
    4. Place the casualty flat on his back on a hard surface (bench, table etc.).
    5. Give a smart hit with the edge of your hand on the lower and left angle of the sternum. This usually stimulates the heart to restart.
    6. In case heart does not work continue the striking for 10-15 seconds, at the rate of one stroke a second. Feel for the pulse when it becomes regular and continuous, stop thumping.
    7. All the while artificial respiration has to go on.
    8. Even if the casualty is breathing but the breathing is not normal, it is wise to start artificial respiration.
    9. Do not begin thumping the heart or compression until you are sure that the heart has stopped beating.
    10. To restore circulation External chest compression is to be started.

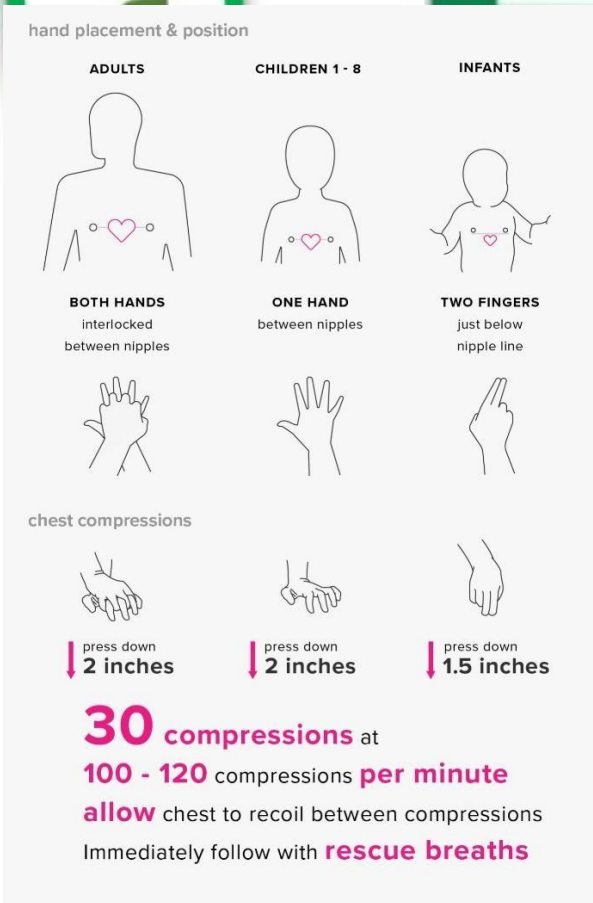
- **EXTERNAL CARDIAC COMPRESSION (ECC):**
  - If only one First Aid Provider is available, artificial respiration and external cardiac compressions both are done alternately.
  - If two First Aiders available. First Aider giving mouth-to-mouth breathing to sit to the right of the casualty and place the other to give External Cardiac Compression on the left side.
  - Feel and mark the lower part of the sternum.

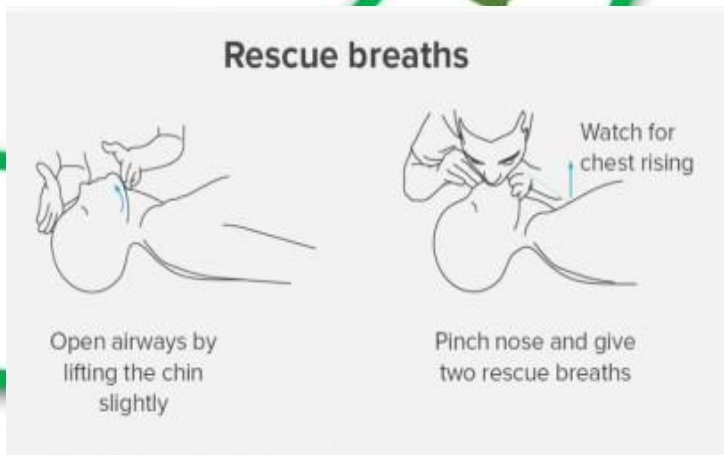
- Place the heel of your hand on the marked part the lower part of sternum (make sure that the palm and fingers are not in contact with the chest).
- Place the heel of the other hand over it.
- With your right arm press the sternum backwards towards the spine (it can be pressed back in adults).

:: Note ::

- *An Adult should be given about 60 Compressions per minute.*
- *For Children from 2-10 years of age, Compression with one hand will be enough but it should be 80-90 times per minute.*
- *For Babies up to 2 years, Compression with fingers is good enough, applied 100 times per minute.*
- *Press firmly but carefully. Carelessness may cause injury to ribs and deeper tissues.*
- *If the treatment is effective:*
  a) Colour will change to normal;
  b) Pupil will start becoming normal as improvement begins;
  c) Carotid pulse beats with each compression will be felt.
- *When pulse is not restored, continue compression till the patient reaches the hospital. If there are two First Aiders, the first one should make 15 heart compressions and then the se cond one should give one lung inflation. These are then repeated. At the same time one can watch the pupils and the second can feel the carotid pulse.*

- **CARDIO PULMONARY RESUSTICATION (CPR):**
  - Essential when both breathing and heart beat are affected.
    Step 1: Thumping the Heart Region.
    Step 2: External Cardiac Compression (ECC).
    Step 3: Mouth-to-Mouth Respiration.
  - If two First Aiders are available one does ECC 30 times followed by the other mouth to mouth respiration twice, repeat. If there is only a single First Aider, ECC 30 times followed by mouth to mouth respiration twice given by the same person.





2. CIRCULA TORY SYSTEM –

- The Circulatory System comprises and involves Blood, Heart and Blood Vessels.

- **HEART:** The Heart pumps blood through Vessels. It is the size of a human's clenched fist shaped like a Pear and located in the left center of the Chest. Heart is divided by a wall to create the right and left compartments which are further divided into Chambers viz., Atrium above and Ventricle below.
  - **During each contraction:**
    - The Heart pumps blood high in Carbon Dioxide from the Right Ventricle to the Lungs.
    - Oxygen-rich blood is returned to the Left Atrium from the Lungs.
    - Left Ventricle pushes oxygen-rich blood to the rest of the body.
    - Right Atrium receives oxygen-poor blood.
  - **At each relaxation:**
    - Blood flows into the Left Atrium from the Lungs.
    - Blood flows into the Right Atrium from the rest of the body.

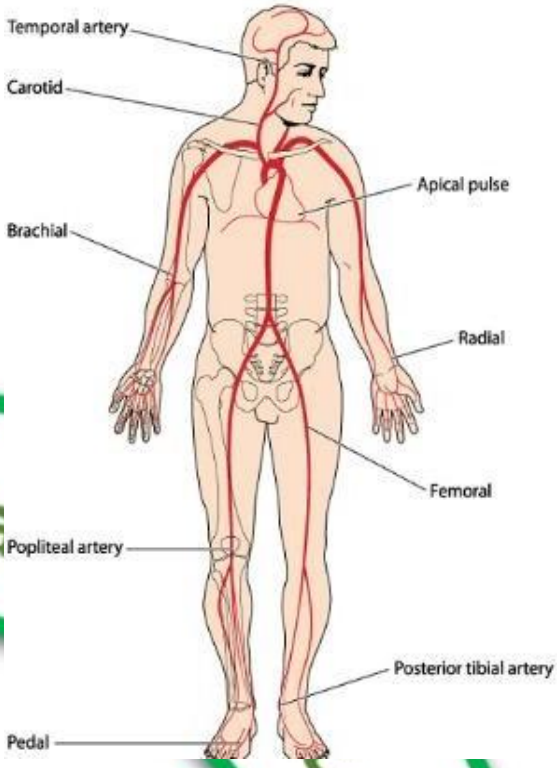
- **BLOOD VESSELS:** They comprise of Arteries, Capillaries and Veins.
  - **Arteries –**
    - Arteries are elastic, muscular tubes that carry blood away from the Heart.
    - Arteries begin at the Heart as two large tubes viz.,
    - Pulmonary Artery – Carries blood to the Lungs.
    - Aorta – Carries blood to other parts of the body and divides into Capillaries.
  - **Capillaries –**
    - Capillaries is a network of extremely fine vessels.
    - Oxygen and nourishment pass out of the bloodstream into the body's cells.
    - Cells discharge waste into the bloodstream.
    - In the lungs, Carbon Dioxide is released and Oxygen is absorbed.
  - **Veins –**
    - Become larger and larger.
    - Form major trunks that empty blood returning from the body into the Right Atrium.
    - Blood returning from the Lungs goes into the Left Atrium.

- **PULSE RATE:**

AGE	TARGET HEART RATE ZONE 50–85%	AVERAGE MAXIMUM HEART RATE, 100%
20 years old	100–170 bpm	200 bpm
30 years old	95–162 bpm	190 bpm
35 years old	93–157 bpm	185 bpm
40 years old	90–153 bpm	180 bpm
45 years old	88–149 bpm	175 bpm
50 years old	85–145 bpm	170 bpm
55 years old	83–140 bpm	165 bpm
60 years old	80–136 bpm	160 bpm
65 years old	78–132 bpm	155 bpm
70 years old	75–128 bpm	150 bpm

➢ **PULSE:**

- Surge of blood that occurs each time the heart contracts is known as Pulse.
- It can be felt at any point where an Artery lies near the skin surface.
- Blood from a cut Artery spurts.
- Blood from a cut Vein flows.
- Location for feeling Pulse –
  - Carotid Artery
  - Femoral Artery
  - Radial Artery
  - Brachial Artery
  - Posterior Tibial Artery
  - Dorsalis Pedis Artery



➢ **BLOOD PRESSURE:**

- Blood Pressure is a measure of the pressure exerted by the blood on the walls of the flexible Arteries.

➢ **BLOOD:** There are two portions of Blood viz., Solid & Liquid Portions.

- **Solid Portion –**
  - Contains Red Blood Cells which carry Oxygen.
  - Contains White Blood Cells which defend against infection.
  - Contains Platelets which are essential for blood clot formation.
- **Liquid Portion –**
  - Contains Plasma which is 90% water. It carries food & waste materials.

3. NERVOUS SYSTEM –

➢ The **Nervous System** is a complex collection of nerve cells that coordinate all parts of the Human Body.

➢ It contains of Neurons which –

- Receive Stimuli
- Transmit Impulses
- Produce Nerve Impulses
- Cannot be regenerated.

➢ The **Central Nervous System** includes the Brain and Spinal Cord.

➢ The **Peripheral Nervous System** is a network of nerve cells divided into voluntary and autonomic (involuntary) systems.

➢ **CENTRAL NERVOUS SYSTEM →**

- **The Brain –**
  - The Brain is the headquarters of the Nervous System containing of three subdivision:
    1. Cerebrum
    2. Cerebellum
    3. Brainstem
  - **Cerebrospinal Fluid** is similar to Blood Plasma which circulates through the brain and spinal cord, serves as a protective cushion exchanging food & waste materials.

- **The Spinal Cord –**
  - The Spinal Cord is a soft column of nerve tissue.
  - It is continuous with the lower part of the brain enclosed in the bony Vertebral Column.
  - There are 31 pairs of Spinal Nerves attached with Spinal Cord.
  - The Spinal Cord is highly and easily vulnerable to injury.

➢ **PERIPHERAL NERVOUS SYSTEM →**
- Made up of nerves that exit the Spinal Cord and are of two types viz., Sensory Nerves and Motor Nerves.
- If a nerve is seriously damaged, that body part becomes non-functioning.
- The PNS is well protected against injuries.

➢ **AUTONOMIC NERVOUS SYSTEM →**
- Autonomic Nervous System controls Heart Rate, Digestion, Sweating, other automatic body processes.

B. THE MUSCULAR SYSTEM

1.0 The Muscular System comprises of Voluntary Muscles, Smooth Muscles, Cardiac Muscles .

Voluntary Muscles	✓ Under control of the person. ✓ Called Skeletal Muscles. ✓ Can be injured in many ways.
Smooth Muscles	✓ Very little control by the person ✓ Line the walls of tube-like structures.
Cardiac Muscles	✓ Found only in the Heart. ✓ Needs continuous Oxygen and Glucose.

FRACTURES

A **FRACTURE** is a break or crack in a bone. Generally, considerable force is needed to break a bone, unless it is diseased or old. However, bones that are still growing are supple and may split, bend, or crack hence the term greenstick fracture. A fracture may be partial or complete bend, crack or breakage of a bone.

1.0 CAUSES OF FRACTURE →

a) **Direct Force:** The **bone breaks at the spot of application** of the force e.g. bullet passing into bones, severe fall on a projecting stone or a wheel passing over the body etc.

b) **Indirect Force:** The **bone breaks away from the spot of application** of force e.g. collar-bone fracture when the fall is on outstretched hands etc.

c) **Muscular Force:** Occurs when there is a violent contraction of a group of rarely muscles; happens very e.g. fracture of ribs on violent cough.

2.0 TYPES OF FRACTURE →

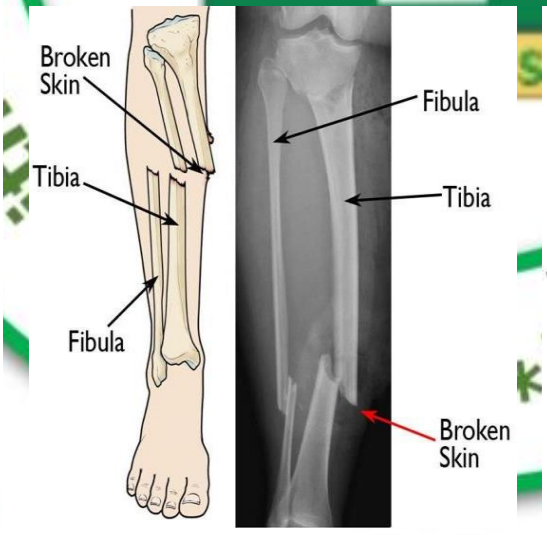
a) **Simple Fracture / Closed Fracture:** The broken ends of the bone do not cut open the skin and show on the outside.

b) **Compound Fracture / Open Fracture:** When the fractured bone is in contact with outside air as a result of an injury (so that dirt, dust and germs get into the protruding bone and the wound).

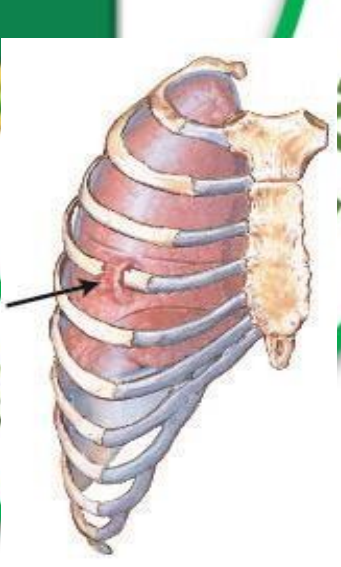
c) **Complicated Fracture:** In addition to the fracture, an important internal organ like the brain or major injured blood vessels, the spinal cord, lung, liver, spleen etc. may also he. Furthermore a complicated fracture may be simple or compound.

d) **Greenstick Fracture:** When the fractured bone is in contact with outside air as a result of an injury (so that dirt, dust and germs get into the protruding bone and the wound).

SIMPLE FRACTURE



COMPOUND FRACTURE



COMPLICATED FRACTURE

GREENSTICK FRACTURE

3.0 SIGN & SYMPTOMS →

1. Pain at the spot of fracture and/or around it.
2. Tenderness i.e. pain on gentle pressure over the injured spot (Do not press hard).
3. Swelling of the area and discoloration.
4. Loss of normal movements of the part.
5. **Deformity of limb:** The limb may lose its normal shape. Sometimes the muscles will pull up the lower free ends causing apparent shortening of the limb.

6. **Irregularity of the bone:** If as in the leg bone, the break is under the skin, the irregular outline of the bone can be felt easily.
7. **Crepitus (Grating):** When one end of the broken bone moves against the other, a crackling sound is heard. This is known as crepitus.
8. Unnatural movement at the spot fracture can be felt.

L-Loss of Power
I-Irregularity
P-Pain
D-Deformity
U-Unnatural Movement
S-Swelling or Bruising
T-Tenderness

Note: The last two sign should never be tried by the First Aider.

To confirm diagnosis compare with the sound limb; look for tear of clothing or of skin at the fracture area; and the patient himself may sometimes state that he heard the snap of the bone.

4.0 AIMS OF FIRST AID →

1. To prevent further damage.
2. To reduce pain.
3. To make the patient comfortable and manage shock.
4. To get medical aid as soon possible.

5.0 MANAGEMENT →

1. Fractures often occur in major accidents. Therefore it is common to find other injuries also. Heavy bleeding and severely wounded parts are more urgent and should be treated first.
2. There may be more than one fracture in the same patient or even in the same limb.
3. Support the fracture on the spot, so that the fractured ends are established and patient is ready for transport.
4. Handle very gently; avoid all unnecessary movements of the injured parts.
5. Send for medical aid or send the patient to hospital as quickly as possible.
6. Treat for shock.
7. If the broken ends of the bones are shown out, do not wash the wound or apply antiseptics to the ends of the bone.
8. Do not handle the fracture unnecessarily.
9. Never attempt to bring the bones to normal position.
10. Do not give anything by mouth as this might delay treatment under anaesthesia.

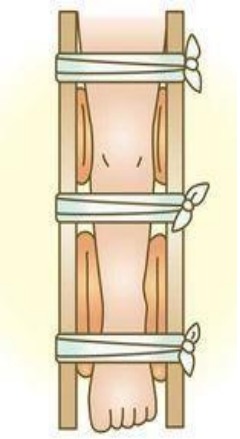
6.0 TREATMENT FOR FRACTURES →

1. **Provide support** to the injured area
2. **Expose the site** of the injury
3. **Treat** any wounds
4. **Immobilize** effectively
5. **Reassure** and monitor

STABILIZATION OF FRACTURED BONE END →

- ❖ Steady and support the injured part immediately, so that no movement is possible.
- ❖ This stops further injury and helps to stop the bleeding moreover the danger of the broken ends of bone damaging arteries, nerves and muscle, is prevented.
- ❖ Immobilize the fracture area and the joints on both side of fracture (above and below fracture site)
  - By using **bandages**, and/or
  - By using **splints** where available and where a
- ❖ First Aider is **confident** of their use.
- ❖ **By using Bandages:-**
  - Usually it is enough to use the other (uninjured) limb or the body of the patient as the splint. The upper limb can be supported by the body, the lower limb by the other limb (provided that also is not fractured) most fractures (except Forearm) can be immobilized thus.
  - Do not apply bandage on the site of fracture.

- The bandaging should be fairly firm so that there is no movement of the fractured ends; but not too tight in which case the circulation of blood to the area will be stopped. If there is further swelling of the injured a bandage is too tight therefore loosen the bandages slightly.



- Always place padding material between the ankles and knees and other hollows, if they have to be tied together, so that when together they are comfortable and steady.

- As the patient will be lying down the bandage should be passed through the natural hollows like the neck, the lower part of trunk, knees and just above the ankles to avoid jolts.

- Always tie knots on the sound side.

❖ **By using Splints:- (when available and necessary expertise is there)**

- A splint is a rigid piece of wood or plastic material or metal applied to a fractured limb, to support it and to prevent movement of the broken bone.
- Reasonably wide splints are better than narrow ones.
- They should be long enough so that the joints above and below the fractured bones can be made immobile.
- The Splints should be well padded with cotton or cloth so as to fit softly and snugly on the injured limb.
- Splints are best applied over the clothing.
- In an emergency splints can be improvised with a walking stick, an umbrella, a piece of wood, a book or even firmly folded newspaper.
- Use of splints becomes obligatory only when either legs or both thigh bones are broken.

FRACTURES OF BODY PARTS AND THEIR MANAGEMENT →

SKULL:- Fracture of the skull may injure the brain, nervous system or the arteries an may cause concussion and compression. These are usually depressed fracture. There are two varieties of skull fractures:

1. Fracture of the dome or sides – This is caused by direct blow or fall upon the head. There will be swelling with a longish or circular irregularity of the bone. The First-Aider, however should not attempt to look for these fractures.
2. Fracture of the base – This is caused by indirect injury, for example, fall on the feet, and fall on the lower part of the spine, severe blow on the side of the head. Blood or brain fluid may flow from the ear, or nose, which may be swallowed and later vomited. If the injury affects the bony socket of the eye, the eyes become blood-shot. It is often missed.

➢ **Management:**

1. If breathing is normal:
   a) Lay the casualty on his back with head and shoulder slightly raised by cushions.
   b) Turn the head to one side (if there is bleeding from the ear, the head should be turned so that the bleeding side is down).
2. If breathing is noisy with bubbling of air through secretions in the chest.
   a) Lay the casualty in the three-quarter-prone position. Support him in this position by pads in front of the chest and draw up the casualty's upper knee.
   b) Keep the air passages clear.

c) In cases with bleeding from the ear, arrange the position of casualty so as to keep bleeding side down. Do not plug the bleeding ear.

3. Treat for shock.
4. Keep a careful watch on the casualty.
5. Do not give anything to drink.
6. Do not rouse him.
7. Transport the casualty to hospital.
8. Maintain the same position in transport: avoid disturbing the casualty.

LOWER JAW:- This is mostly the result of direct force. Usually one side is affected. But rarely both sides can be fractured. In most cases this fracture is a compound one. There is usually a wound inside the mouth also.

➢ **Signs & Symptoms:-**

1. The casualty has difficulty in speaking/opening mouth.
2. Saliva becomes blood-stained.
3. There is pain which is increased by speaking and swallowing.
4. The face and lower jaw becomes swollen.
5. The teeth look irregular: Some teeth may have fallen out.
6. There may be crepitus, it can be felt both by the patient and First-Aider, when they try to steady the jaw.
7. If there is an injury to the tongue, it may fall back and block the air passage and there will be profuse bleeding.

➢ **Management:-**

1. Ask the casualty not to speak, and do not give anything by mouth.
2. Remove false teeth, if any. Make sure the tongue does not fall back. Ensure and open airway.
3. With the patient leaning forward place the palm or your hand on chin and gently press the lower jaw upwards against the upper jaw (which acts as splint).
4. Place a narrow bandage under the chin. Carry one end up and over the top the head, cross with the other end over the ear. Carry the shorter end across the front of forehead and the longer and in the opposite direction around the back of the head. Tie just above the opposite ear.
5. If the casualty show signs of vomiting, remove the bandage and tie it up again after vomiting stops.
6. Remove him to hospital as early as possible.

➢ **Transport:-**

1. If the patient can sit, make him bend his head forwards and downwards so that the tongue may not slip back and choke him.
2. When the fracture is compound or extensive, turn casualty face down on a blanket, load him on the stretcher with the blanket with head projecting beyond the canvas and forehead supported by hammock-like bandages tied to the handles of the stretcher and a blanket under the chest so that the head hangs forward.

SPINE:- Vertebrae which together form the spine are small bones which bear the weight of the head and the trunk. They are commonly fractured:

1. Indirectly by:-

- Lifting a heavy weight
- Landing on the feet or buttocks in a heavy fall
- Being thrown forward suddenly (e.g. a car driver during a collision) or
- Neck fractures in whip-lash injuries.

2. Directly by:-

- The fall of a heavy weight on the back or
- Falling from a height on the back across a bar
- Injuries in occurrence of landslides, earthquakes etc., when a heavy mass falls on the spine.

➢ The fracture will be more serious if the spinal cord is injured. As a result there may be loss of power of the muscles (paralysis) and loss of sensation of the skin below the level of the injury. Injury to the spine is always a serious emergency.

- Fracture of the spine should be suspected in all cases of back injury. There will be pain and shock in all cases.

- Just because there is no paralysis, do not neglect the case. Treat it as fracture until the case is in medical hands.

- **Management:-**

1. Try to get a doctor immediately.
2. Make the casualty lie still. Never allow him/her to get up.
3. If unconscious see that the tongue does not fall back and choke the casualty.
4. If medical aid is not immediately available.
   a) Do not move the casualty; cover with a light bed sheet or a thin blanket.
   b) Keep under observation till the doctor arrives.
5. If medical help is not available, prepare the casualty for shifting on a stretcher.
   a) Place pads between thigh, knees and ankles.
   b) Tie a figure of eight bandage over ankle and feet with the knot on sole of foot.
   c) Apply broad bandages on knees and thighs.
   d) Be ready to shift to a nearby shelter.

:: Note ::

Carry patient face upwards, for in this position the spinal cord is not likely to be damaged further.

- **Transport:-**

1. The canvas stretcher must be made hard, surfaced by short boards placed across the stretcher or a long board placed lengthwise. A sufficiently long board can be used by itself if stretcher is not available.
2. Cover the stretcher with a blanket, place small pillow for neck and small for the back so that the hollow of neck and the back rest in the normal position.
3. Do not disturb the position of the casualty when loading on the stretcher. One person must hold the head and support firmly but gently: the aim is not to disturb the neck. A second helper should hold the legs just above ankles; the aim is not to disturb the trunk.
4. If casualty is not on a blanket:
   a) Place the blanket or rug on the ground in line with the patient and roll half its width.
   b) Instruct two bearers to keep the head and ankles firm and steady. Two other First Aiders then very gently turn the casualty on to his side. Taking care not to disturb the fractured part.
   c) Now move the rolled part of blanket to be in contact with the casualty and gently roll him over so that the other side of his body is in contact with ground.
   d) Now it is easy to unroll the rolled pat of the blanket and place the casualty on his back on the centre of the blanket.

Note: During all these changes in position the bearers at neck and ankles work in unison with the other two so as not to disturb the spine.

- **Loading the Stretcher :-** The two methods used for loading on the stretcher are:

a) Blanket Lift: This method is used when a blanket has been placed under the patient.

- If poles of good length and rigidity are available roll the blanket over the until the poles are pressed to the sides of the casualty.
- With two bearers supporting the neck and ankle, the others stand on each side and lift the casualty. Now the stretcher is placed exactly under the casualty, who is gently lowered on the stretcher.
- Now make sure that neck and back pads in correct position and supported to avoid undesired movement.
- If poles are not available, the blanket is rolled tightly up to the sides of the casualty. If necessary, board bandages are placed around the body, one at the level of thigh and another at the level of the shoulders. Lift the casualty adopting the same method described above.

b) Emergency Lift: When no blanket or poles are available the following method is used.

- Open the casualty's coat or bush-coat and roll the free ends firmly close up to the side of the casualty's body or improvise stretcher.
- Loading to the stretcher is identical to the method described under blanket lift.
- In the case of neck injuries place sand bags on either side of the neck to steady it.
- Place folded blankets under the neck, of the back, and under the knees.
- Wrap the casualty in a thin bed-sheet or a thin blanket.

- If a long journey over uneven ground is needed bind the body to the stretcher firmly, around the hips, thigh, below the knees and over the body above the elbow level.
- On reaching the shelter, do nothing; except wait for medical help.

RIBS:- Ribs are broken by:

1. **Direct Force:** from a blow or fall upon the chest or hit against the driving wheel of a car. The broken end may be given inwards causing injury to the lung, which then becomes a complicated fracture.

2. **Indirect Force:** As a crush caused by pressure over the front and back of chest at the same time. The broken ends are pushed outwards, thus there is no fear of injury to lungs.

➢ **Signs and Symptoms:-**

1. There is pain at the injury area increased by coughing and deep breathing.
2. The casualty takes short, shallow breaths so that the ribs do not move and increase the pain.
3. Crepitus may usually be felt if the hands are placed flat over the chest particularly the broken rib. But the First Aider should not try to elicit this sign at all.
4. Signs of internal bleeding such as paleness of face, lips, and palm, sole and a weak pulse should be looked for.
5. If there is an open wound in the chest, air is sucked in and blown out through the wound like the bellows. Cover the wound with a clean sterile cloth. **This is a serious condition**.

➢ **Management:-**

1. If the **fracture is not complicated** –

- Two broad bandages should be applied around the chest. The center of the first should be below the area of pain and the center of the second above it. The upper bandage should overlap the lower by half its width.
- Instruct the casualty to breathe out as much as he can and then tie a knot firmly so as to support the broken rib. The knots should be tied near the front of the chest on the uninjured side.
- Support the arm on the sides of injury in a sling.
- If there is no relief of pain by this treatment remove the bandages and send the case to the nearest hospital.

2. If the **fracture is complicated** –

- Do not apply bandage, except in case where air is sucked in through an open wound, in the chest.
- Lay the patient with raised head and shoulders, and turned towards the injured side. Keep in position with a blanket folded lengthwise and tucked to the back of the casualty.
- Apply sling to the arm of the injured side place him on a stretcher.
- Transport to the nearest hospital.

BREAST BONE:- The breast-bone is usually fractured in crush injuries. The danger is that the heart and the blood vessels under it may be injured as well.

➢ **Signs & Symptoms:-**

1. Pain at the area of fracture.
2. Difficulty in breathing.
3. Irregularity of the bone (felt by running fingers along it).

➢ **Management:-**

1. Loosen tight clothing
2. Place the casualty on his back in the most comfortable position.
3. Cover him with light material.
4. Transport on a stretcher.

COLLAR BONE:- The collar bone is broken when the person falls on the tip of the shoulder or on the palm of the outstretched hand.

➢ **Signs & Symptoms:-**

1. The arm on the injured side is partially helpless. The casualty usually supports it at the elbow with the other hand.
2. His head is inclined towards the injured side.
3. The broken ends can be seen and felt. They overlap the outer end being lower.

➢ **Management:-**

1. Support the arm of the injured side with the help of the casualty himself or an assistant.
2. Do not remove the coat or shirt.
3. Place a pad in the arm-pit.
4. Leaving the forearm free and bandage the upper arm to the side of the chest with a broad bandage.
5. Support the upper limb in the triangular sling.
6. Feel the pulse to make sure that circulation in the limb is free.
7. Shock is not usually severe; the casualty may be transported even as a walking case to the nearest hospital.

AROUND THE ELBOW:-

➢ If elbow can be bent, strap arm to the chest and support forearm in a triangular sling.
➢ If elbow cannot be bent, strap arm and forearm on the side of body in extended position.

FOREARM:-

➢ Single or both the bones may be fractured. Shortening is not possible unless both bones are broken.

LOWER END OF THE RADIUS:-

➢ Care must be taken not to mistake it for a sprain of the wrist.
➢ Do not mobilise or bend the elbow forcefully.
➢ Support the forearm with triangular bandage.
➢ Strap the upper arm with roller bandage before mobilizing the casualty to hospital.
➢ Casualty can be moved in a sitting posture or lying down Position in a stretcher.

HAND AND THE FINGERS:-

➢ These are mostly due to direct injury.
➢ There may be severe bleeding in the palm.
➢ Do not hang down injured hand by the side of the body.
➢ Keep the hand at the chest level in a sling.

PELVIS:- This is mostly due to direct force like fall of beams crush accident etc. Indirect force very rarely results in fracture of the pelvis, (as by a fall from a great height on the feet with lower limbs stiff). The bladder and urinary passages may also be injured producing grave complications.

➢ **Signs & Symptoms:-**

1. Pain in the hip and joints increased by cough and/ or movement.
2. Although the lower limbs are not injured the casualty will be unable to stand.
3. Internal bleeding is possible.
4. There will be difficulty in passing urine. Urine may be mixed with blood.

➢ **Management:-**

1. Allow the casualty to lie in the position most comfortable to him preferably on his back with lower limbs stretched.
2. Ask him to avoid passing urine.
   a) If a hospital is near, transport on stretcher in the most comfortable position. No need to bandage.
   b) If the journey is long and on rough roads:-
      (i) Place centre of the broad bandage on the hip joint of the injured side, pass one end round the Pelvis and tie on the other side. Tie another broad bandage so that it overlaps the first by half its breadth and tie similarly. The bandage should be firm but not too tight, avoid pressing the broken parts more inwards.
      (ii) Put pads between knees and ankles.
      (iii) Apply figure-of-eight bandage around the ankles and the knees with a broad bandage if needed.

LOWER LIMB:-

Fracture of the Thigh Bone (Femur):-

➢ This bone could break at any place along its length.

➢ Fracture of neck of the thigh-bone occurs quite frequently in old people with small cause like tripping. Do not take it for a bruise of the hip, suspect a fracture.

- Fracture of the thigh bone is always serious because:
  (i) Great shock results from it.
  (ii) There will be bleeding into the surrounding tissues.
  (iii) Healing is prolonged especially in old people.
  (iv) It will be more serious when it is a compound fracture.

- **Signs & Symptoms:-**

1. Pain, swelling and shock
2. A shortening of the limb can be noted
3. The foot on the side lies flat and turned to the outer side and may or may not be lifted by the casualty to upright position.

- **Management:-**

1. Treat shock and reassure the patient.
2. Immobilize the thigh by bandaging to the sound limb up to and e below knees with padding below knees. If splint is easily available and expertise is there.
   a) Apply a well padded splint between the legs from the crotch to the foot.
   b) Tie the feet and ankles to the splint with a figure-of-eight bandage if needed.
   c) Apply **seven broad bandages** at the following places:
      - Chest, below the arm pits
      - Pelvis at the level of hip joints.
      - Both ankles and feet (fig of eight)
      - Both thighs above fracture if the shaft is broken
      - Below the fracture, including both thighs
      - Both legs
      - Both knees.
      - Transfer to a hospital at the earliest.

Fracture of the Knee Cap:- The knee-cap can be broken by direct force, but usually the fracture is due to muscular force causing it to snap across into two bits.

- **Signs & Symptoms:-**

1. The limb is helpless as the important extensor, muscle is out of action.
2. There will be lot of swelling and bleeding.
3. The gap between the two bits can often be felt.

- **Management:-**

1. Lay the casualty flat with head and shoulders raised. The injured limb should be raised to an easy position. This will relax the thigh muscles.
2. Apply a padded splint under the limb from the buttocks to beyond the heel. The ankles should be raised from the splint by pads.
   - Apply a broad bandage around the upper part of the thigh.
   - Apply a narrow figure-of-eight bandage around the Knee.
   - Place a narrow bandage with its center on the upper fracture piece, cross it behind the knee and bring it up over the lower fractured bit behind the knee and tie off.
3. During transport also the limb should be kept raised on a box, blanket or similar material.

Fracture of Leg:-

- This is due to direct: force on the leg.

- One or both of the bones may be broken. When both the bones are broken, or when tibia is fractured all signs of fracture such as pain swelling deformity and shock are seen. But when Fibula only is broken no deformity is visible because it is splinted by the Tibia.

- Fracture of bones of ankle should be suspected when swelling around the ankle is present.

➢ **Management:-**

1. The limb should be tied to sound limb with suitable padding from thigh to ankle. Pads should be between knees and ankles.
2. Make long well padded splint and place it between the lower limbs extending from the groin to feet.
3. Without causing disturbance or pain bring the two limbs close to the splint.
4. Placing additional pad between the ankles and knees tie the feet and ankles with a figure-of-eight bandage.
5. Place a broad bandage at upper part of the thighs.
6. Apply a broad bandage on the knees.
7. Finally apply two bandages of required size, one above and one below the fracture.

Fracture of Bones of the Foot and Toes:- This is caused by direct injury like a crush injury or wheel passing over the foot. Suspect fracture when there is pain, swelling and loss of power.

➢ **Management:-**

1. When there is a wound, remove footwear, cut or remove the socks.
2. Treat the wound. Use the other foot as splint. Tie the feet and legs together below knee with padding between ankles, feet and knee.
3. Apply a padded splint reaching the heel to the toe over the sole of the foot.
4. Bandage:
5. Place the center of a broad bandage over the foot. Cross the ends over the instep and carry them to the back of the ankles.
6. Cross once more to bring them to the front of the ankles (double figure-of-eight bandage)
7. Cross once more to bring the ends on the back of the ankles and tie it off.
8. Raise the foot to make the casualty feel comfortable.
9. If no wound is present or suspected and if the casualty wears shoes, do not remove them, secure as describe above with a broad bandage and keep foot raised to a comfortable position.
10. But in India most person wear chappals, quite a few do not have footwear at all. In such cases treat as in the case of wounded crushed foot.
11. Transport on a stretcher with the foot raised.

UNIT 5

SHOCK & SPRAINS

A. SHOCK

SHOCK is a life-threatening condition that occurs when the Circulatory System (which distributes oxygen to the body tissues and removes waste products) fails and, as a result, vital organs such as the heart and brain are deprived of oxygen. It requires emergency treatment to prevent permanent organ damage and death. Shock can be made worse by fear and pain. Whenever there is a risk of shock developing, reassuring the casualty raising the lower limbs by about 2 feet and making him comfortable may be sufficient to prevent him from deteriorating.

RECOGNITION OF SHOCK →

Initially:

- A rapid pulse,
- Pale, Cold, Clammy Skin, Sweating

As Shock Develops:

- Grey-blue skin (cyanosis), especially inside the lips.
- Weakness and dizziness.
- Nausea and possibly vomiting, Thirst.
- Rapid, shallow breathing.
- A weak, "thready" pulse. When the pulse at the wrist disappears, about half of the blood volume will have been lost.

As the brain's oxygen supply weakens:

- Restlessness and aggressiveness
- Yawning and gasping for air.
- Unconsciousness.

Finally, the heart STOPS

CAUSES OF SHOCK → The most common cause of shock is severe blood loss. If this exceeds 1.2L (2 pints) *(which is about one-fifth of the normal blood volume)*, Shock will develop. The main causes are:

1. Wounds
2. Internal bleeding
3. Damaged blood vessels due to closed fracture
4. Loss of other body fluids like diarrhoea
5. Severe Burns
6. Non-pumping of blood by Heart due to heart disease/attack or acute heart failure.
7. Overwhelming infection
8. Lack of harmones
9. Low Blood Sugar (Hypoglycemia)
10. Hypothermia
11. Anaphylactic Shock (Allergic Reaction)
12. Drug Overdose
13. Spinal Cord Injury

TYPES OF SHOCK → There are two types of Shock:

Nervous Shock: It may be due to strong emotional upset like fear, pain; and not be due to an injury. Nervous Shock does not need treatment, requires only reassurance and sympathetic handling.

True Shock: It may be due to severe bleeding, severe burns, heart attack, abdominal injuries, crush injuries, loss of body fluids, bacterial infections.

4.0 MANAGEMENT OF SHOCK →

1. Reassure the Casualty (when conscious).
2. Put him comfortably on his back. However, in cases of injury of the head, chest or of the abdomen, lower the head slightly and turn it to a side. In cases of vomiting place in the three-quarter prone position (Recovery Position).
3. Loosen the tight clothing do not remove the clothing.
4. Wrap in light bed sheet or thin rug.
5. Never use hot water bottles or very warm rugs. Do not rub any part of the body with anything.
6. In case of injuries to chest or abdomen, nothing should be given by mouth as he may later need an operation or blood transfusion.
7. Observe all the above quickly as even a minute's delay may mean death. If there is no chest or abdominal injury and the patient is conscious, give sips of water, hot tea, coffee or coconut milk (Never give any alcoholic drinks).
8. Transfer to hospital on priority basis.

ELECTRICAL INJURIES / SHOCK →

Causes →

1. If any part of the body comes in contact with a "live" wire which is exposed and not covered by an insulator or with a cable or rail in which current is leaking, a person gets an **Electric Shock**.
2. Electrical shock is produced only when an electric current passes through the human body which is in contact with earth. It passes even more quickly if the part is wet. In wet conditions even lower voltage is dangerous.
3. A very strong current passing to earth through lower limbs may be less dangerous than a weaker current passing through the chest, especially so when it enters through the hands and arms.

Effects →

1. The electric current may affect the beating of heart leading to stoppage of heart.
2. There may be sudden stoppage of breathing due to paralysis of muscles used in breathing.
3. Heart may continue to beat, while breathing has stopped. In this condition the face appears blue.
4. There may be burns either superficial or deep. That depends on the strength of the electric current causing the injuries.

Management →

1. **Intelligent and prompt action** is required if the First Aider is not cautious he may also receive severe electric shock or even die along with the casualty.
2. If the casualty is still in contact with the source, **switch off the current**. If the switch is not found, remove the plug or **cut off the current** by breaking circuit (MCB). Before cutting off the current, ensure that you stand on a dry piece of wooden board. **Do not use scissors or knife.**
3. **When the current is of low voltage** the First Aider should stand on an insulated material which is dry. Insulating materials are rubber/soled shoes, wooden planks or piles of newspaper. Rubber gloves, if available should be worn. If not, dry coat, cap or other clothing may be used.
4. **When the current is of a very high voltage**, as in the cases of over-head (high tension) lines, there is greater danger. The casualty may not be in actual contact with the wire as the current can pass through the gap (causing an arc). The First Aider in such circumstances should keep as far away as possible from the electric wires. The casualty is to be dragged out by means of a non/conducting material such as walking stick, dry bamboo, wooden plank or dry rope is to be used.
5. If the casualty is not breathing normally, or heart has artificial stopped beating, give respiration and External Cardiac Compression for long time.
   - Treat for shock.
   - Treat for burns, if any.
   - Transfer to a hospital, or seek the help of a nearest medical practitioner.

B. STRAINS, DISLOCATIONS & SPRAINS

Before we get into the subject of Dislocations and Sprains, let us know the organs that cause dislocations and sprains:

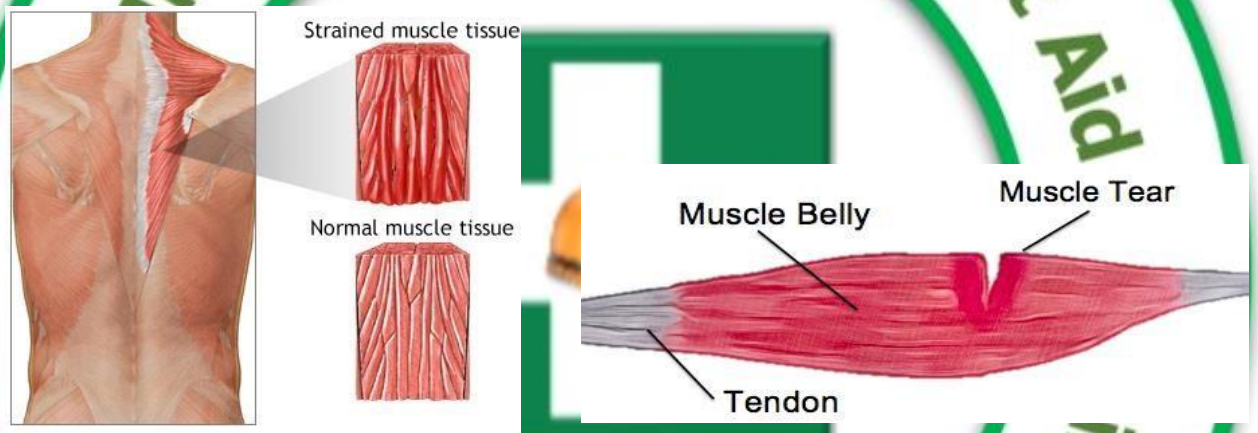
MUSCLES → Muscles are the fleshy part of the body. They give the body its shape. All movements of the body are done with the help of muscles. There are two types of muscles – Voluntary and Involuntary.

Voluntary Muscles are found in the head, the neck the limbs and the walls of trunk. They are attached to the bones either directly or by **white fibrous bands called Tendons**. Voluntary muscles are under the **control of the will**. Movements of the body take place by the contraction and relaxation of these muscles.

Involuntary Muscles are found on the walls of the stomach and intestines, in the air passages, the blood vessels and the heart. They are **not controlled by the will**. They work constantly under the influence of the Autonomous Nervous System.

A **Muscle Strain** is caused by overstretching of muscles. It generally happens as a **result of twist or a sudden effort**, such as lifting a heavy weight. A few muscle fibers or tendon **might be torn**.

A **Rupture** (or tear) is a more serious injury in which a muscle bundles or tendon is **torn across**. The sudden pulling of the calf muscle is a common example of a rupture.



MUSCLE STRAIN **RUPTURE**

Signs & Symptoms:-

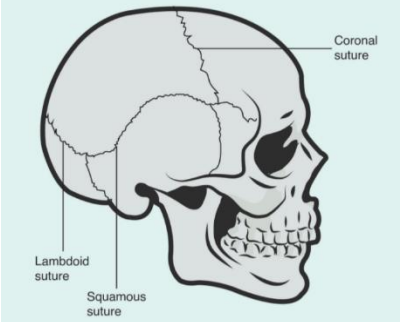
1. There is a sudden sharp pain in the muscle.
2. The muscles may swell and feel stiff.
3. In a rupture, there is severe pain and the casualty cannot move the injured part.

Management:-

1. Place the casualty in the position most comfortable to him.
2. Support the injured part. Use a sling in case of an upper limb fracture and, crutch or stick for lower limb.
3. Apply a cold compress (a handkerchief, towel or a piece of cloth soaked in cold water).
4. Take the casualty to a hospital.

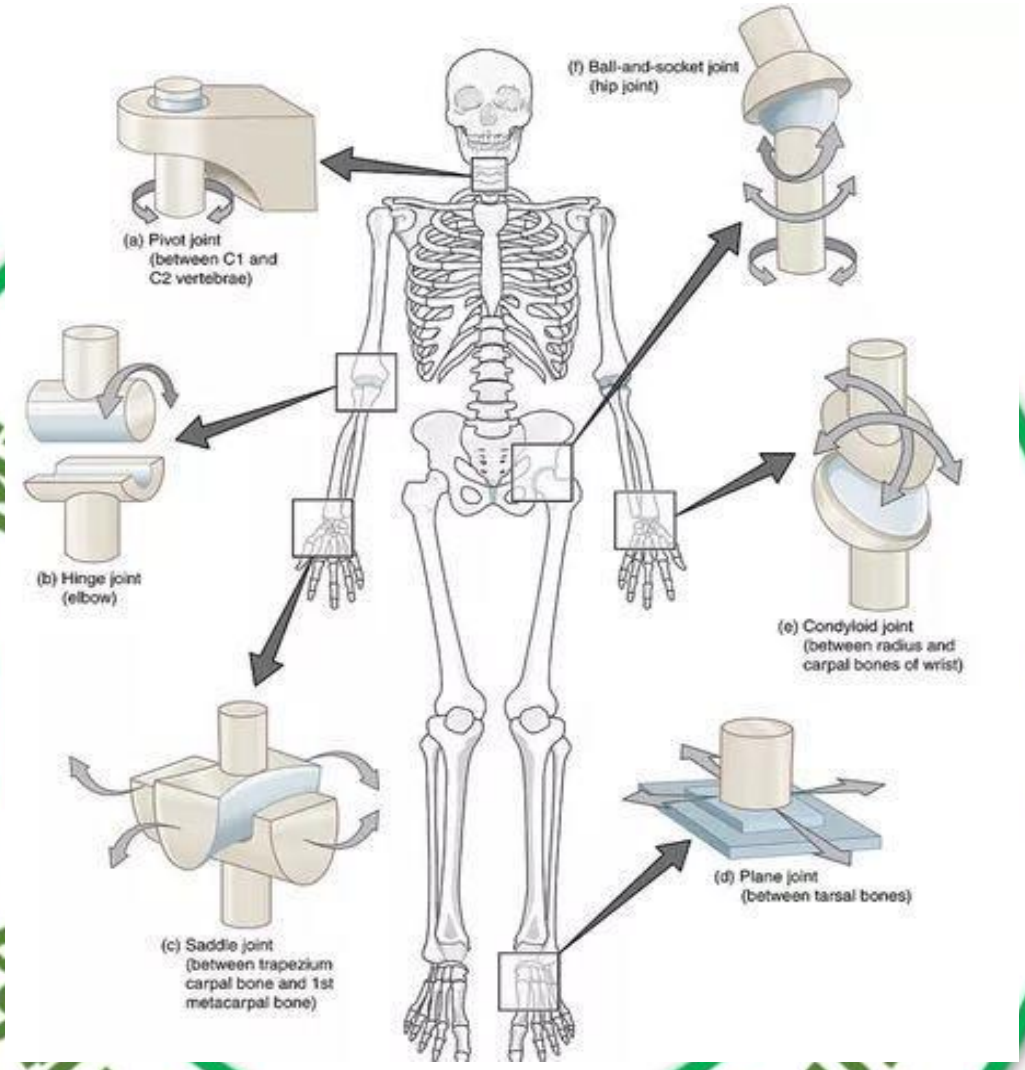
2.0 **JOINTS →** The **junction of two or more bones** is called a **Joint**. There are two types of joints: Immovable Joints and Movable Joints.

2.1 In **Immovable Joints,** the bones are permanently fixed and no movement is possible. E.g.: Several bones of the skull.

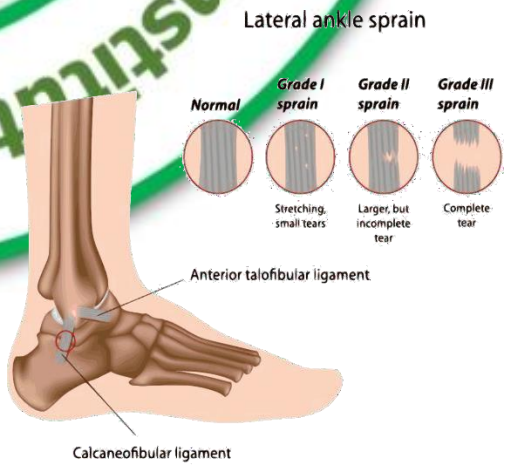


2.2 In **Movable Joints,** two or more bones are held together by means of muscles, tendons and ligaments, and movement between the bones is possible. Three kinds of movable joints are found in the body:

1. **Ball and Socket Joint:** as found in the shoulder in the shoulder joint and in the hip joint. In this case, the round head of the bone enters the socket of another bone thus allowing free movement in several directions and planes.
2. **Hinge Joint:** as found in elbow and knee joints allow movements of the bones on one plane only (bending and extending) like hinge of a door.
3. **Gliding Joint:** as in the wrist, the feet and also between the ribs and the vertebras of the spinal column. These joints allow light movements only.



SPRAINS → A **Sprain** is the **tearing** of the ligaments of joint and the tissues around the joint. It is caused by a sudden wrench or twist at the joint. A sprain of the ankle is quite common.



Signs & Symptoms:-

1. There is pain at the joint.
2. There is swelling and may be bruising also.
3. Movement of the joint is painful.

Management:-

1. Place the limb in the position most comfortable to the casualty, preferably elevated.
2. Do not allow him to move the joint.
3. Apply a firm bandage on the joint. This will lessen pain and give support to the Joint.
4. Take the casualty to the Doctor.

It is sometimes difficult to say whether the casualty has a Sprain, Dislocation or a Fracture. ***When in doubt, treat as a Fracture.***

DISLOCATION → A **Dislocation** is the displacement of one or more bones at a Joint. This happens to the Shoulder Joint by heavy fall on the hand, to the Elbow to the Jaw due to yawning or blows on the Chin, and to the Thumb and Fingers.

Signs & Symptoms:-

1. There is severe pain and swelling at or near the Joint.
2. The casualty cannot move the joint.
3. The joint looks deformed and the limb assumes an unnatural position.
4. Later there is swelling.

Aim of First Aider for Dislocation:-

1. To immobilize the joint.
2. To reduce pain.
3. To get medical aid.

Management:-

1. In the case of the Shoulder:

- Support the limb in the most comfortable position.
- Place a pad of folded newspaper or cloth between the arm and the Body. Bandage the arm to the body.
- If indoors, place the casualty on a bed in the position most comfortable to him, support the limb on pillows or cushion.

2. In the case of the Lower Jaw:

- Remove false teeth, if any
- Support the lower jaw by a bandage tied over the top of the head.
- Nothing must be given by mouth.
- Advise the casualty not to speak.

3. In the case of the Elbow Joint:

- Apply a large arm sling and take the casualty to a hospital.

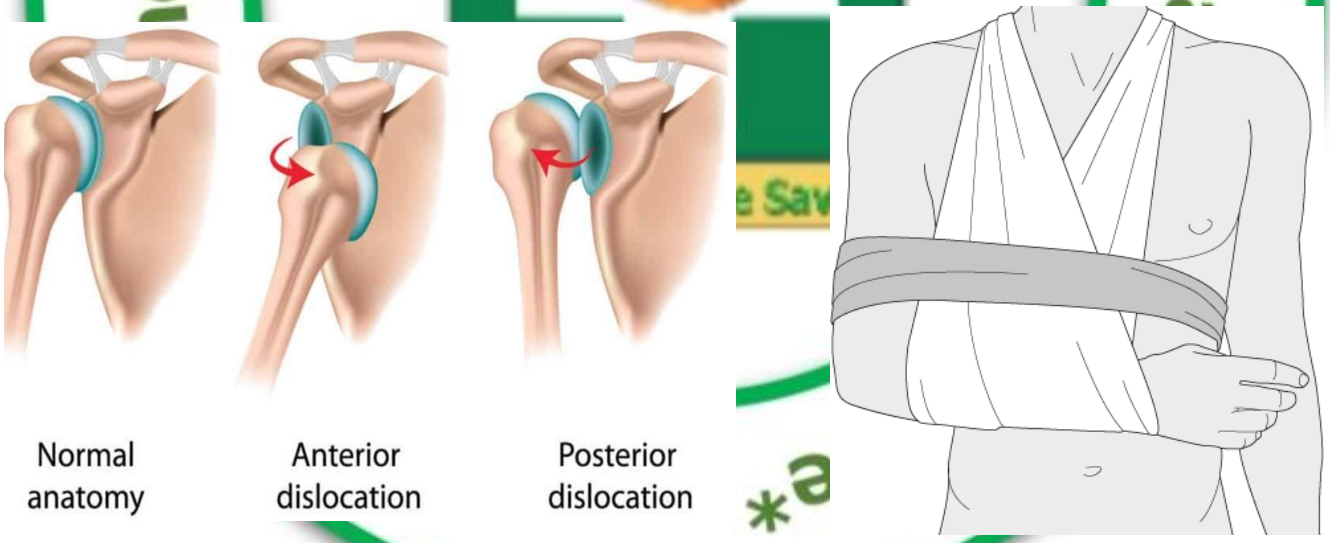


Fig: SHOULDER DISLCOATION

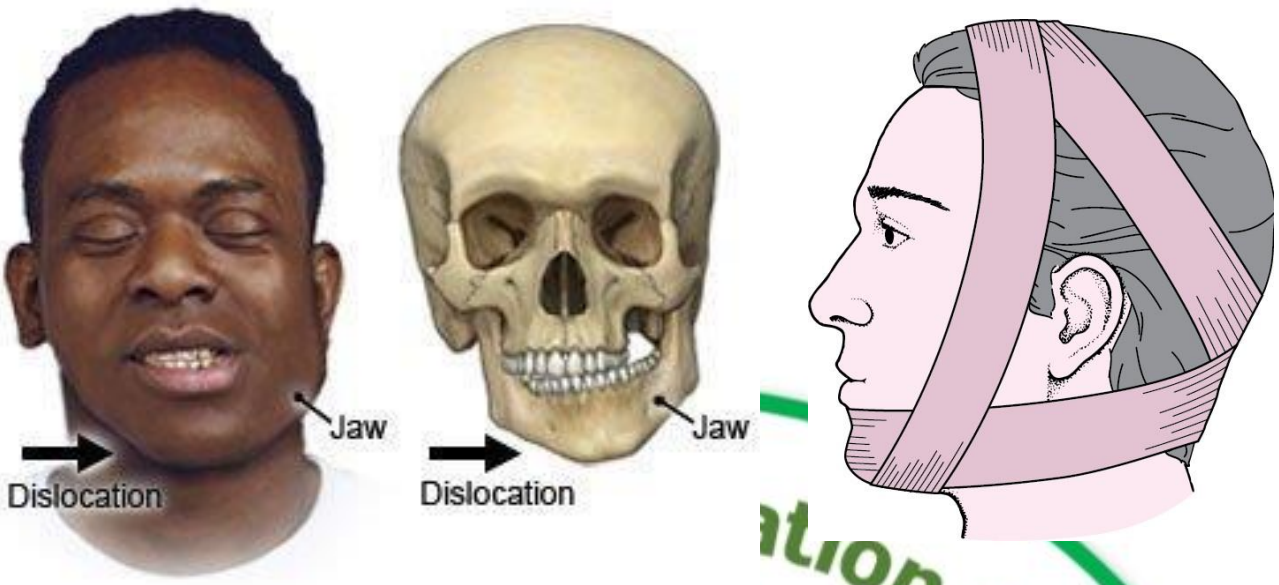


Fig.: LOWER JAW DISLOCATION

Fig.: ELBOW JOINT DISLOCATION

WOUNDS & BLEEDING

A. WOUND

A **WOUND** is a break in the continuity of skin of the body. There will be bleeding from the injured part and it also forms an opening through which germs can get into the body. The depth of a wound is often more important than its area; small deep wounds caused by knives, bullets etc. are often more dangerous.

TYPES OF WOUNDS →

Incised Wounds are caused by sharp instruments like knife, razor etc. The blood vessels are clean cut and so these wounds bleed very much.

Contused Wounds are caused by blows by blunt instruments or by crushing. The tissues are bruised.

Lacerated Wounds are caused by machinery, fall on rough surfaces, places of shells, claw of animals etc. These wounds have torn and irregular edges and bleed less.

Punctured Wounds are caused by stabs by any sharp instrument like a knife or a dagger. They have small openings, but may be very deep.

Fig.: Incised Wound

Fig.: Contused Wound

Fig.: Lacerated Wound

Fig.: Punctured Wound

COMPLICAITONS OF WOUNDS →

Wounds cause two great dangers – **Bleeding** and **Infection.**

1. **Bleeding –**

- When the blood comes out of a blood vessel it is called **Bleeding**. Bleeding is the immediate complication of wound and must be treated promptly.
- A wound is not initially infected even though it may be contaminated by the dirt and infected material which contain germs. These germs are microscopic and not visible to naked eye. Infection only occurs after a lapse of time when the germs have time to multiply and invade the tissues.
- This time was formerly arbitrarily fixed at 6 hours but varies with the number of bacteria and their virulence and body resistance.
- Pus formation is part of body's method to fight the infection.

2. **Infection –** It is caused by germs getting into the body through the broken skin. The germs multiply in wound and make it infected or septic. They may then get into the blood stream and cause blood-poisoning (Septicemia).

AIMS OF FIRST AID →

The aim of First Aid is to stop bleeding and minimize the number of germs that get into the wound.

We should remember that germs come from the object that causes the wound (knife, stone, etc.), the skin of the person, the clothes of the person, hands of the First Aider, dirty dressing, air and contaminated water.

4.0 MANAGEMENT →

1. Stop bleeding. Apply direct pressure to the wound with a sterile dressing or a clean cloth piece. If necessary, press the relevant **arterial pressure-point**.
2. Handle the injured part as gently as possible.
3. Make the patient sit or let him/her lie down. If the wound is on a limb and there are no broken bones, raise the limb. This will reduce the bleeding.
4. Wash your hands thoroughly or clean them with an antiseptic lotion.
5. Remove any foreign objects like glass, stones, etc., if you could see them easily.
6. Do not disturb any blood clot already formed. Place a clean dressing over the wound and bandage firmly.
7. Take the Casualty to the Hospital.

B. BLEEDING

As you are aware, Blood circulates in vessels called arteries, veins, and capillaries. When a blood vessel is damaged, several mechanisms are activated to control blood loss: the vessel constricts, and a series of chemical reactions occur to form a blood clot - a **"plug"** over the damaged area. If blood vessels are torn or severed, uncontrolled blood loss may occur before clotting and shock may develop.

BLEEDING is also termed as **Hemorrhage**.

- If the bleeding is **from the surface** of the body it is called **External Bleeding**.
- If the bleeding is **within** the chest, skull or abdomen etc. it is called **Internal Bleeding**. This cannot be seen immediately but later the blood may ooze out through the nose or ear or coughed up from the lungs, or vomited from the stomach.

TYPES OF BLEEDING → Bleeding (hemorrhage) is classified by the type of blood vessel that is damaged.

By Arteries: Arteries carry bright red, oxygen-rich blood under pressure from the heart. If an artery is damaged, bleeding may be profuse. Blood will spurt out of it time in with the heartbeat. If a main artery is severed, it may jet blood several feet high. In this case, the volume of circulating blood will fall rapidly.

By Veins: Blood from Veins, having given up its oxygen into the tissues, is dark red. It is under less pressure than arterial blood, but vein walls can widen greatly and the blood can "pool" inside them. If a major vein is damaged, blood may gush from it profusely.

By Capillaries: Bleeding from Capillaries occurs with any wound. At first, bleeding may be brisk, but blood loss is usually slight. A blow may rupture capillaries under the skin, causing bleeding into the tissues (bruising).

2.0 CLOTTING OF BLOOD →

When a blood vessel is severed or damaged, it constricts (narrows) in order to prevent excessive amounts of blood from escaping. Injured tissue cells at site of the wound, together with specialized blood cells called platelets, trigger a series of chemical reactions that result in the formation of a substance called **Fibrin**. **Strands (filaments)** of fibrin come together to form a mesh, which traps blood cells to make a blood clot. The clot releases a pale-colored fluid known as **Serum**, which contains antibodies and specialized cells. This serum begins the process of repairing the damaged area.

At first, the blood clot is a jelly-like mass. Later, it dries into a crust (scab) that seals and protects the site of the wound until the healing process is completed.

Platelet Activation	In the first stage of clotting, cells in the blood called platelets come into contact with the damaged vessel wall. They become sticky and start to clump at the site of the injury.
Release of Chemicals	The clumped platelets and the damaged tissue release chemicals that trigger a complex chain of reactions. This process creates substances that enable clotting.
Fibrin Formation	Threads of fibrin forma mesh at the site of the injury. The fibrin mesh traps more blood cells at the site to form a jelly-like clot, usually within about 10 minutes.

3.0 SIGNS & SYMPTOMS →

1. The casualty feels faint and may even collapse.
2. Skin becomes pale cold and clammy.
3. Pulse gets rapid but very weak.
4. Breathing becomes shallow, casualty gasps for breath and sighs deeply.
5. There is profuse sweating.
6. The casualty feels thirsty.

AIMS OF FIRST AID FOR BLEEDING →

When bleeding is severe, it can be dramatic and distressing. Shock is likely to develop, and the casualty may lose consciousness. If bleeding is not controlled, the casualty's heart could stop. Bleeding at the face or neck may impede the air flow to the lungs. When treating severe bleeding, first check if there is an object embedded in the wound; take care not to press on the object.

AIMS:

- To control bleeding.
- To prevent and minimize the effects of shock.
- To minimize infection.
- To arrange urgent removal to Hospital.

MANAGEMENT →

Minor Bleeding: Minor Bleeding is usual at work and play. It results from injured capillaries. There is no need to get frightened. The bleeding will stop by itself or by firm pressure and bandaging, keeping the limb raised.

Major Bleeding: Major Bleeding is the result of an injury to a large blood vessel or when the person suffers from some blood disease.

In case of Severe External Bleeding:

1. Put on disposable gloves if available. Remove or cut clothing as necessary to expose the wound.
2. Apply direct pressure over the wound with your fingers or palm, over a clean piece of cloth or over. A sterile dressing or non-fluffy clean pad.
3. Raise and support the injured Limb above the level of the Casualty's Heart to reduce blood loss. Handle the Limb very gently if you suspect that there is a Fracture.
4. Help the casualty to lie down on a blanket, if available, to protect her from the cold. If you suspect that shock may develop, raise and support her legs so that they are above the level of her Heart.
5. Secure the dressing with a bandage that is tight enough to maintain pressure but not so tight that it impairs the circulation.

6. If further bleeding occurs, apply a second dressing on top of the first. If blood seeps through this dressing, remove both dressings and apply a fresh one, ensuring that pressure is applied accurately to the point of bleeding.
7. Support the injured part in a raised position with a sling or bandaging.
8. Call for an Ambulance and shift the Casualty to the Hospital.

In case of Severe Internal Bleeding:

1. Make the casualty lie down. Raise his/her legs by use of pillows etc.
2. Keep him/her calm and relaxed. Reassure him. Do not allow him/her to move.
3. Keep the body warm with thin blankets, rugs or coats.
4. Do not give anything to eat or drink because he/she may have to be given an anesthetic later.
5. Do not apply hot water bottles or ice-bags to chest or abdomen. This might make things worse.
6. Take him/her to a hospital as quickly as possible.

:: NOTE ::

- *Do not apply a tourniquet. If there is an embedded object in the apply pressure on either side of the wound, and pad around it before bandaging.*
- *Do not allow the Casualty to eat, drink and smoke.*

BLEEDING FROM VARIOUS PARTS →

HEAD INJURY:- As a result of head injury, blood and brain fluid (Cerebrospinal Fluid) may flow out of the Nose, Ear or Mouth.

- **Management:**
  1. Ask the patient not to blow his/her nose.
  2. Do not pack ear or nose, but place a dressing on ear or nose and strap it in position.
  3. Lay the patient on the affected side.
  4. Remove him to a hospital immediately.

SCALP INJURY:- These wounds bleed freely and may be alarming.

- **Management:**
  1. This may be with or without fracture of skull.
  2. Apply a large pad and a bandage which will help stop bleeding.

NOSE:-

- Habitual bleeding during dry/hot weather is common among youngsters and this is not caused by any injury.
- Adults may bleed from the front portion of the nostril due to minor injury like blowing the nose, or picking out crusts.
- High blood pressure may also cause bleeding through the nose. Head injury affecting base of skull gives rise to bleeding from the nose
- **Management:**
  1. Bleeding usually stops in 10 to 15 minutes.
  2. Seat the casualty with the head bent slightly forward.
  3. Ask him/her to breathe through the mouth.
  4. Loosen clothing at neck.
  5. Pinch the soft part of the nostrils together firmly
  6. Apply a cold compress to the nose for 10 minutes.
  7. Ask patient not to blow his/her nose for some time.
  8. Advise the doctor's consultation.
  9. Suspected skull injury, immediately transfer to the hospital.

GUMS:- Injury to face, spongy gums leads to gum bleeding. After teeth extraction, bleeding from teeth socket may occur immediately or after a few hours.

- **Management**:
  1. Rinse mouth with water or saline.
  2. Place a thick cotton wool ball in the socket and ask him to give pressure by biting it.
  3. Send the patient to a dentist or a doctor

PALM:- Injury to face, spongy gums leads to gum bleeding. After teeth extraction, bleeding from teeth socket may occur immediately or after a few hours.

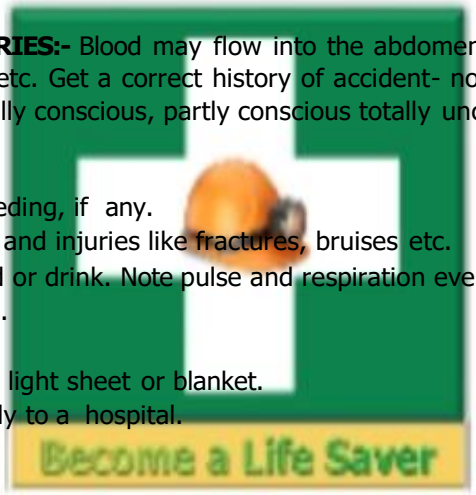
- **Management**:
  1. Grasp the wrist with your hand tightly for 10 to 15 minutes.
  2. Put a suitable pad over the wound, close the fingers over it, and bandage firmly up to the Wrist.
  3. Support limb in a Triangular Sling.
  4. Send him to a Hospital.

VARICOSE VEINS (Swollen Knobbly Veins):- Varicose veins of the leg may burst and severe bleeding may occur.

- **Management**:
  1. Lay casualty flat and raise the leg high.
  2. Apply a pad to the part and bandage firmly.
  3. Send him to a Hospital.

CLOSED ABDOMINAL INJURIES:- Blood may flow into the abdomen as a result of injury to the spleen, kidney, intestine or the liver etc. Get a correct history of accident- note the time of the accident. Find out the level of consciousness (fully conscious, partly conscious totally unconscious).

- **Management**:
  1. Control external bleeding, if any.
  2. Treat other wounds and injuries like fractures, bruises etc.
  3. Do not give any food or drink. Note pulse and respiration every half hour or earlier.
  4. Loosen tight clothing.
  5. Reassure patient
  6. Cover him up with a light sheet or blanket.
  7. Transport him quickly to a hospital.



CRUSH INJURY:-

- In major accidents like landslides etc. people are caught under machinery, masonry or beams and are possibly under pressure for hours due to landslides, earth quake etc. The injuries may appear simple, with swelling, redness or blister formation or numbness of the whole limb. But after some time of release, the swelling increases, becomes hard.

- There is loss of blood substance (plasma) and in addition poisonous (toxic) products from crushed cells pour into the blood stream. This leads to 'shock' i.e. lowered blood pressure, cold clammy skin pallor and fast thready pulse.

- If this is not promptly and properly treated, kidney failure can result

- **Management**:
  1. Keep head low and raise the lower limbs.
  2. If conscious, give a little of water or tender coconut water. Then repeat the same but in small quantities at a time.
  3. Transfer to a hospital immediately.

CHEST INJURY:- Injuries to chest should always be treated as serious for without any visible injury there may be fracture of ribs, tear of lung, Injury to heart or blood vessels.

- **Management**:
  1. Send all such cases as "Priority" to hospital.
  2. Reassure the casualty.
  3. Never give any stimulant.
  4. Give ice to suck or ice water to sip.
  5. Transport gently in the most comfortable position.

BLAST INJURY:- Are caused by explosions, gases or bursting of bombs. The high pressure waves may damage the lungs, Ear Drums and internal organs without showing a wound outside. The falling debris and splinters may cause additional external wounds, burns and fractures.

- **Signs & Symptoms:** General signs of shock, Marked restlessness, Asphyxia, Frothy blood stained sputum, Bleeding from ruptured ear drum, Other injuries

- **Management**:
  1. Reassure.
  2. Examine thoroughly for other injuries and treat them accordingly i.e., Asphyxia, burns, wounds and fractures.
  3. If possible help him/her into half sitting position supporting the head and shoulders.
  4. Loosen constricting clothes around the neck, chest and waist.
  5. Evacuate to the hospital continuing treatment along the way.

ABDOMINAL WOUND:-

- Adjust the patient's position so that the wound does not gape e.g., if the wound is horizontal, place him on his back with head and shoulders raised and a pillow under his knees.

- If the intestines have come out: Cover with clean pads, don't give anything to eat or drink, Obtain medical aid: till then give casualty absolute rest in bed.

- Casualty has to be transported to hospital. There may be severe associated internal haemorrhage when patient's pulse becomes feeble and eventually goes into shock. In that case casualty should be sent to hospital as a priority case.

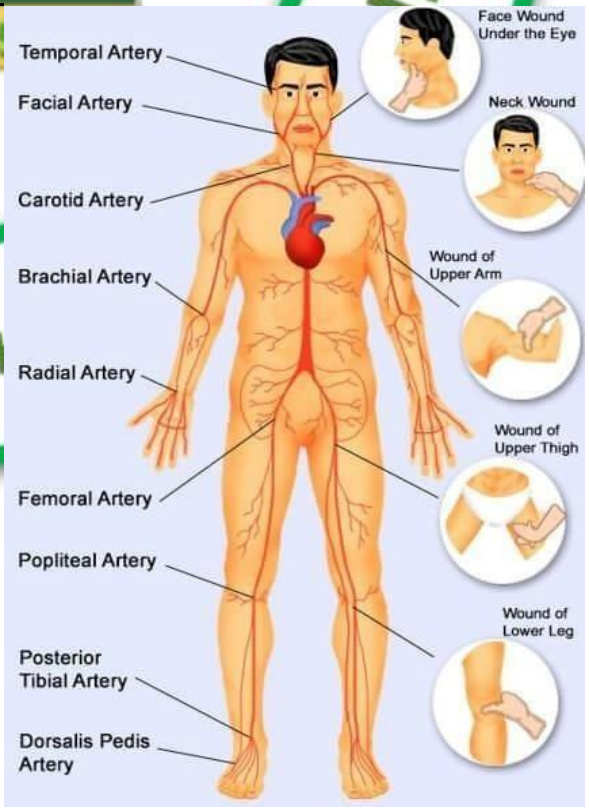
7.0 PRESSURE POINTS TO STOP EXTERNAL BLEEDING →

7.1 The second method of indirectly stopping of haemorrhage is the use of pressure points. This is adopted when direct pressure becomes a failure. There are quite a large number of pressure points which must be remembered by First Aider so that he can use the method in emergencies.

7.2 The Broad guideline it to press the artery before the injury so that blood does not flow to the injured site. A Pressure point is an area where an artery along its course can be pressed against an underlying bone so as to prevent the flow of blood beyond that point. Generally, you can feel pulsations at such points.

7.3 CAROTID PRESSURE POINT:

- Two in number one on either side, these arteries arise from the Aorta and pass up the neck on either side of the trachea or windpipe to supply blood to the head area.



- Pressure is applied by the thumb placed in the hollow between the voice box **and** the prominent stern mastoid muscle nearby. It is pressed against the vertebral column behind it.
- In cut-throat cases, in addition to the digital pressure to be applied describe as above, the First Aider has to apply digital pressure on the jugular vein (large vein) above the wound from which blood will be oozing out, because this vein is also usually injured along with the artery in these cases. In the event of bleeding not stopping even then digital pressure has to be applied below the wounds, also cover the wound. Cover the wound, treat for shock and take the casualty immediately to a Hospital.

SUBCLAV IA N PRESSURE POINT:

- As the name indicates these (two) arteries run behind the clavicles on either side.
- These are branches of the aorta, which run from behind the inner and of the clavicle across the first ribs on the armpits.
- Pressure is applied by pressing one thumb on top of the other in the hollow above and behind the middle of the collar bone, so that the artery is pressed against the first rib.
- Before applying pressure bare the neck and upper part of chest; depress shoulder and bend his head to the injured aids. These make it easy to see the area and get the muscles relaxed making the work easy.

FACIAL PRESSURE POINT:

- The palm is placed across the upper part of the neck in such a way that the thumb is on the lower portion of the lower jaw and the fingers on the back of the head and neck.
- Pressure is applied on the artery at a point which is the junction between the mid-third of jaw and posterior third under the line of the lower jaw.

TEMPORAL PRESSURE POINT:

- The palm is placed so that the thumb is a line with upper margin of the ear and the rest of palm over the back of the head.
- Pressure is applied about an inch in front of the upper part the ear backwards against the temporal bone. The temporal artery runs at this place before it gives off branches.

BRANCHIAL PRESSURE POINT:

- The brachial arteries run along the inner border of the biceps and branches out to supply the upper limb.
- Apply pressure on the middle third of the arm by passing the fingers.
- It is compressed against the humerus.

RADIAL OR ULNA PRESSURE POINT:

- As their names indicate these lower parts of the radial/ulnar artries pass over the wrist into palm to form the palmer arch.
- Each of them should be compressed simultaneously by pressing the thumb against the bone just above the wrist.

PALMER ARCH PRESSURE POINT:

- As noted above, the arch is formed by anastamosis of the terminal points of the Radial and Ulna arteries beyond the middle of the palm.
- Pressure is applied by a single thumb which is placed flat across whilst the rest of the palm and fingers are on the back of the injured palm.

FEMORAL PRESSURE POINT:

- Femoral arteries are in the thigh. They help to supply the lower limbs with blood.
- The artery enters the thigh about midway in the groin fold and runs a little inwards up to the upper two thirds of the thigh and then passes to the back of the knee.
- To apply pressure, lay the patient, bend the knees slightly grasps the thigh with both hands so that each of the thumb is at about the centre of the groin. Place the left thumb over the right and apply pr essure directly backwards against the pelvic bone.

AMPUTATION OF LIMBS →

Recent advances in surgery have made the re-attachment of amputated limbs, fingers and toes possible. The chances of a good result are greater the sooner the casualty and the severed part are taken to hospital. Always place the severed part in a suitable container to protect it. Avoid use of liquid/antiseptic while carrying the severed part.

AIM: Control bleeding and arrange urgent removal to hospital with severed part.

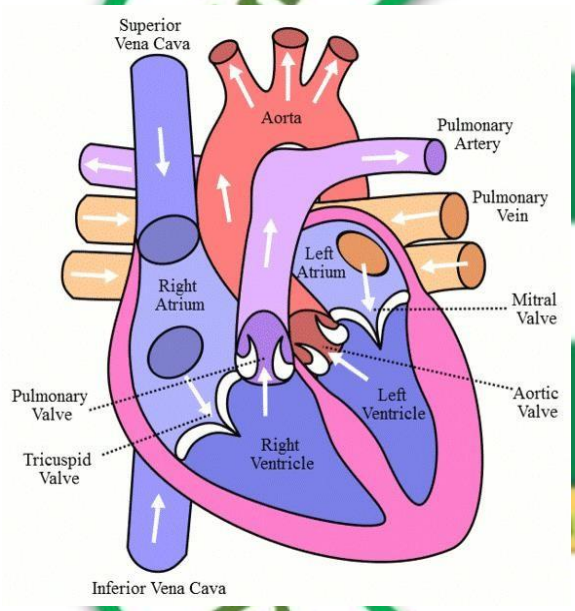
TREATMENT:

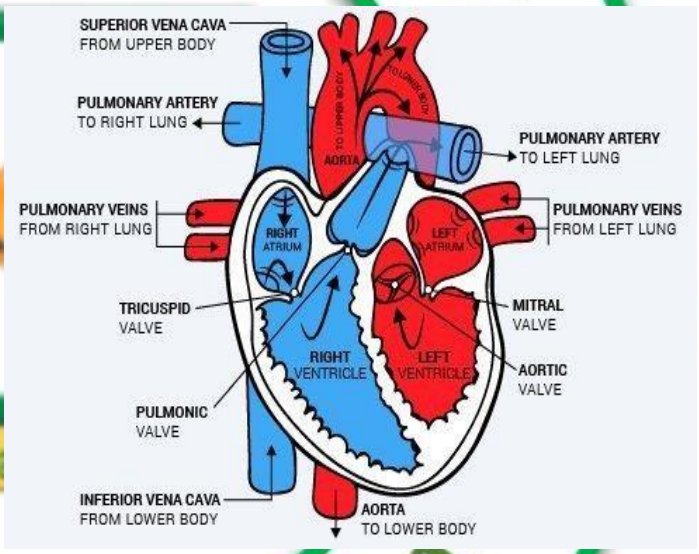
1. Control bleeding using elevation and direct pressure, take great care not to damage the stump.
2. Place the severed part in a clean plastic bag to keep it clean and prevent drying out. If possible, put the bag in a container of ice. However the bag must be wrapped in suitable material to prevent the severed part touching the ice.
3. Arrange urgent removal to hospital.

CARDIOVASCULAR SYSTEM

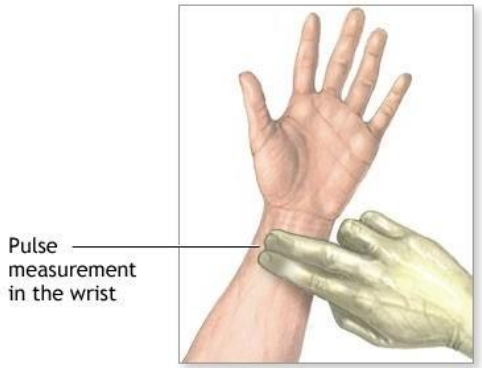
INTRODUCTION:

- The heart is a muscular organ situated at the centre of the chest cavity. It acts as a pump.
- It is divided into **4 Chambers**. The **right upper chamber**, called the **Right Atrium** receives **impure blood from all parts** of the body through blood vessels called **Veins**.
- When the heart beats this impure blood is passed into the Right Lower Chamber called **Right Ventricle**, and finally finds its way to the lungs where it is purified.
- The blood so purified finds its way into the **Left Upper Chamber called Left Atrium**. It then passes to the **Left Lower Chamber, called Left Ventricle**, and from there, in the course of the beating of the heart the purified blood is discharged into various blood vessels called **Arteries and Capillaries** which convey this purified blood for the nourishment for the body as a whole. Thus each **Heart has two pumps** put together.





- The pressure in the arteries varies with the beating of the heart. When the heart, contracts the pressure in the arterial system increases; when the heart relaxes the pressure in the arteries decreases. This pressure exerted on the arteries known as the **'Blood Pressure'** and is recorded by the blood pressure instrument or a rough estimate made by feeling the pulse.
- With each heartbeat blood is ejected into the arterial system. Most of the arteries are placed deep in the body except on the wrist, elbow, neck, groin and ankle. So Arterial Pulse is normally felt over the lateral side of the wrist, in the neck, temples, and groin and near the ankle.
- The average adult has a Pulse Rate of 72 per minute.



CORONARY HEART DISEASES →

The narrowing of the Coronary Arteries that prevents adequate blood supply to the heart muscle is called Coronary Artery Disease.

It is also known as Coronary Heart Disease.

Usually caused by **Atherosclerosis**, which may progress to the point where the heart muscle is damaged due to lack of blood supply. Such damage may result in heart failure.
Atherosclerosis is the abnormal accumulation of lipid or fatty substances or fatty plaque in the lumen of Coronary Artery.

Risk factors of Coronary Heart Diseases are:

1. **Modifiable:** High Blood Cholesterol Level, Cigarette Smoking, Tobacco use, Hypertension, Diabetes Mellitus, Lack of Estrogen in Women, Physical Activity, Obesity
2. **Non-Modifiable:** Family History, Increasing Age, Gender (Male), Race (Non-White Populations)

SIGNS & SYMPTOMS:- Chest Pain, Myocardial Infarction, Diaphoresis, ECG Changes, Dysarrithmias, Chest Heaviness, Dyspnea, Fatigue.

DIAGNOSIS:- History collection, Physical Examination, Cardiac Enzymes, Electrocardiograms, Echocardiograms, Stress Tests, Nuclear Imaging, Angiography.

COMPLICATIONS:- Chest Pain, Heart Attack, Heart Failure, Abnormal Heart Rhythm.

FIRST AID FOR ANGINA:-

Angina is pain in the chest. It occurs when arteries supplying blood to the heart become narrowed and restrict blood flow. This can happen when doing exercise, including walking. It can also happen with increased excitement.

SIGNS & SYMPTOMS:-

1. The casualty may have a dull, heavy or vice-like central chest pain, that may spread to their jaw and down one or both arms.
2. The casualty may have pain which may ease with rest.
3. The casualty may have shortness of breath.
4. The casualty may experience sudden and extreme tiredness.
5. The casualty may feel anxious.

FIRST AID:-

1. Instruct the casualty to stop what they are doing and help them to sit down. Try to reassure them and **make them comfortable**. The best position is on the floor with their knees bent and their **head and shoulders supported**. You could place **cushions behind them or under their knees**. If this is their first angina attack, they have no angina medication on them, the pain comes on at rest, is more frequent, worse or different to previous attacks, advise them to seek urgent medical aid.
2. Ask if the casualty has **any angina medication**, like a spray or tablets. If they do, let them take it themselves but help them if needed.
3. If the **pain** is still there **five minutes after taking the medication**, suggest **they take a second dose** and keep any bystanders away.
4. If they are **still in pain after another five minutes**, or the pain returns, suspect **it's a Heart Attack**. **Call for an Ambulance**.
5. If the **pain subsides within 15 minutes** after they've rested or taken medication, they should usually be **able to go back** to what they were doing. If they are worried, tell them to **seek medical advice**.

FIRST AID FOR HEART ATTACK:-

A **Heart Attack** happens when the **supply of blood to part of the heart is suddenly blocked**, usually by a blood clot. You can make a full recovery following a heart attack, but this may depend on how much of the heart is affected.

SIGNS & SYMPTOMS:- Someone having Heart Attack may:

1. have crushing pain in the centre of their chest, that may spread to their jaw, and down one or both arms.
2. be breathless or gasping for breath.
3. be sweating profusely.
4. experience pain similar to indigestion.
5. collapse without warning.
6. complain of dizziness.
7. have pale skin and their lips may have a blue tinge .
8. have a rapid, weak or irregular pulse.
9. have a feeling of impending doom.

FIRST AID:-

1. Call for emergency help straight away and tell them you think someone is having a heart attack.
2. Help move the casualty into a comfortable position. The best position is on the floor, with their knees bent and their head and shoulders supported. You could place cushions behind them or under their knees.
3. Give them one Aspirin tablet (300mg) and ask them to chew it slowly. Do not give aspirin to the casualty if they are under 16 or if they are allergic to it.
4. Ask the casualty to take their own Angina medication, if they have some.
5. Keep monitoring the casualty's level of response until emergency help arrives. If they become unresponsive at any point, prepare to start CPR.

1 **2** **3** **4** **5**

EXTERNAL CARDIAC COMPRESSION (ECC):-

- If only one First Aid Provider is available, artificial respiration and external cardiac compressions both are done alternately.
- If two First Aiders available. First Aider giving mouth-to-mouth breathing to sit to the right of the casualty and place the other to give External Cardiac Compression on the left side.
- Feel and mark the lower part of the sternum.
- Place the heel of your hand on the marked part the lower part of sternum (make sure that the palm and fingers are not in contact with the chest).
- Place the heel of the other hand over it.
- With your right arm press the sternum backwards towards the spine (it can be pressed back in adults).

:: NOTE ::

- *An Adult should be given about 60 Compressions per minute.*
- *For Children from 2-10 years of age, Compression with one hand will be enough but it should be 80-90 times per minute.*
- *For Babies up to 2 years, Compression with fingers is good enough, applied 100 times per minute.*
- *Press firmly but carefully. Carelessness may cause injury to ribs and deeper tissues.*
- *If the treatment is effective:*
  - *a) Colour will change to normal;*
  - *b) Pupil will start becoming normal as improvement begins;*
  - *c) Carotid pulse beats with each compression will be felt.*
- *When pulse is not restored, continue compression till the patient reaches the hospital. If there are two First Aiders, the first one should make 15 heart compressions and then the second one should give one lung inflation. These are then repeated. At the same time one can watch the pupils and the second can feel the carotid pulse.*

CARDIO PULMONARY RESUSCITATION (CPR):-

- Essential when both breathing and heart beat are affected.

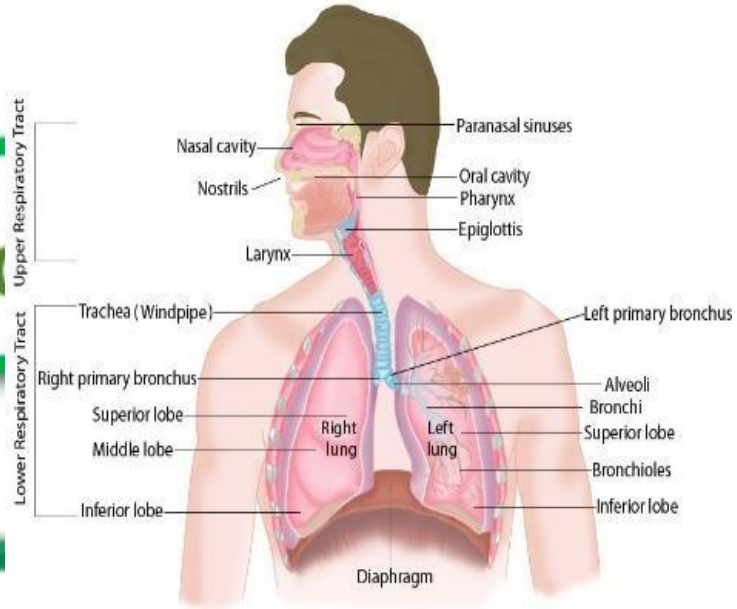
  Step 1: Thumping the Heart Region.
  Step 2: External Cardiac Compression (ECC).
  Step 3: Mouth-to-Mouth Respiration.

- If two First Aiders are available one does ECC 30 times followed by the other mouth to mouth respiration twice, repeat. If there is only a single First Aider, ECC 30 times followed by mouth to mouth respiration twice given by the same person.

RESPIRATORY SYSTEM

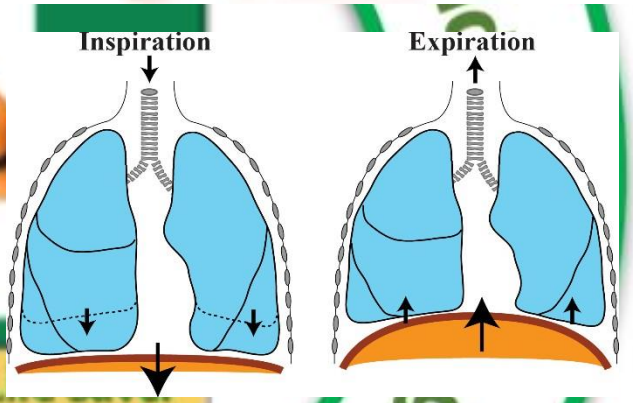
A. RESPIRATORY SYSTEM

- Oxygen is essential to life. Every time we breathe in, air containing oxygen enters the lungs. This oxygen is then transferred to blood to be around the body. Breathing and transported exchange of oxygen and carbon dioxide (a waste product from body tissues) are described as "Respiration", and the structures that enable us to breathe make up the Respiratory System.



- Respiration means breathing in and out of air. This function is necessary to supply oxygen (from the air) to all the organs in the body. Stoppage of oxygen supply to the organs may result in death. Death will result in about 4 to 6 minutes if the body's Oxygen supply is cut off.

- **Mechanism of Respiration:**



- During Inspiration (breathing in), the diaphragm (the muscle separating the chest from the abdominal cavity) flattens and increases the chest capacity from above downwards.

- The ribs move upwards and forwards increasing the capacity of the chest cavity from front to back by the action of the muscles situated between the ribs; the lungs thus expand and air enters them. This is an active process.

- During Expiration (breathing out) the reverse process takes place. The diaphragm comes back to its original state and the ribs fall back thus forcing the air out of the lungs. This is a passive process.

- Small blood vessels (capillaries) surround the alveoli. The exchange of oxygen and carbon dioxide take place through the blood circulating in these capillaries. Oxygen is absorbed by the red blood corpuscles of the blood, water vapour and carbon dioxide are let out from the blood plasma into the alveoli and expelled out. The lungs are also supplied with nerves which are connected to an area in the brain called respiratory centre. This centre controls respiration.

- The **Organs** connected with respiration are:
  1. **The Air Passages** consist of nose, throat (Pharynx), wind pipe (Trachea) and two air-tubes (Bronchi). The bronchi divide into minute branches (Bronchioles) which end in the lung substance (Alveoli)
  2. **The Lungs** are two in number and are situated on the right and left sides of the chest cavity. Each lung is made up of a number of small sacs, called **"Alveoli"**. The lungs are covered by a membrane called **"Pleura"** which lines the inner wall of the chest cavity.
  3. **The Muscles**, Diaphragm, Intercostals and Abdominal breathing muscles help to contract and expand the lungs to facilitate the breathing.

➢ **ASPHYXIA (Suffocation):**

- Asphyxia is a condition in which the lungs do not get sufficient supply of air for breathing. If this continues for some minutes, breathing and heart action stops and death occurs.

- **Causes of Asphyxia:**
  1. *Obstruction* - Foreign Body, Food or Water in Air Passage, Irritant Gases in to the Air Passage, Tongue falling back, Swelling of Tissues of Throat.
  2. *Compression* - Type of Rope/Scarf around the Neck, Hanging or Throttling, Smothering like covering face & nose.

- **Conditions affecting the Respiratory Mechanism:**
  - Epilepsy, Tetanus, Rabies etc.
  - Nerve diseases causing paralysis of chest wall or diaphragm.
  - Poisonous snake bite (e.g. Cobra).

- **Conditions affecting the Respiratory System:**
  - Over doses of Morphia, Barbiturates (Sleeping tablets)
  - Electric Shock.
  - Stroke

- **Compression of the Chest:**
  - Caving in of earth or sand, in mines, quarries, pits or compression by grain in a silo or big beam and/or pillars in house-collapse.
  - Crushing against a wall or other barrier or pressure in a crowd (Stampede).

- **Lack of Oxygen at High Altitudes:**
  - With low atmospheric pressure where the oxygen content in the atmospheric air is low due to lack of acclimatization.

- **Management:**
  - Remove the cause, if possible or remove the casualty to environment where the suffocating agent is not there.
  - Loosening the tight clothing e.g. collar belt etc., and expose the chest and neck.
  - Resuscitations:
    1. Opening the Airway
    2. Checking the breathing
    3. Clearing the Airways
    4. Artificial Respiration mouth to mouth/mouth to nose respiration.
    5. Circulation- External Chest Compressions
  - Gently shake casualty's shoulders and ask what happened.
  - Check the breathing by- Observing movement of the chest and also observing air coming out during expiration.
  - Clearing the Airways by backward tilt of head and chin lift-opening the air way.
  - Providing rescue breath.
  - Check for heart beat and movement of chest for recovery of respiration and heart beat, if achieved put the casualty in recovery position; if not start compression activity.
  - External Chest Compressions: Lean over the casualty, with your arms straight Press down vertically on the chest, and depress by about 4-5cm. Release pressure and let chest recoil. Compress 30 times at the rate of 100 compressions per minute.
  - Mouth-to-Mouth Respiration: If No recovery of respiration and heart beat, close the nose, open the mouth ensuring tilting of head, blow in the air from your mouth to mouth of the casualty. And allow the chest recoil; after 5 times again check for recovery.
  - Check the Pulse.

➢ **DROWNING:**

- This is another consequence of disaster especially during flooding. Drowning causes asphyxia by water weeds and mud entering into the lungs. It may also cause the throat to go into spasm (constricting the air passage dry drowning). Congestion of the lungs can occur very quickly but it may be several hours before it is apparent.

- **All casualties rescued from drowning should be sent to a hospital.** If a casualty has been immersed in cold water there is also a danger of hypothermia. It is important that the casualty is kept warm.

- **Symptoms & Signs →**
  1. General symptoms and signs of asphyxia.
  2. Froth around the casualty's lips, mouth and nostrils.

- **Aims →** Get air into the casualty's lungs as fast as possible, even in water. If necessary arrange removal to hospital.

- **Management →**
  1. Quickly remove any obstruction such as weed from the casualty's mouth and begin artificial respiration immediately.
  2. If in deeper water give the occasional breath of air while towing the casualty ashore.
  3. Place casualty on a firm surface, check breathing and pulse and continue Resuscitation.
  4. As soon as the casualty begins breathing place him in the recovery position.
  5. Keep him warm. If possible, remove wet clothing and dry him off. Cover with spare clothes and or towels to keep the body warm.
  6. Arrange shifting to hospital. Transport as a stretcher case, maintaining the recovery position.

:: NOTE ::
If the casualty stops breathing, give two initial rescue breaths and thirty Chest Compressions.
If you are alone, give CPR for 1 minute before calling Ambulance.

➢ **STRANGULATION & HANGING:**

- Strangulation is constriction or squeezing around the neck or throat. Sometimes, hanging or strangulation may occur accidentally – for example, by ties or clothing becoming caught in machinery.

- Hanging may cause a broken neck; for this reason, a casualty in this situation must be handled extremely carefully.

- STRANGULATION is usually the result of throttling by hands or a rope or scarf being tied round the neck.

- In HANGING the fracture of spine at the junction of head and neck causing compression or tear of the spinal cord lending to respiratory failure.

- **Aim of First Aider** should be to restore adequate breathing, to arrange urgent removal to hospital.

:: NOTE ::
Do not move the casualty unnecessarily, in case of spinal injury. Do not destroy or interfere with any material that has been constricting the neck, such as knotted rope; police may need it as evidence.

- **Management →**
  1. Cut or remove the band constricting the throat.
  2. If suspended raise the body and loosen or cut the rope.
  3. Give artificial respiration.
  4. Do not wait for the policeman to arrive, start immediately.
  5. Lay the casualty on the ground. Open the airway and check breathing. If he is not breathing, be prepared to give chest compressions and rescue breaths if necessary for saving life.
  6. If the casualty is breathing, place the person in the **Recovery Position**.

- **CHOKING (Asphyxia due to obstruction in Windpipe):** The airway is the passage that connects the nose and mouth with the lungs. If anything blocks the airway, the person chokes and cannot get enough oxygen. This is a life-threatening emergency, and you must give First Aid to remove whatever is blocking the airway.

- **Mild Choking →** Coughing may indicate a mild airway obstruction. Coughing is a natural way to clear the airway, and it is a sign that the person is still getting enough at Encourage the person to keep coughing and stay close by in case you need to help. An object may become more firmly stuck in the airway, stopping the person from breathing.
- **Severe Choking →** Severe choking happens when a foreign object or swelling blocks the airway completely. The object may get stuck at any point in the airway from the throat to the lungs. This is a severe airway obstruction. A foreign object that is stuck at the back of the throat may block the throat or cause muscular spasm. If blockage of the airway is mild, the casualty should be able to clear it; if it is severe he will be unable to speak, cough, or breathe and will eventually lose consciousness. Be prepared to begin rescue breaths and chest compressions. This is most common with children. A marble, a seed or button may get struck in the air passage. In adults, food may go down the airway and choke it.

- **Aim →** Is to remove foreign body or obstruction.

- **Management →** In case of **Adults & Children**

Step 1
If you think someone is choking, ask them **'Are you choking?'** If they can breathe, speak or cough then they might be able to clear their own throat. If they cannot breathe, cough, or make any noise, then they need your help straight away.

Step 2
Cough it out. Encourage them to cough and remove any obvious obstruction from their mouth.

Step 3
Slap it out. If coughing fails to work, you need to give five sharp back blows.

To do this, help them to lean forwards, supporting their upper body with one hand. With the heel of your other hand give them **five sharp back blows between their shoulder blades**. After each back blow, check to see if there's anything in their mouth.

Step 4
Squeeze it out. If back blows fail to clear the obstruction, give **five abdominal thrusts**.

To do this, stand behind them and put your arms around their waist. Place one hand in a clenched fist between their belly button and the bottom of their chest. With your other hand, grasp your fist and pull sharply inwards and upwards up to **five times**. Check their mouth again, each time.

Step 5
If the **blockage has not cleared**, **call for Ambulance** help straight away. **Repeat** five back blows and five abdominal thrusts until help arrives, re-checking their mouth each time.

If they become unresponsive at any point, prepare to start **Adult CPR.**

- **SWELLING WITHIN THE THROAT:** Swelling within the throat may occur as a result of trying to drink very hot liquid or swallowing corrosive poisons or may be due to inflammation.

- **Management →**
  1. Make the patient sit up.
  2. If breathing continues normally or is restored to normal, give ice to suck, or cold water to sip.
  3. Butter, olive oil or medical paraffin may also be given in small quantity.
  4. Apply cloth wrung out of hot water to the front of the neck.
  5. If breathing has stopped, give artificial respiration.
  6. An early hospitalization is advised.

- **SUFFOCATION BY SMOKE:** Protect yourself by a towel or a cloth (preferably wet) over your mouth and nose. Keep low and remove the casualty as quickly as possible away from the area.

- **SUFFOCATION BY POISONOUS GASES like Carbon Monoxide (Lighter than Air):** This gas which is lighter than air is present in car-exhaust fumes, in house hold Coal gas, during incomplete combustion charcoal stoves and in coal mines.

- **Management →**
  1. The First Aid treatment consists of removing the person and applying artificial respiration and giving pure oxygen, if available.
  2. Ensure circulation of fresh air before entering the room on doors and windows.
  3. Before entering the enclosed space take two or three deep breaths and your breath as long as you can and hold
  4. Crawl along the floor (as the gas is lighter than air).
  5. Remove the casualty as quickly as possible to the area of fresh air
  6. Loosen his clothes at neck and waist and give artificial respiration casualty is asphyxiated.

- **SUFFOCATION BY POISONOUS GASES like Carbon Dioxide & Others (Heavier than Air):** Such gases are found in coal mines, deep unused wells and sewerage. Various other gases such as leaking refrigerator gases, compressed gasses used for cooking and lighting could also cause suffocation.

- **Management →**
  1. Observe all the precautions mentioned above.
  2. Enter in upright position (as the gas is heavier than air and collects near the floor).
  3. Remove the casualty as quickly as possible to fresh air.
  4. Wherever ventilation is not possible and deadly poisonous gas is suspected use a gas mask for protection.

- **ASTHAMA:** This is a condition where sudden constriction of airways causing difficulty in breathing especially in breathing out occurs. Allergy, infection, anxiety or tension can trigger an attack.

- **Management →**
  1. Reassure the patient
  2. Make him sit up in bed or chair and allow him to lean forward with a couple of pillows and/or a small table on which to rest his head.
  3. Ensure fresh air by opening the windows.
  4. Seek medical aid from a nearby doctor.

- **Asphyxia of a severe degree with unconsciousness:**
  - This could be due to:
    1. The tongue might have fallen back into the throat.
    2. Vomit might have collected in the throat.
    3. Some foreign material (like weeds, mud etc.) might have collected and obstructed the air passages.

  - **Begin to work immediate ly as every second counts. Do not delay.**

  - Management when not breathing →
    1. Loosen all clothing at waist, chest and neck.
    2. Tilt the head backwards, while supporting the back of neck with your palm. This will lift the tongue to its normal position. Thus the air passage will be cleared and the casualty may begin to breathe after a gasp.
    3. If breathing does not begin after the above treatment. Mouth-to-mouth or Mouth-to-nose breathing should be given.

  - **If the heart is not beating, the following will be noticed →**
    1. The face is blue or pale.
    2. Pupils are dilated.
    3. Heartbeats and pulse at root of neck (carotid) are not felt.
    4. Place the casualty flat on his back on a hard surface (bench, table etc.).
    5. Give a smart hit with the edge of your hand on the lower and left angle of the sternum. This usually stimulates the heart to restart.
    6. In case heart does not work continue the striking for 10-15 seconds, at the rate of one stroke a second. Feel for the pulse when it becomes regular and continuous, stop thumping.
    7. All the while artificial respiration has to go on.
    8. Even if the casualty is breathing but the breathing is not normal, it is wise to start artificial respiration.
    9. Do not begin thumping the heart or compression until you are sure that the heart has stopped beating.
    10. To restore circulation External chest compression is to be started.

➢ **EXTERNAL CARDIAC COMPRESSION (ECC):**

- If only one First Aid Provider is available, artificial respiration and external cardiac compressions both are done alternately.
- If two First Aiders available. First Aider giving mouth-to-mouth breathing to sit to the right of the casualty and place the other to give External Cardiac Compression on the left side.
- Feel and mark the lower part of the sternum.
- Place the heel of your hand on the marked part the lower part of sternum (make sure that the palm and fingers are not in contact with the chest).
- Place the heel of the other hand over it.
- With your right arm press the sternum backwards towards the spine (it can be pressed back in adults).

:: Note ::

- *An Adult should be given about 60 Compressions per minute.*
- *For Children from 2-10 years of age, Compression with one hand will be enough but it should be 80-90 times per minute.*
- *For Babies up to 2 years, Compression with fingers is good enough, applied 100 times per minute.*
- *Press firmly but carefully. Carelessness may cause injury to ribs and deeper tissues.*
- *If the treatment is effective:*
  - *d) Colour will change to normal;*
  - *e) Pupil will start becoming normal as improvement begins;*
  - *f) Carotid pulse beats with each compression will be felt.*
- *When pulse is not restored, continue compression till the patient reaches the hospital. If there are two First Aiders, the first one should make 15 heart compressions and then the second one should give one lung inflation. These are then repeated. At the same time one can watch the pupils and the second can feel the carotid pulse.*

➢ **CARDIO PULMONARY RESUSTICATION (CPR):**

- Essential when both breathing and heart beat are affected.

  Step 1: Thumping the Heart Region.
  Step 2: External Cardiac Compression (ECC).
  Step 3: Mouth-to-Mouth Respiration.

- If two First Aiders are available one does ECC 30 times followed by the other mouth to mouth respiration twice, repeat. If there is only a single First Aider, ECC 30 times followed by mouth to mouth respiration twice given by the same person.

B. FOREIGN BODIES IN ORGANS

FOREIGN BODIES IN EYE → Foreign objects (such as grit, a loose eyelash or a contact lens) that lie on the surface of the eye can easily be rinsed out. Sharp fragments like metal or glass may cut or penetrate the eye and become embedded. If this is the case, the person should not attempt to remove the object but cover the eye and seek medical help as soon as possible.

Signs and Symptoms:- Look for:

1. pain or discomfort in the eye or eyelid
2. redness and watering of the eye
3. a visible wound or a bloodshot appearance
4. blurred, partial or a total loss of vision.

Management:-

1. Wash your hands with soap and water.
2. Seat the person in a well-lighted area.
3. Advise the casualty not to rub their eye as this could make it worse. Ask them to sit down facing a light.
4. Stand behind them and **gently open their eyelids with your thumbs**. Ask them to look right, left, up and down as you look closely at the eye.
5. If you can see something, ask them to tip their head backwards and **wash it out by pouring clean water** from the inner corner from a glass or jug.
6. If this doesn't work and the object is still on the surface of the eye, try to remove it with a moist piece of gauze or the damp corner of a clean handkerchief or tissue. **If the object isn't easy to remove or the eye is very painful, seek medical advice.**

FOREIGN BODIES IN EAR → A foreign object in the ear can **cause pain, infection and hearing loss**. Usually you know if an object is stuck in your ear, but small children may not be aware of it.

Management:-

1. Don't probe the ear with a tool such as a cotton swab or matchstick. You risk pushing the object farther in and damaging the ear.
2. Remove the object if possible. If the object is clearly visible, pliable and can be grasped easily with tweezers, gently remove it.
3. Try using gravity. Tilt the head to the affected side to try to dislodge the object.
4. Try using oil for an insect. If the foreign object is an insect, tilt the person's head so that the ear with the insect is upward. Try to float the insect out by pouring mineral oil, olive oil or baby oil into the ear. The oil should be warm, but not hot. Don't use oil to remove an object other than an insect. Don't use this method for a child if ear tubes are in place or if you think the eardrum may be perforated. **Signs and symptoms of a perforated eardrum are pain, bleeding or discharge from the ear.**
5. Try washing the object out. Use a rubber-bulb ear syringe and warm water to irrigate the object out of the canal, again provided no ear tubes are in place and you don't suspect the eardrum is perforated.

If these methods fail or the person continues to experience pain, discharge from the ear canal, reduced hearing or a sensation of something lodged in the ear, seek medical assistance.

FOREIGN BODIES IN NOSE → If a foreign object becomes lodged in your nose:

- Don't probe at the object with a cotton swab or other tool.
- Don't try to inhale the object by forcefully breathing in. Instead, breathe through your mouth until the object is removed.
- Blow out of your nose gently to try to free the object, but don't blow hard or repeatedly. If only one nostril is affected, close the opposite nostril by applying gentle pressure and then blow out gently through the affected nostril.
- Gently remove the object if it's visible and you can easily grasp it with tweezers. Don't try to remove an object that isn't visible or easily grasped.
- Call for emergency medical assistance or go to your local emergency room if these methods fail.

HEAD & SYPINAL INJURIES

1.0 What is a SPINE:- Vertebrae which together form the spine are small bones which bear the weight of the head and the trunk. They are commonly fractured:

1. Indirectly by:-

- Lifting a heavy weight
- Landing on the feet or buttocks in a heavy fall
- Being thrown forward suddenly (e.g. a car driver during a collision) or
- Neck fractures in whip-lash injuries.

2. Directly by:-

- The fall of a heavy weight on the back or
- Falling from a height on the back across a bar
- Injuries in occurrence of landslides, earthquakes etc., when a heavy mass falls on the spine.

- The fracture will be more serious if the spinal cord is injured. As a result there may be loss of power of the muscles (paralysis) and loss of sensation of the skin below the level of the injury. Injury to the spine is always a serious emergency.

- Fracture of the spine should be suspected in all cases of back injury. There will be pain and shock in all cases.

- Just because there is no paralysis, do not neglect the case. Treat it as fracture until the case is in medical hands.

2.0 MANAGEMENT:-

1. Try to get a doctor immediately.
2. Make the casualty lie still. Never allow him/her to get up.
3. If unconscious see that the tongue does not fall back and choke the casualty.
4. If medical aid is not immediately available.
   a) Do not move the casualty; cover with a light bed sheet or a thin blanket.
   b) Keep under observation till the doctor arrives.
5. If medical help is not available, prepare the casualty for shifting on a stretcher.
   a) Place pads between thigh, knees and ankles.
   b) Tie a figure of eight bandage over ankle and feet with the knot on sole of foot.
   c) Apply broad bandages on knees and thighs.
   d) Be ready to shift to a nearby shelter.

:: Note ::

Carry patient face upwards, for in this position the spinal cord is not likely to be damaged further.

3.0 CAUSES OF SPINAL INJURY:-

1. Falling from a motor bike or horse,
2. a heavy object falling across their back,
3. a collapsed rugby scrum,
4. falling awkwardly, for example, while doing gymnastics,
5. falling from a height, for example, from a ladder,
6. an injury to the head or face,
7. sudden deceleration in a vehicle,
8. diving into a shallow pool and hitting the bottom.

4.0 SIGNS & SYMPTOMS:-

1. Pain in the neck or back at the site of injury.
2. Irregular shape or twist in the normal curve of the spine.
3. Tenderness and/or bruising in the skin over the spine.

4. Movement of limbs may be weak or absent.
5. Loss of sensation, or abnormal sensations, e.g. burning or tingling.
6. Loss of bladder and/or bowel control.
7. Breathing difficulties.

→ *NOTE* ←

When the vertebrae are damaged, there may be:

- *Pain in the neck or back at the injury site; this may be masked by other, more painful injuries.*
- *Take step to avoid twisting of the normal curve of the spine.*
- *When the spinal cord is damaged, there may be:*
  - *Loss of control over limbs; movement may be weak or absent.*
  - *Loss of sensation, or abnormal sensations such as burning or tingling. The casualty may say that limbs feel stiff, heavy, or clumsy.*
  - *Loss of bladder and/or bowel control.*
  - *Breathing* difficulties.

ASSESSMENT OF CONDITION OF THE CASUALTY:- The Casualty could be either conscious or may be unconscious. To assess gently tap the shoulder and observe by gently asking the question to see the response, if casualty response indicates consciousness.

A. FOR A CONSCIOUS CASUALTY –

1. <u>Aims of the First Aider –</u>

- To prevent further injury.
- To arrange urgent shifting to hospital.

If you suspect neck injury place rolled-up blankets, towels, or items of clothing on either side of the casualty's head and neck, while you keep her head in the neutral position. Continue to support the casualty's head and neck throughout until emergency medical services take over.

2. <u>Management –</u>

- Reassure the casualty and advise him/her not to move.
- Kneel behind the casualty's head. Grasp the sides of the casualty's head firmly, with your hands over the ears. Do not completely cover her ears he/she should still be able to hear you. Steady and support her head in the neutral head position, in which the head, neck, and spine are aligned. This is the least harmful head position for a casualty with a suspected spinal injury.
- Continue to support the casualty's head in the neutral position until emergency medical services take over, no matter how long this may be. Get help to monitor and record vital signs -level of response, pulse, and breathing.
- Examining for any other injury on the body.
- If casualty is moving limbs because of pain before preparing to transport the casualty suitably put bandages on the legs so that it becomes easy to apply **Log- Roll technique**.

Log-Roll Technique

This technique should be used if you have to turn a Casualty with a Spinal Injury. Ideally, you need five helpers but the move can be done with three.

- While you support the Casualty's head and neck, ask your helpers to straighten the limbs gently. Then, ensuring that everyone works together, direct your helpers to roll the Casualty.
- Keep the Casualty head, trunk and toes in a straight line at all times. Roll the Casualty supporting the neck and head on a hard plank or hard stretcher and transport to the Ambulance.

B. FOR A UNCONSCIOUS CASUALTY –

1. Aims of the First Aider –

- To maintain an open airway.
- To resuscitate the Casualty if necessary.
- To prevent further spinal damage.
- To arrange urgent shifting to hospital.

2. Management –

- Kneel behind the casualty's head. Grasp the sides of her head firmly with your hands over the ears. Steady and support her head in the neutral head position, in which the head, neck, and spine are aligned.
- If necessary, open the casualty's airway using the jaw thrust method. Place your hands on each side of her face with your fingertips at the angles of her jaw. Gently lift the jaw to open the airway. Take care not to tilt the casualty's neck.
- Transport the casualty with spinal injury with special care to neck, head and spine from hard plank or stretcher as stated above to the ambulance.

3. Transportation –

- Prepare the stretcher, the soft bed of the canvas type of stretcher must be stiffened, preferably by placing short boards across the stretchers, or long ones lengthwise on the canvas if only these are available. If no stretcher is available, a narrow shutter, door or board of at least the same width and length as the patient may be used.
- Cover the stretcher with a folded blanket and then "blanket the stretcher" by one of the methods.
- Place pillows or pads in readiness on the stretcher in a position to support the neck, and small part of the back. Those should be sufficiently large, but not too large, to preserve the normal curves of the spine.
- Whenever the casualty is to be moved or lifted he must not be bent, twisted or over extended. One bearer must apply firm but gentle support to the head and face, so as to prevent neck movement and another bearer must steady and support the lower limbs to prevent trunk movement. This must be continued until the casualty has been placed on the stretcher.
- When the casualty is not already laying on a blanket or rug.
  a) Place the blanket or rug on the ground in line with the casualty, and rolled lengthwise for half its width.
  b) While the two bearers maintain control of the head and lower limbs, other bearers very carefully turn the casualty on to his side every precaution being taken against movement at the site of the fracture. Place the roller portion of the blanket or rug close to the casualty's back and gently rolls him over the roll until he is lying on his opposite side. Unroll the rolled portion of the blanket or rug gently lowering the casualty on his back so that he lies on the centre of the open blanket or rug. The bearers at the head and at the lower limbs conform to the rolling of the casualty throughout.
- Loading the stretcher. There are two methods of loading a stretcher, a standard method (when there is a blanket under the casualty) and an Emergency Method (When there is no blanket under the casualty) in which case the stretcher can be pushed under the casualty it will be necessary for the bearer at the feet to keep his legs wide apart to allow the stretcher to be placed between them.
  a) **Blanket Lift:** This method is used when a blanket has been placed under the patient.
     - "Blanket lift" is the standard method for loading fractures of the spine when there is blanket under the casualty.
     - Roll the two edges of the blanket up against the casualty's side. If poles of sufficient length and rigidity are available the edges of the blanket should be rolled around them. This will make the lifting of the casualty very much easier.
     - While two bearers maintain support of the head and lower limbs, the remaining bearers distribute themselves as required on each side of the casualty facing one another. On the word of command they raise him by grasping the rolled edges of the blanket and, acting together, carefully and evenly lift him to a sufficient

height to enable the stretcher to be pushed underneath him. If this is for any reason impossible the stretcher should be brought as near to the casualty as circumstances permit and the bearers should move short even side paces until the casualty is directly over the stretcher, when he should be gently and cautiously lowered onto it.

- Ensure that the pads are in the correct position.

b) Emergency method for loading fractures of the spine when there is no blanket under the Casualty and none is available –

- Open out the casualty jacket and roll it firmly so that the rolls are close to each side.
- Place the casualty on the stretcher adopting the same procedure as described for the standard Method except that the bearers grasp the rolled up jacket and/or the clothing and /or bandage round the casualty's thighs instead of the rolled edges of the blanket. When the clothing is insecure, a broad bandage must be placed round the body just below the shoulder for the bearers to grasp.

- In the case of cervical injuries, place firm supports such as rolled-up blankets or sandbags on each side of the head to steady it.
- Place a folded blanket in the hollow above the heels so as to relieve pressure on them.
- Wrap the casualty.
- If he is to be carried over rough ground, reduce his body movements to a minimum by binding him firmly but not too tightly to the stretcher, with broad bandages. These should be applied round the pelvis, thighs and calves, and round the body and arms, just above the elbows.
- On reaching shelter, do nothing further until the arrival of medical aid. The above method of transportation of spinal injury case is to be used only if hard board is not available.

UNIT 10

BURN, ELECTROCUTION, EFFECTS OF HEAT & COLD MANAGEMENT

A. BURNS & SCALDS

Burns are injuries that result from dry heat like fire, flame, a piece of hot metal, the sun, and contact with wire carrying high tension electric current or by lightning or friction.
Scalds are caused by moist heat due to boiling water, steam, oil, hot tar, etc.

TYPES OF BURNS →

Chemical Burns are caused by strong acids (Sulfuric Acid. Nitric Acid) or by strong Alkalies (Caustic Soda, Caustic Potash, Quick lime or Strong Ammonia).

Nuclear Burns are caused by the instantaneous flash of intense heat given off by a nuclear explosion. It is capable of causing superficial burns on the exposed skin of person several miles away.

Radiation Burns are caused by over-exposure to X-ray or Radiation Therapy. This casualty is to be referred to Hospital immediately.

TYPE OF BURN	CAUSES
Dry Burn	Flames: Contact with hot objects, such as domestic appliances or cigarettes. Friction: in Rope burns.
Scald	Steam: Hot liquids, such as tea and coffee, or hot fat.
Electrical Burn	Low-Voltage Current: as used by domestic appliances High-Voltage Current: as carried in mains overhead cables, Lightning strikes.
Cold Injury	Frostbite: Contact with freezing metals. Contact with freezing vapors, such as liquid oxygen or liquid Nitrogen.
Chemical Burn	Industrial Chemicals: including inhaled fumes and corrosive gases Domestic Chemicals and agents, such as paint stripper, caustic soda, weed killers, bleach, oven cleaner, or any other strong acid or alkali.
Radiation Burn	Sunburn: Over-exposure to ultraviolet rays from a sunlamp. Exposure to a radioactive source, such as an A-ray

RESULTS OF BURNS →

Immediate: Intense pain, Shock.
Later: There may be infection in the damaged area,
After heating, it will leave scars causing disfigurement and / or restriction of movements.

DEGREE OF BURNS → The degree of burns indicates the degree of damage to the tissues. There are three degrees of burns.

DEGREE OF BURN	DESCRIPTION
FIRST DEGREE	When the skin is only reddened.
SECOND DEGREE	When there are blisters on the skin.
THIRD DEGREE	When the destruction is deeper damaging nerves, tissues, muscles etc.

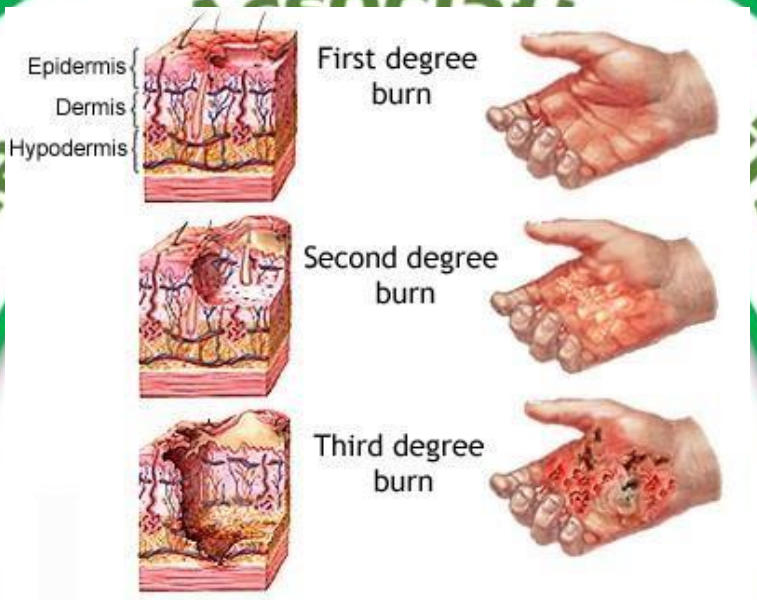
The danger from burns depends on the area of the burns rather than the degree.

Superficial burns over a large area of the body are more dangerous than the complete charring of a part of the limb. It must be noted that in the same person, different parts of the body may show different degree of burns.

(a) **FIRST DEGREE BURN:-** First Degree Burns are usually limited to (Erythema), a white plaque and minor pain at the site of injury. These burns usually extend only into the Epidermis.

(b) **SECOND DEGREE BURN:-** Second Degree Burns additionally fill with clear fluid, have superficial blistering of the skin, and can involve more or less pain depending on the level of nerve involvement. Second-degree burns involve the superficial (Papillary) dermis and may also involve the deep (Reticular) dermis layer.

(c) **THIRD DEGREE BURN:-** Third Degree Burns additionally have charring of the skin, and produce hard, leather-like escarps. An escarps is a scab that has separated from the unaffected part of the body. Frequently, there is also purple fluid. These types or burns are often painless because nerve endings have been destroyed in the involved areas.



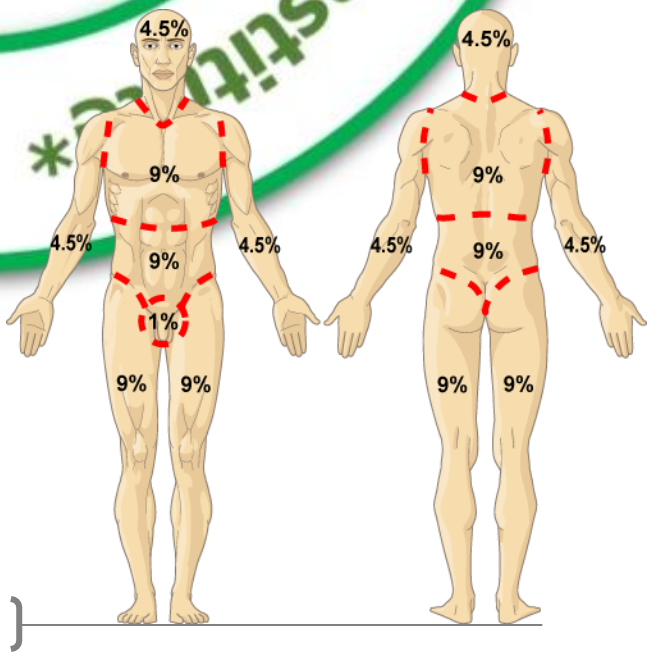
The first two degree is seen in scalds also.

When the chemicals fall on the skin or cloth worn by the person on any of the three degrees of burn may be produced. When swallowed, the chemicals, if strong, will damage the tissues with which they come into contact while swallowing viz., lips, tongue, throat, food passages, and stomach. There may be damage to the skin around the mouth.

The severity of a burn depends upon both the area it covers and depth.

5.0 RULE OF NINE →

Any burn over 15% in Adults and 10% in Children of deep degree should be hospitalized as priority.



6.0 RESCUE FROM FIRE →

❖ **Helping a person whose clothes caught fire:**

1. Put out the flames by whatever means available. Most of the causes of burns occur in homes and water is readily available to quench the flames, water also cools the burnt area causing less damage to occur.
2. Do not allow the person to run about. This only fans the fire and makes the flame spread.
3. Hold a rug, blanket, coat or table cover in front of you, while approaching a man whose clothing have caught fire.
4. Lay him down quickly on the ground and wrap tightly with any thick piece of cloth, rug or coat. Smother the flame by gentle pats over the covering but do not role the casualty.
5. If the clothes in front of the body have caught fire, lay him down on his back and vice versa, till suitable material is brought to smother the flame.

❖ **Rescuing a person from fire:**

1. In rescuing persons from a room which has caught fire, speed and clear thinking are required.
2. Remember, clean air is at ground level. So crawl along the floor to pull out a person who is lying unconscious or is disabled.
3. Have a wet Hand Kerchief round your face when you rescue.
4. If there is smoke in the room, these precautions do not protect the rescuer from Carbon Monoxide poisoning. When there is fire in a closed room, there is always some amount of Carbon Monoxide, therefore, quick action is also important.
5. When there is fire in a room in which the doors and windows are closed, do not open the windows and doors to let in air. The rush of air will increase the fire and it will burn more intensely.

7.0 MANAGEMENT →

❖ **Management of Serious Burns and Scalds:**

1. Keep the casualty quiet and reassure him.
2. Wrap him in clean cloth.
3. Do not remove adhering particles of charred clothing.
4. Cover burnt area with sterile or clean dressing and bandages or with, clean sheet or towel.
5. Keep him warm but do not overheat him.
6. If the hands are involved, keep them above the level of the victim's heart.
7. Keep burnt feet hands or legs elevated.
8. If victim's face is burnt, sit up or prop him up and keep/under continuous observation for breathing difficulty. If respiration problems develop, an open airway must be maintained.
9. Remove quickly from the body anything like rings, bangles, belts or boots. If this is not done early, it would be difficult to remove them later as the limb begins to swell.
10. Do not immerse the extensive burnt area or apply ice water over it because cold may intensify the shock reaction. However a cold pack may be applied to the face or to the hands or feet.
11. Shift the casualty to the nearest hospital as soon as possible.
12. If you cannot take him/her to a hospital, wait for the doctor to arrive.
13. Do not open blisters.
14. Keep him wrapped up in clean cloth.
15. Treat for Shock.
16. If medical help of trained Ambulance personnel cannot reach the scene for an hour or more and the victim is conscious and not vomiting, give him a weak solution of salt and soda at home and enrooted; one level tea spoon full of salt and half level tea spoon full of baking soda to each glass of water, neither hot nor cold. Allow the casualty to sip slowly. Discontinue fluid if vomiting occurs. Do not apply ointment or any form of grease or other home remedy.

❖ **Management of Minor Burns and Scalds:**

1. Wash the area gently with clean cold water.
2. Submerge the burnt area in cold water.
3. Remove burnt clothes but do not forcibly remove adherent portion of charred clothing.
4. Cover with dry dressing.
5. Do not apply cotton wool
6. Do not apply any greasy substance or adhesive dressing.
7. Give warm drinks for example sweetened tea or coffee.

❖ **Management of Chemical Burns:**

1. Wash off the chemical with a large quantity of water by using a shower or hose if available as quickly as possible. This flooding with water wash away most of irritant.
2. Cut out contaminated clothing.
3. Do not touch the burnt area with bare fingers.
4. Treat as for burns as described above.

❖ **Management of Burns of the Eye:**

1. First aid for acid burns of the eye should be given as quickly as possible by thoroughly washing the face, eyelids and the eye for at least five minutes.
2. If the casualty is lying down, turn his head to the side, hold the eyelids open and pour water from the inner corner of the eye outward. Make sure that the chemical does not get into the other eye. Cover the eye with a dry clean protective dressing and bandage. **Do not use cotton.**
3. Caution the victim against rubbing his eye.
4. Get medical help immediately.

❖ **Management of Burns in the Mouth and Throat:**

1. They occur from drinking very hot liquid, inhaling hot air (fire in the room) or drinking corrosive chemicals. They cause severe and dangerous damages by producing swelling of the mouth, tongue or the air passages.
2. The casualty may show:
   - Damaged skin around the mouth.
   - Difficulty in breathing may be symptoms of shock and the casualty may be unconscious.
   - Immediately evacuate to the Hospital.

❖ **Electric Burns:**

- These are caused by High Voltage Current at the point of contact and going through the body and at the point of exit (that part of the body which touches ground/earth point).
- High Voltage Industrial Power current can jump 16-18m and kill the Rescuer. Therefore, do not approach the casualty till the switch has been turned off.
- These currents not only cause local damage but affect the respirator and cardiac centers. They produce superficial or deep burns including charring, but also cause stoppage of breathing and heart beat.
- **Management:-**

1. Cut Off or Switch Off the source of current.
2. Separate the casualty from the cause of injury.
3. Cover the burns.
4. Treat the shock.
5. If breathing or heart beat has stopped, resuscitate.
6. Put in Recovery Position.
7. Evacuate speedily to the Hospital.

❖ **Sun Burns:**

- Direct exposure of a person to Sun rays can have ill effects on Skin and Eyes.
  - **Skin –** The injury to the Skin known as Sunburn is due to Ultraviolet Rays. The burn is produced by over exposure to sun rays, when the body is covered with sweat, sea water or the wind is blowing strongly. However, high up in the mountains, burns can be produced even on a dull overcast day with strong winds.

    The Skin becomes red, itchy and painful. It may go into blisters formation with marked swelling and become very painful.

    Management:- Remove the casualty to a shaded cool place and bathe the skin with cold water. Cover the burn area and evacuate to hospital giving frequent sips of cold water.

- **Eyes –** Reflected light from the sun produces Thermal and Photochemical burns in the front and back of the eye depending upon the duration of exposure. Reflected light from snow (snow -blindness), Welder's Flash and looking at the solar eclipse also produces the same. The eyes becomes red.

  Prevention:- Wear dark glasses; protect eyes by protective helmets and goggles while doing welding.

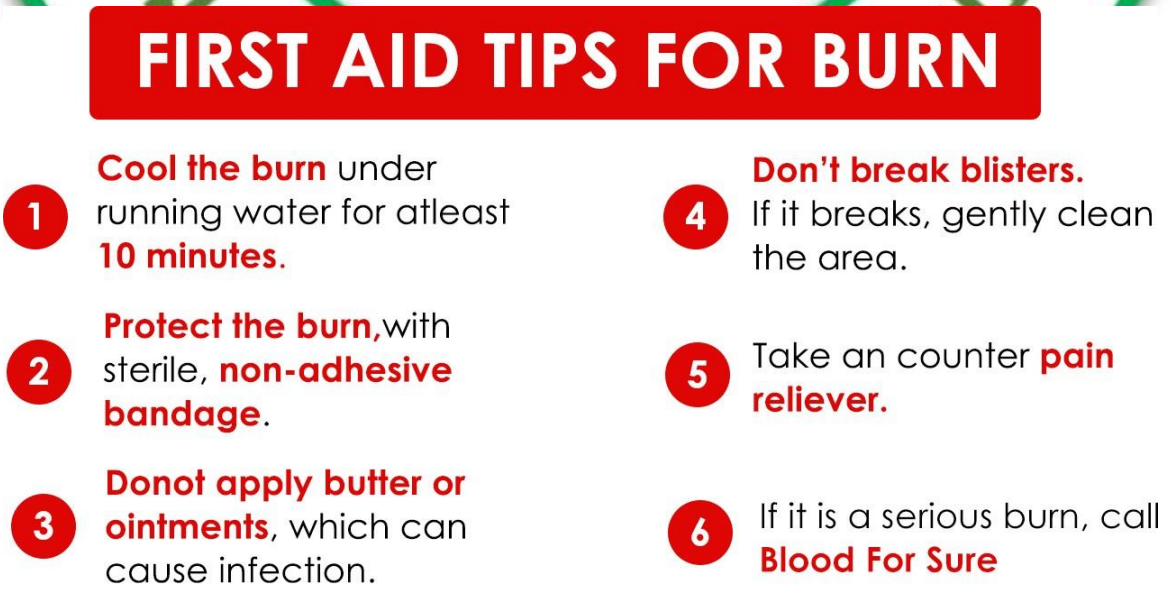
  Management:-
  1. Wash eyes with cold water.
  2. Lightly dress the eyes with sterile non fluffy pad.
  3. Send to the eye specialist.

8.0 PREVENTION OF BURNS → Most of the conditions under which burns occur can be prevented.

1. Women and Children get burnt more often than men, women get burnt while cooking in the kitchen. They should take the following precautions:
   a) Ovens or Stoves should be kept at a higher level about two feet above the ground.
   b) While working near fire, see that you clothes are not hanging free, or flapping about.
   c) Never go near fire when wearing material made out of nylon or similar fibers as these clothes catch fire easily and quickly. It is a good practice to use a cotton overall while cooking.
   d) Do not put kettles or other vessels with hot liquid near the edge of a stove, sink or the table or the spout pointing towards you.
2. Never leave children alone in a room where there is a fire or a naked lamp burning.
3. Keep matches out of the reach of children.
4. Never sleep with a kerosene lamp near the bed.
5. Do not hang clothes near an open fire.

BURNS THAT NEED HOSPITAL TREATMENT →

❖ If the casualty is a Child, call a Doctor or take the child to Hospital, however small the burn appears. For other people, medical attention should be sought for any serious burn. Such burns include:
1. All full-thickness burns.
2. All burns involving the face, hands, feet, or genital area.
3. All burns that extend right around arm or a leg.
4. All partial-thickness burns larger than 1% of the body surface (an area the size of the palm of the casualty's hand).
5. All superficial burns larger than 5% of the casualty's body surface (equivalent to 5 Palm Areas).
6. Burns with a mixed pattern of varying depths.
7. If you are unsure about the severity of any burn, seek medical attention.



B. ELECTROCUTION

ELECTRICAL INJURIES / SHOCK →

Causes →

- If any part of the body comes in contact with a "live" wire which is exposed and not covered by an insulator or with a cable or rail in which current is leaking, a person gets an **Electric Shock**.

- Electrical shock is produced only when an electric current passes through the human body which is in contact with earth. It passes even more quickly if the part is wet. In wet conditions even lower voltage is dangerous.

- A very strong current passing to earth through lower limbs may be less dangerous than a weaker current passing through the chest, especially so when it enters through the hands and arms.

Effects →

- The electric current may affect the beating of heart leading to stoppage of heart.

- There may be sudden stoppage of breathing due to paralysis of muscles used in breathing.

- Heart may continue to beat, while breathing has stopped. In this condition the face appears blue.

- There may be burns either superficial or deep. That depends on the strength of the electric current causing the injuries.

Management →

- **Intelligent and prompt action** is required if the First Aider is not cautious he may also receive severe electric shock or even die along with the casualty.

- If the casualty is still in contact with the source, **switch off the current**. If the switch is not found, remove the plug or **cut off the current** by breaking circuit (MCB). Before cutting off the current, ensure that you stand on a dry piece of wooden board. **Do not use scissors or knife.**

- **When the current is of low voltage** the First Aider should stand on an insulated material which is dry. Insulating materials are rubber/soled shoes, wooden planks or piles of newspaper. Rubber gloves, if available should be worn. If not, dry coat, cap or other clothing may be used.

- **When the current is of a very high voltage**, as in the cases of over-head (high tension) lines, there is greater danger. The casualty may not be in actual contact with the wire as the current can pass through the gap (causing an arc). The First Aider in such circumstances should keep as far away as possible from the electric wires. The casualty is to be dragged out by means of a non/conducting material such as walking stick, dry bamboo, wooden plank or dry rope is to be used.

- If the casualty is not breathing normally, or heart has artificial stopped beating, give respiration and External Cardiac Compression for long time.
  1. Treat for shock.
  2. Treat for burns, if any.
  3. Transfer to a hospital, or seek the help of a nearest medical practitioner.

C. EFFECTS OF HEAT & COLD MANAGEMENT

DEHYDRA TION →

Dehydration occurs when someone loses fluid from the body and does not replace it. If untreated, someone with dehydration can develop heat exhaustion.

Possible causes include:

1. excess sweating during exercise,
2. too much exposure to the sun or humid conditions,
3. sweating from a raised body temperature. For example, a fever,
4. loss of fluid from severe diarrhoea and vomiting.

Signs & Symptoms:

1. a headache or light-headedness,
2. dizziness or confusion,
3. a dry mouth and dry eyes,
4. dry or cracked lips,
5. reduced amounts of dark urine,
6. muscle cramps, such as to the calves.

Special attention should be paid to babies and young children as they may also have pale skin with sunken eyes and can deteriorate very quickly.

Management:

1. Reassure the casualty and help them to sit down.
2. Give them plenty of water. You can also use an oral rehydration solution. These can help to replace fluid as well as the correct salt and other minerals they've lost.
   - Do not mix regular cooking salt into water and give it to the casualty, this will make the condition worse.
3. If they have any painful cramps, encourage them to rest. Help them to stretch and massage the muscles that are affected.
4. Monitor the casualty's level of response.
   - If the casualty appears to be unwell, seek medical advice.

HEAT EXHAUSTION→

Heat exhaustion usually happens to people who aren't used to hot, humid weather. Heat exhaustion is caused by a loss of salt and water, usually through excessive sweating. It develops slowly and usually happens to people who aren't used to hot, humid weather.

Signs & Symptoms:

1. a headache, dizziness and confusion,
2. a loss of appetite and feeling sick,
3. sweat with pale, clammy skin,
4. cramps in the arms, legs and stomach,
5. a fast, weakening pulse and breathing.

Management:

1. Help the casualty to a cool place, out of the sun and encourage them to lie down with their legs raised and supported.
2. You then need to give them lots of water to drink.
   - You could also give them an isotonic sports drink or oral rehydration solution, to help replace the salt and fluid they have lost though sweating.
   - Do not mix regular cooking salt into water and give it to them to drink, this will make their condition worse.
3. Monitor their level of response. Even if they recover quickly, suggest they seek medical advice.
   - If their condition seems to be getting worse, call for emergency help.

HEAT RASH→

Heat rash is sometimes called prickly heat. Heat rash consists of small red spots or raised bumps that can cause a stinging or prickling feeling on the skin, sometimes called prickly heat. It occurs when sweat glands are blocked due to the casualty sweating more than normal. It can appear anywhere on the body, but usually appears on the face, chest, back and thighs.

Signs & Symptoms:

1. a rash of tiny red spots, blisters or bumps,
2. a prickling or burning feeling on their skin,
3. itchy skin,
4. redness and mild swelling.

Management:

1. Tell them to drink lots of water to prevent them becoming dehydrated.
2. Take a cool bath or shower to cool the skin and prevent further sweating.
   - Do not use perfumed shower gels or creams as this could irritate the skin.
3. Apply a cold ice pack wrapped in a tea towel for up to 10 minutes.
4. Wear lose clothing, preferably made of cotton, which will not trap the heat as much as synthetic fibres.
5. Suggest they avoid excessive heat such as a fire, heater or sitting in the sun, to prevent aggravating the rash.
6. Advise them to see a pharmacist or healthcare professional for further treatment if required.
   - They may prescribe calamine lotion, an antihistamine or low strength hydrocortisone cream.
7. If they are concerned or unwell, seek medical advice.

HYPOTHERMIA IN ADULTS →

Hypothermia can become life-threatening quickly, so it's important to treat someone with hypothermia straight away. Hypothermia is a condition that occurs when someone's **body temperature drops below 35°C (95°F).** Normal body temperature is around 37°C (98. 6°F). Hypothermia can become life-threatening quickly, so it's important to treat someone with hypothermia straight away.

Signs & Symptoms:

1. shivering, cold and pale with dry skin,
2. unusually tired, confused and have irrational behavior,
3. reduced level of response,
4. slow and shallow breathing,
5. slow and weakening pulse.

Management: Treating Hypothermia Outdoors

1. If the casualty is outside, try to get them indoors. If you are unable to get them indoors, try to take them to a sheltered place as quickly as possible, shielding the casualty from the wind.
2. Remove and replace any wet clothing and make sure their head is covered.
   - Do not give them your clothes - it is important for you to stay warm yourself.
3. Try to protect the casualty from the ground. Lay them on a thick layer of dry, insulating material such as pine branches, heather, or bracken. If possible put them in a dry sleeping bag and/or cover them with blankets. If available, wrap them in a foil survival blanket. You can use your body to shelter them and keep them warm.
4. Call for emergency help.
   - Do not leave the casualty alone. Somebody must be with them at all times. If you are in a remote area and cannot call for emergency help, send two people to get help together.
5. If the casualty is fully alert, offer them warm drinks and high energy food such as chocolate.
6. Monitor their breathing, level of response and temperature while waiting for help to arrive.

Management: Treating Hypothermia Indoors

1. If you are indoors, cover the casualty with layers of blankets and warm the room to about 25°C (77°F).
   - Do not place any direct heat such as hot water bottles or fires near a casualty as they may cause burns.
2. Give them something warm to drink, like soup, and/or high-energy food, like chocolate.
   - Do not give the casualty alcohol in an attempt to warm them, it will make hypothermia worse.
3. Seek medical advice. Hypothermia could be disguising a more serious illness such as a stroke, heart attack or an underactive thyroid gland.
4. Monitor their breathing, level of response and temperature until they recover.

HYPOTHERMIA IN BABIES →

Signs & Symptoms:

1. be cold to touch,
2. be quiet and sleepy,
3. be limp,
4. refuse to feed.

Management:

1. If you suspect a baby has hypothermia, take them to a warm room and dress them in warm clothes.
2. Do not place any direct heat, such as hot water bottles, near a baby as they can cause burns.
   - You can also wrap them in a blanket and hold them close to you to help to warm them up.
3. Call for emergency help. Keep trying to warm them until help arrives.

HEAT STROKE →

If someone has heatstroke, your priority is to cool the casualty down as quickly as possible and get them to hospital. Heatstroke is caused by a failure of the 'thermostat' in the brain which regulates the body's temperature. This means the body is unable to cool down when it becomes too hot.

It could be caused by spending too much time in the sun, having a high fever, or from taking non-prescription drugs such as Ecstasy. It can also occur after heat exhaustion when sweating ceases.

Your priority is to cool them down as quickly as possible and get them to hospital.

Signs & Symptoms:

1. headache, dizziness and discomfort,
2. they may be restless and confused ,
3. hot, flushed and dry skin,
4. becoming less responsive quickly,
5. pulse that's full and bounding,
6. body temperature above 40°C (104°F).

Management:

1. Quickly move the casualty to a cool place and remove as much of their outer clothing as you can. Call for emergency help.
2. Help them to sit down in a comfortable, supported position. Wrap them in a cool, wet sheet and keep pouring cold water over the sheet until their temperature falls to at least 37.5°C (measured under the armpit).
3. If a sheet is not available, fan them or sponge them down with cold water.
4. Once their temperature has come down to normal, replace the wet sheet with a dry one.
5. While waiting for help to arrive, monitor their level of response and temperature.
   - If their temperature starts to increase cool them down again using the same method.
   - If they become unresponsive at any point, open their airway, check their breathing and prepare to give CPR.

FROST BITE →

Frostbite can happen when exposed to freezing cold temperatures. Frostbite happens when part of the skin and other tissues freeze due to low temperatures. It can lead to loss of sensation and eventually tissue death and gangrene. This usually happens when exposed to freezing cold temperatures and windy weather.

Signs & Symptoms:

1. 'pins and needles',
2. paleness of the area and numbness,
3. hardened and stiffened skin,
4. colour change to the skin. The skin may change from white to mottled and blue. On recovery, the skin may be red, hot, painful and blistered. When gangrene occurs, the skin may become black due to the loss of blood supply.

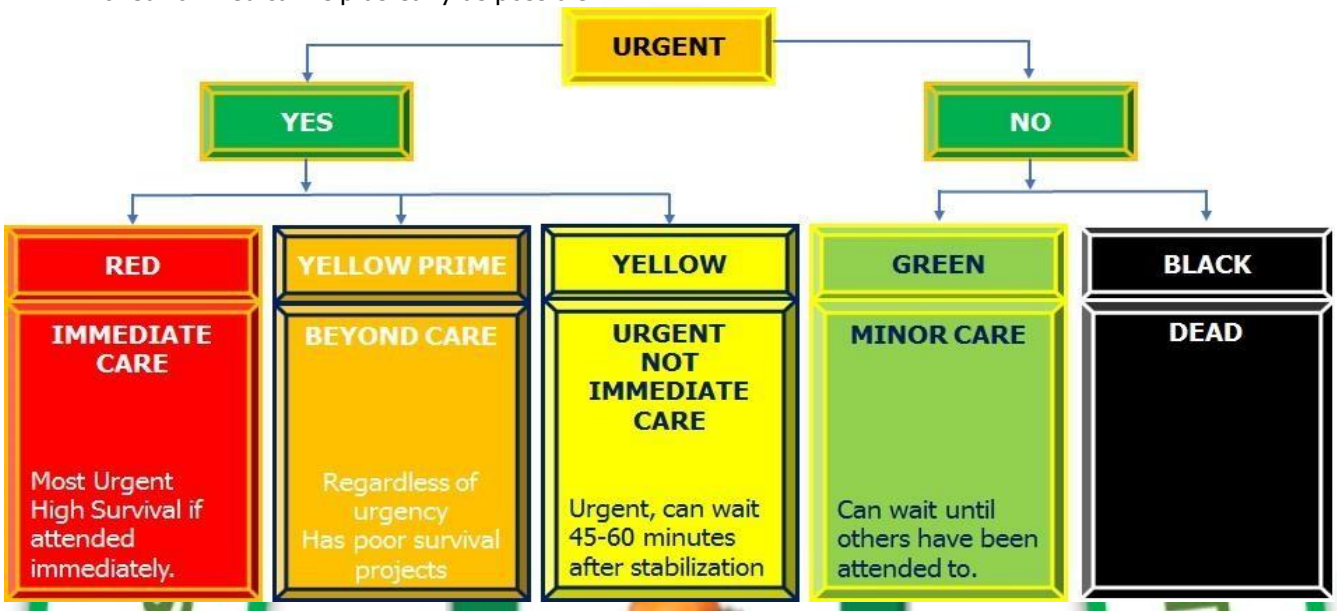
Management:

1. Help move the casualty indoors or to somewhere warm.
2. Once inside, gently remove any constricting rings, gloves, boots or any other constricting items.
3. Next, warm the affected part with your hands, in your lap.
   - Do not rub the area as this could damage their skin.
   - Do not place the affected part of the body on to direct heat.
4. Place the affected part into warm but not hot water – around 40°C. Dry the area carefully and put on a light dressing, ideally a gauze bandage from your first aid kit.
5. Once you've done that, help them to raise the affected part to reduce swelling. If the casualty is an adult, you can suggest they take the recommended dose of paracetamol tablets. If the casualty is a child, you can give them the recommended dose of paracetamol syrup.
   - Do not give aspirin to anyone under the age of 16 or anyone who is known to be allergic.
6. Take or send them to hospital.

TRANSPORTATION OF INJURED PERSON

TRIAGE OF VICTIMS OF DISASTER →

It is important in the early stages of any accident to decide whether the casualty should be treated where the accident occurred or whether he/she should be moved to hospital. It would be safer and easier to carry out a complete examination and provide First aid. Anyhow, if advice of a doctor is required, victim must be moved for medical help as early as possible.



	RED	YELLOW PRIME	YELLOW	GREEN	BLACK
Priority	Transfer immediately to a referral Hospital with a medical escort in an equipped Ambulance	Transfer only after evacuating all Red victims, with a medical escort in an equipped Ambulance	Transfer to a referral Hospital in Ambulance with First Aid escort.	Transfer to an appropriate Health Care Facility by available vehicles without escort.	Transfer to Morgue.
Urgency	Most urgent (fluids, intubation, fascitomy)	Urgent (constant, intensive care)	Urgent (IV, Line Drugs, immobilize fractures)	Not Urgent (Splint/Dressing)	Not Urgent
Condition	Shock/Hypoxia present/imminent	Deep shock, needs available resources	Stable for 1 hour, can wait at field	Stable till end of response	No Pulse/ Respiration. No BP/Heart Beat.
Injuries	Life-threatening	Catastrophic	Systematic effects, not yet life threatening	Localised	Fatal
Potential for Survival	High after immediate care & transportation	Very Poor	High after treatment	Good	None
Examples	Intra-Abdominal injury, Shock status from any cause	Massive Skull or Chest injuries, Extensive and Severe Burns	Heart Attack, Compound Fractures, Severe Burns	Minor fractures, Burns, Wounds	Dead

2.0 **<u>TRANSPORTATION OF VICTIM →</u>** After appropriate First Aid has been given the following principles or transport must be kept in mind.

1. The position assumed by the casualty or in which he has been placed, must not be disturbed unnecessarily.

2. Throughout the transport a careful watch must be kept on:
   a) The general condition of the casualty,
   b) Any dressing that may have been applied.
   c) Any recurrence of haemorrhage.
   d) The transport must be safe, steady and speed

<u>REMOVALS & TRANSPORTATION →</u>

An injured or sick person may be removed to shelter or hospital by:

1. Support of single helper.
2. Hand seats and the 'Kitchen-chair carry.
3. Blanket lift.
4. Stretcher.
5. Wheeled transport (ambulance).
6. Air and sea travel.

The method to be adopted and it may be necessary to use more than one, will depend upon:

1. The nature and severity of the injury.
2. The number of helpers and facilities available.
3. The distance to shelter/hospital.
4. The nature of route to be covered.

<u>METHOD OF CARRYING →</u>

IF ONLY ONE PERSON IS AVAILABLE:-

1. **CRADLE** – (To be used only in the case of light casualty or children) Lift the other casualty by passing one of your arms well beneath his two knees and the other round his back

2. **HUMAN CRUTCH** – Standing at his injured side except where there is injury to an upper limb, assist the casualty by putting your arm round his waist, grasping the clothing at him and placing his arm round your neck, holding his hand with your free hand.

If his upper limbs are injured and his other hand is free, the casualty may gain additional help from a staff or walking stick.

3. **PICK-A-BACK** – If the casualty is conscious and able to hold, he may be carried in the ordinary Pick-a-back fashion.

FIREMAN'S LIFT CARRY – (To be used only when the casualty is not heavy for the bearer). Help the casualty to rise to upright position. Grasp his right wrist with your left hand. Bend down with your head under his extended right arm so that your right shoulder is level with the lower part of his abdomen and place your right arm between or around his legs.

4. Taking his weight on your right shoulder rise the position. Pull the casualty across both shoulder and transfer his right wrist to your right hand, so leaving your left hand free.

IF TWO OR MORE BEARERS ARE AVAILABLE:-

1. **THE FOUR HANDED SEAT –** This seat is used when the casualty can assist the bearer by using one or both arms.

STEP 1	Two bearers face each other behind the casualty and grasp their left wrists with their right hands and each other's right wrist their left hands.
STEP 2	The casualty is instructed to place one arm around the neck of each bearer so that he may raise himself to sit on their hands and steady himself during transport.
STEP 3	The bearers rise together and step off, the bearer on the right hand side of the casualty with the right foot and the left hand bearer with the left foot.

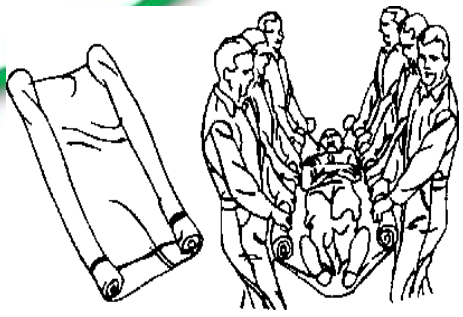
2. **THE TWO HANDED SEAT –** This seat is mostly used to carry a casualty who is unable to assist the bearers by using his arms.

STEP 1	Two Volunteers face each other and stoop down - (not kneel) one on each side of the casualty. Each bearer passes his forearm nearest the casualty's head under his back just below the shoulders and if possible takes hold of his clothing.
STEP 2	They slightly raise the casualty's back and then pass their other forearms under the middle of his thighs and grasp their hands the bearer on the left of the casualty with his palm upwards and holding a folded handkerchief to prevent hurting by the finger nails; the bearer on the right of the casualty with his palm downwards, as shown in (Hook Grip).
STEP 3	The bearers rise together and stop off, the right- hand bearer with the right foot and the left-hand bearer with the left foot.

3. **THE FORE AND AFT METHOD** – This method of carrying should be used only when space does not permit a hand seat. One bearer stands between the casualty's legs, facing the feet with hands down and grasps the casualty under his knees. The other bearer takes a position behind the casualty and after raising his trunk passes his hands under the casualty's armpits and grasps his own wrists on the casualty's chest. The casualty is then lifted. The bearers walk in step.

4. **THE KITCHEN CHAIR CARRY** – The bearers walk in step by carrying the patient in a chair. Use this method when the casualty is light weight and the distance is small.

5. **BLANKET LIFT →** The placing of a casualty on to a blanket is described earlier when lifting by a blanket the edges are role up close to the casualty's sides and lifted by two persons on either side.



STRETCHERS →

- Stretchers are of two patterns viz. "Ordinary" and "Telescopic-handled". In general Principle they are alike, the component parts being designated the poles, handles, jointed traverses, runners, bed, pillow -sack and slings. The 'head' and 'foot' of a stretcher correspond to the head and feet of the casualty.

- At the head of the stretcher there may be a canvas overlay (the pillow sack) which can be filled with straw, hay, clothing etc. to form a pillow. The pillow sack opens at the head and its contents can therefore be adjusted without due disturbance of the casualty. The traverses are provided with joints for opening or closing the stretcher. The telescopic-handled pattern is similar but its length can be reduced to 6 feet by sliding the handles underneath the poles. This is of a great value when working in confined space, or when a casualty has to be taken up or down a narrow stair-case with sharp turns.

- When closed, the poles of the stretcher lie close together, the transverse bars being bent inwards, the canvas bed neatly folded on top of the poles and held in position by the slings, which are laid along with canvas and secured by strap which is placed transversely at the end of each sling and passed through the large loop of the other, and round the poles and bed.

- **Carrying a loaded Stretcher:** Depending on the availability of manpower one can decide whether the stretcher is to be carried by four or two persons.

- **Lowering a loaded Stretcher:**
  1. "Lower Stretcher" – the four bearers will stoop, gently lower the stretcher to the ground and rise together.
  2. Hand Carriage by Two Bearers – "Lift Stretcher" will take a side pace over the handles of the stretcher and if they decide to use sling will pick them up, Place them over their shoulders and on the handles of the stretcher. They will then rise steadily together keeping the stretcher level.
- **To load into an Ambulance:**
  1. The stretcher is lowered with its head one pace from the door of the ambulance. The casualty will be loaded head first.
  2. While loading, take side pace to the ambulance raising the stretcher evenly to the level of the berth to be loaded. The front bearers place the runners in the grooves and then assist the rear bearers to slide the stretcher into its place and secure it. If sling have been used they should be kept with their stretcher.

SPINAL INJURY TRANSPORT →

- Injuries to the spine can involve one or more parts of the back and/or neck, the bones (vertebrae), the discs of tissue that separate the vertebrae, the surrounding muscles and ligaments, or the spinal cord and the nerves that branch off from it.
- The most serious risk associated with spinal injury is damage to the spinal cord. Such damage can cause loss of power and/or sensation below the injured area. The spinal cord or nerve roots can suffer temporary damage it they are pinched by displaced or dislocated discs or by fragments of broken bone. If the cord is partly or completely severed, the damage may be permanent.
- The Spinal Cord is protected by the vertebrae (back bones). Injury to a vertebra or to an inter-vertebral disc may damage nerve roots that emerge from the Spinal Cord or damage the cord itself.

CAUSES OF SPINAL INJURY:-

1. Falling from a motor bike or horse,
2. a heavy object falling across their back,
3. a collapsed rugby scrum,
4. falling awkwardly, for example, while doing gymnastics,
5. falling from a height, for example, from a ladder,
6. an injury to the head or face,
7. sudden deceleration in a vehicle,
8. diving into a shallow pool and hitting the bottom.

SIGNS & SYMPTOMS:-

1. Pain in the neck or back at the site of injury.
2. Irregular shape or twist in the normal curve of the spine.
3. Tenderness and/or bruising in the skin over the spine.
4. Movement of limbs may be weak or absent.
5. Loss of sensation, or abnormal sensations, e.g. burning or tingling.

6. Loss of bladder and/or bowel control.
7. Breathing difficulties.

→ NOTE ←

When the vertebrae are damaged, there may be:

- *Pain in the neck or back at the injury site; this may be masked by other, more painful injuries.*
- *Take step to avoid twisting of the normal curve of the spine.*
- *When the spinal cord is damaged, there may be:*
  - *Loss of control over limbs; movement may be weak or absent.*
  - *Loss of sensation, or abnormal sensations such as burning or tingling. The casualty may say that limbs feel stiff, heavy, or clumsy.*
  - *Loss of bladder and/or bowel control.*
  - *Breathing* difficulties.

ASSESSMENT OF CONDITION OF THE CASUALTY:- The Casualty could be either conscious or may be unconscious. To assess gently tap the shoulder and observe by gently asking the question to see the response, if casualty response indicates consciousness.

A. FOR A CONSCIOUS CASUALTY –

Aims of the First Aider –

- To prevent further injury.
- To arrange urgent shifting to hospital.

If you suspect neck injury place rolled-up blankets, towels, or items of clothing on either side of the casualty's head and neck, while you keep her head in the neutral position. Continue to support the casualty's head and neck throughout until emergency medical services take over.

Management –

- Reassure the casualty and advise him/her not to move.
- Kneel behind the casualty's head. Grasp the sides of the casualty's head firmly, with your hands over the ears. Do not completely cover her ears he/she should still be able to hear you. Steady and support her head in the neutral head position, in which the head, neck, and spine are aligned. This is the least harmful head position for a casualty with a suspected spinal injury.
- Continue to support the casualty's head in the neutral position until emergency medical services take over, no matter how long this may be. Get help to monitor and record vital signs -level of response, pulse, and breathing.
- Examining for any other injury on the body.
- If casualty is moving limbs because of pain before preparing to transport the casualty suitably put bandages on the legs so that it becomes easy to apply **Log- Roll technique**.

Log-Roll Technique

This technique should be used if you have to turn a Casualty with a Spinal Injury. Ideally, you need five helpers but the move can be done with three.

- While you support the Casualty's head and neck, ask your helpers to straighten the limbs gently. Then, ensuring that everyone works together, direct your helpers to roll the Casualty.
- Keep the Casualty head, trunk and toes in a straight line at all times. Roll the Casualty supporting the neck and head on a hard plank or hard stretcher and transport to the Ambulance.

B. FOR A UNCONSCIOUS CASUALTY –

Aims of the First Aider –

- To maintain an open airway.
- To resuscitate the Casualty if necessary.
- To prevent further spinal damage.
- To arrange urgent shifting to hospital.

Management –

- Kneel behind the casualty's head. Grasp the sides of her head firmly with your hands over the ears. Steady and support her head in the neutral head position, in which the head, neck, and spine are aligned.
- If necessary, open the casualty's airway using the jaw thrust method. Place your hands on each side of her face with your fingertips at the angles of her jaw. Gently lift the jaw to open the airway. Take care not to tilt the casualty's neck.
- Transport the casualty with spinal injury with special care to neck, head and spine from hard plank or stretcher as stated above to the ambulance.

Transportation –

- Prepare the stretcher, the soft bed of the canvas type of stretcher must be stiffened, preferably by placing short boards across the stretchers, or long ones lengthwise on the canvas if only these are available. If no stretcher is available, a narrow shutter, door or board of at least the same width and length as the patient may be used.
- Cover the stretcher with a folded blanket and then "blanket the stretcher" by one of the methods.
- Place pillows or pads in readiness on the stretcher in a position to support the neck, and small part of the back. Those should be sufficiently large, but not too large, to preserve the normal curves of the spine.
- Whenever the casualty is to be moved or lifted he must not be bent, twisted or over extended. One bearer must apply firm but gentle support to the head and face, so as to prevent neck movement and another bearer must steady and support the lower limbs to prevent trunk movement. This must be continued until the casualty has been placed on the stretcher.
- When the casualty is not already laying on a blanket or rug.
  a) Place the blanket or rug on the ground in line with the casualty, and rolled lengthwise for half its width.
  b) While the two bearers maintain control of the head and lower limbs, other bearers very carefully turn the casualty on to his side every precaution being taken against movement at the site of the fracture. Place the roller portion of the blanket or rug close to the casualty's back and gently rolls him over the roll until he is lying on his opposite side. Unroll the rolled portion of the blanket or rug gently lowering the casualty on his back so that he lies on the centre of the open blanket or rug. The bearers at the head and at the lower limbs conform to the rolling of the casualty throughout.
- Loading the stretcher. There are two methods of loading a stretcher, a standard method (when there is a blanket under the casualty) and an Emergency Method (When there is no blanket under the casualty) in which case the stretcher can be pushed under the casualty it will be necessary for the bearer at the feet to keep his legs wide apart to allow the stretcher to be placed between them.
  a) **Blanket Lift:** This method is used when a blanket has been placed under the patient.
     - "Blanket lift" is the standard method for loading fractures of the spine when there is blanket under the casualty.
     - Roll the two edges of the blanket up against the casualty's side. If poles of sufficient length and rigidity are available the edges of the blanket should be rolled around them. This will make the lifting of the casualty very much easier.
     - While two bearers maintain support of the head and lower limbs, the remaining bearers distribute themselves as required on each side of the casualty facing one another. On the word of command they raise him by grasping the rolled edges of the blanket and, acting together, carefully and evenly lift him to a sufficient height to enable the stretcher to be pushed underneath him. If this is for any reason impossible the stretcher should be brought as near to the casualty as circumstances permit and the bearers should move short even side

paces until the casualty is directly over the stretcher, when he should be gently and cautiously lowered onto it.

- Ensure that the pads are in the correct position.

b) Emergency method for loading fractures of the spine when there is no blanket under the Casualty and none is available –

- Open out the casualty jacket and roll it firmly so that the rolls are close to each side.
- Place the casualty on the stretcher adopting the same procedure as described for the standard Method except that the bearers grasp the rolled up jacket and/or the clothing and /or bandage round the casualty's thighs instead of the rolled edges of the blanket. When the clothing is insecure, a broad bandage must be placed round the body just below the shoulder for the bearers to grasp.

- In the case of cervical injuries, place firm supports such as rolled-up blankets or sandbags on each side of the head to steady it.
- Place a folded blanket in the hollow above the heels so as to relieve pressure on them.
- Wrap the casualty.
- If he is to be carried over rough ground, reduce his body movements to a minimum by binding him firmly but not too tightly to the stretcher, with broad bandages. These should be applied round the pelvis, thighs and calves, and round the body and arms, just above the elbows.

  On reaching shelter, do nothing further until the arrival of medical aid. The above method of transportation of spinal injury case is to be used only if hard board is not available.

RESCUE OF UNCONSCIOUS VICTIMS →

After giving emergency First Aid, the victim is to be placed on a large hard or inverted "charpoy'. Secure him on the board and strap him.

The head of the victim is to be secured tightly.

If due to certain conditions it is not possible to rescue in horizontal position the vertical position is to be used in case of removal from a "Cave" in accident or the First Aider must ensure his own safety as more mud or earth or building material may give way. Immediately after the casualty is spotted out you must uncover his face and chest and start artificial respiration if it is necessary.

If you have a portable oxygen apparatus with you, give oxygen at the spot and then place him on board ensuring that he is properly strapped before lifting

8.0 LABELLING OF CASUALTIES→

X	Requires priority of removal from the incident and examination when reaching hospital. This is used mainly, but not exclusively, for wounds of the chest and abdomen for internal haemorrhage, and for all unconscious casualties
H	Severe haemorrhage has occurred
S	Sedative has been given. The time of administration and dosage should be written on the label.
C	Contaminated or suspected of having been contaminated

UNIT 12

AMBULANCE & EQUIPMENT

AMBULANCE →

An Ambulance is a vehicle for transportation of sick or injured persons to, from or between places of treatment for an illness or injury and in some instances will also provide out of hospital medical care to the patient.

The word is often associated with road going emergency ambulances which form part of an emergency medical service, administering emergency care to those with acute medical problems.

The term Ambulance comes from the latin word ambulare meaning "to walk or move about which is a reference to early medical care where patients were moved by lifting or wheeling".

TYPES OF AMBULANCE →

Emergency Ambulance:- The most common type of Ambulance, which provide care to patients with an acute illness or injury. These can be road-going vans, boats, helicopters, Air Ambulances.

Patient Transport Ambulance:- A Vehicle, which has the job of transporting patients to, from or between places of medical treatment.

Response Unit:- Also known as a Fly-Car which is a vehicle which is used to reach an acutely ill patient quickly, and provide On-scene Care.

Bariatric Ambulance:- A special type of patient transport Ambulance designed extremely for obese patients equipped with the appropriate tools to move and manage these patients.

3.0 EQUIPMENT IN AMBULANCE →

1. **Two-Way Radio:** It allows for the issuing of jobs to the Ambulance and can allow the crew to pass information back to control or to the Hospital.

2. **Trauma Lights:** In addition to the normal working lights, Ambulances can be fitted with special lighting.

3. **Air Conditioning:** Ambulances are often fitted with a separate Air Condition System to serve the working area from that which serves the cab. This helps to maintain an appropriate temperature for any patients being treated, but may also feature additional features such as filtering against airborne pathogens.

4. **Data Recorders:** These are often placed in Ambulances to record such information as Speed, Braking Power & Time, Activation of Active emergence warnings such as lights & sirens, as well as seat belt usage.

5. **Active Visual Warnings.**

6. **Audible Warnings.**

4.0 SERVICE PROVIDERS →

1. **Government Ambulance Service:** Operating separately from the Fire & Police service of the area, these Ambulances are funded by local or national Governments.

2. **Volunteer Ambulance Service:** Charities or Non-Profit Companies operate Ambulances, both in emergency and patient transport function.

3. **Private Ambulance Service:** Normal commercial companies with paid employees, but often on contract to the local or national government. Private companies may provide only the patient transport elements of Ambulance care.

4. **Charity Ambulance:** This special type of Ambulance is provided by a Charity for the purpose of taking sick children or adults to other hospital.

5. **Cardiac Ambulance:** It is a fully equipped Life Support Ambulance. They are equipped with international quality instruments for international standards of service & care. It contains a Doctor, Trained Nurse, ECG, Defibrillator, Suction Machine, Oxygen, Resuscitation Kit, Syringe Pump, Pace Maker, Cardiac Monitor, Portable Ventilator, Pulse Oxymeter, Emergency Medicines, Nebuliser, Bipap, Spine Board.

108 EMERGENCY SERVICE →

How it works?

1. When an emergency is reported through 108, the Call taker gathers the needed basic information and dispatches appropriate services.

2. Emergency help dispatched through this process is expected to reach the site of emergency **in an average of 18 minutes.**

3. **Pre-hospital care is given** to the patients being transported to the nearest hospital. This is a free service.

4. 108 is management by the EMRI (Emergency Management and Research Institute) **across more than 10 States in India.**

UNIT 13

MISCELLANEOUS
(Drowning, Poisoning, Bites & Stings, Convulsion & Epilepsy, Diabetes)

A. DROWNING

- This is another consequence of disaster especially during flooding. Drowning causes asphyxia by water weeds and mud entering into the lungs. It may also cause the throat to go into spasm (constricting the air passage dry drowning). Congestion of the lungs can occur very quickly but it may be several hours before it is apparent.

- **All casualties rescued from drowning should be sent to a hospital.** If a casualty has been immersed in cold water there is also a danger of hypothermia. It is important that the casualty is kept warm.

- **Symptoms & Signs →**
  1. General symptoms and signs of asphyxia.
  2. Froth around the casualty's lips, mouth and nostrils.

- **Aims →** Get air into the casualty's lungs as fast as possible, even in water. If necessary arrange removal to hospital.

- **Management →**
  1. Quickly remove any obstruction such as weed from the casualty's mouth and begin artificial respiration immediately.
  2. If in deeper water give the occasional breath of air while towing the casualty ashore.
  3. Place casualty on a firm surface, check breathing and pulse and continue Resuscitation.
  4. As soon as the casualty begins breathing place him in the recovery position.
  5. Keep him warm. If possible, remove wet clothing and dry him off. Cover with spare clothes and or towels to keep the body warm.
  6. Arrange shifting to hospital. Transport as a stretcher case, maintaining the recovery position.

:: NOTE ::
If the casualty stops breathing, give two initial rescue breaths and thirty Chest Compressions.
If you are alone, give CPR for 1 minute before calling Ambulance.

B. POISONING

- Some substances when taken in fairly large quantities can be dangerous to health or can cause death, such substances are called POISONS. They may be taken with a view to committing suicide, or may be given to persons by enemies deliberately, or taken by mistake.

- Poisons get into the body by swallowing, by breathing poisonous gases, and by injections.

- Recognizing and treating the effects of poisoning:

ENTRY POINT	POISON	SIDE EFFECTS	ACTION
Swallowed	• Drugs and Alcohol • Cleaning products • Gardening products • Plants poisons • Food poisoning	Nausea and Vomiting, Abdominal Pain, Seizures, Irregular or fast or slow heartbeat, impaired consciousness	• Monitor Casualty. • Seek medical help. • Resuscitate if necessary

ENTRY POINT	POISON	SIDE EFFECTS	ACTION
Absorbed through the Skin	• Cleaning products • Gardening products • Industrial poisons • Plant poisons	Pain, swelling, rash, redness, itching	• Remove contaminated clothing. • Wash area for at least 10 minutes. • Seek medical help. • Resuscitate if necessary
Inhaled	• Fumes from cleaning and DIY products • Industrial poisons • Plant poisons	Difficulty in breathing, Hypxia, Cyanosis (grey-blue skin coloration)	• Help Casualty into fresh air. • Seek medical help. • Resuscitate if necessary.
Splashed in the Eye	• Cleaning products • DIY and Gardening products • Industrial poisons • Plant poisons	Pain and watering of the eye, blurred vision.	• Irrigate the Eye. • Seek medical help. • Resuscitate if necessary.
Injected through the Skin	• Venom from stings and bites. • Drugs	Pain, redness and swelling at injection site, blurred vision, nausea and vomiting, difficulty in breathing, seizures, impaired consciousness, anaphylactic shock	• For Sting/Venom: • Remove sting, if possible. • Seek medical help. • Resuscitate if necessary. • For Injected Drugs: • Seek medical help. • Resuscitate if necessary.

➢ **TYPES OF POISONING & MANAGEMENT:-**

A. POISONING BY SWALLOWING→

Sometimes acids, alkalies, disinfectants etc; are swallowed by mistake. They burn the lips, tongues, throat, food passages and stomach and cause great pain. Other swallowed poisons cause vomiting, pain and later on diarrhoea. Poisonous fungi, berries, metallic poisons and stale food belonging to the latter group. Some swallowed poisons affect the nervous system. To this group belong:

- Alcoholic drink (Methylated spirit, wine, whisky etc.) when taken in large quantities.
- Sleeping pills, tranquilizers, and pain killers taken in overdoses.

All these victims must be considered as seriously ill. The symptoms are either delirium or fits or coma.

B. POISONING BY SWALLOWING→

Fumes or gases from charcoal stoves, household gas, motor exhausts and smoke from explosions etc., cause choking (asphyxia) which may result in unconsciousness in addition to difficulty in breathing.

C. POISONING BY INJECTION→

Poisons get into the body through injection, bites of poisonous snakes and rabid dogs, or stings by scorpions and poisonous insects. Danger to life is again by choking and coma.

➢ **FIRST AID IN POISONING→**

- Poisoning is a serious matter. Patient must be removed to a hospital or a doctor be sent for at once with a note of the findings and if possible the name of the poison.

- Preserve packets or bottles which you suspect contained the poison and also any vomits, sputum etc. for the doctor to deal with.

- **If Unconscious:-**

1. Do not induce vomiting.
2. Make the casualty lie on his back on a hard, flat bed without any pillow and turn the head to one side. As there is no pressure on the stomach and the gullet is horizontal, the vomited matter will not get

into the voice box and the tongue will not close the air passage. This is also the best posture for giving artificial respiration, if needed.

3. Sometimes when there is excess of vomiting the three-quarter prone posture (i.e., the Casualty is made to lie on his sides with one leg stretched, the other bent at knee and thigh) will make things easier for the Casualty.
4. If breathing is very slow or stopped, start artificial respiration and keep it up till the doctor comes.

- **<u>If Conscious:-</u>**
  1. Ask the person as to what has he/she consumed and quantity.
  2. Ask person's name and address.
  3. When the poison is a corrosive, do not induce vomiting.

- The poison must be diluted by giving large, quantities of cold water iced, if possible. This will dilute the irritant and delay absorption and will replace fluid lost by vomiting. Tender coconut water will be even better as this will be a food and also a diuretic.

- Soothing drinks can be given. Like Milk, beaten egg mixed with water or any other soothing drinks are good for the purpose.

SIGNS OF CORROSIVES

- Lips, mouth and skin show grey, white or yellow patches which are to be looked for, acids, alkalies etc. cause such burns.
- Factories which use certain chemicals shall have the respective antidotes ready and displayed in an easily available place. The personnel should be taught about the use of antidotes-so-that anyone can render assistance in case of emergency.

NOTE

- *For children between two and eight years of age one half or the quantity mentioned should be given.*
- *For infants less than two years one quarter of the quantity is sufficient.*

➢ **<u>POISON – SOURCE – FIRST AID →</u>**

POISON	SOURCE	FIRST AID
Arsenic	Rat Poisons and Arsenic itself	Induce Vomiting Give Soothing Drinks
Carbon-Monoxide	Charcoal Stove, Gas Stoves, Exhaust Gases of Cars	Apply artificial respiration. Give oxygen
Sleeping Tablets	Chemists	Induce Vomiting Give Mag. Sulph (2 Tea Spoons) Give Hot Coffee. Keep him awake.
Opium and Morphia	Hospitals, Some Mixtures, Opium Eaters	Put a few crystals of Potassium Permanganate in a tumbler of Water, give as a drink. Give Hot Coffee. Keep him awake.
Petrol, Kerosene, Oil, etc.	Houses, Garages, Industry	Induce vomiting Give a large quantity of water of tender coconut. Liquid paraffin if available is preferable to water in cases of Kerosene oil poisoning.
Phosphorus	Rat Poison, Match Heads	Induce vomiting Give a large quantity of water of tender coconut. *Note: Never give oils as they will dissolve phosphorous and increase the effect of the poison.*
Prussic Acid	Used in photography and electroplating and in oil of	- It is an emergency act at once. Induce vomiting.

	bitter almonds. Tender bamboo shoots.	- Begin artificial respiration.
Strychnine	Some vermin killers and also to kill stray dogs.	- Induce vomiting if there is no spasm. If breathing stops, give artificial respiration.
Follidol	- Used for bug and cockroach. - Destruction	- Induces vomiting. - Give water of tender coconut. - Start artificial respiration, if needed.
Insecticides and Weed killers	Agriculture	- Symptoms: Giddiness, blurred vision, chocking in Chest (slow pulse, contracted pupils, sweating, blue lips, convulsions) - Give artificial respiration till doctor comes.
Acids (Strong)	Hospitals, Laboratories, Garages, Industries	- Must not be made to vomit - Dilute the acid with large quantities of water of tender coconut. Better add soda bicarb, chalk or milk of magnesia to water.
Alkalis (Strong)	Hospitals, Laboratories, Industries, Ammonia slaked Lime (Chunam)	- Must not induce vomiting. - Give water of tender coconut in plenty. Better add orange or lime juice to it.
Disinfectants Carbolic Acid, Phenyle, Lysol, Dettol	Hospitals and Homes	- Do not induce vomiting. - Give four spoons of Mag. Sulp. in a litre of water.

C. BITES & STINGS →

1. SNAKE BITE:- There is more than 2,500 different kinds of snakes. Only about 200 of them are poisonous. All snakebites are not fatal. Most people die not because of the venom, but from fear. However, all snake bite cases are to be treated as if bitten by poisonous ones and should be referred to nearest health care provider.

AIMS OF FIRST AID→

1. To reassure the person.
2. To stop spreading of the venom.
3. To obtain medical aid.

MANAGEMENT→

1. Lay the patient down, give him complete rest. Calm and reassure him, never make him walk or sleep.
2. Wash the wound with soap and water. Flush the wound with lot of water.
3. Cover the wound with a sterilized dressing.
4. Get medical aid or send the person on a stretcher to the hospital as quickly as possible. If the snake has been killed, carry it to the hospital for identification. If breathing fails, commence artificial respiration.
5. Be on the lookout for signs of poisoning such as drooping eyelids, bleeding gums, unusual bruises, drowsiness, swelling, as well as difficulty in speaking.

2. DOG BITE:- Dog bites are sometimes very serious. They may cause infection the animal is suffering from rabies it will be transmitted to the person. The condition is known as Hydrophobia.

AIMS OF FIRST AID→

1. To prevent rabies or other infections.
2. To get medical aid.

MANAGEMENT→

1. Wash the wound thoroughly with plenty of soap and water.
2. Cover the wound with a dry, sterile light dressing.
3. Get medical aid or send the patient to the hospital for proper treatment.

The dog should not be killed. It must be chained if it is a pet animal and not risky to do so, and must be kept under observation for ten days. Rabies is also caused by infected cats, monkey and jackals. If animal cannot be observed or dies /runs away from observation, bitten person should be referred to nearest health care provider. Immediate washing the bitten area with soap and water is useful.

In case of animals that are stray and cannot be observed, the treatment with vaccine becomes essential. Animals suffering from rabies have short life, if the animal is kept under observation and survives; the possibility of rabies is much less where testing facilities are not available.

3. **STINGS OF MITES, TICKS AND LEECHES:-** Mites, Ticks and Leeches are found in marshes and jungles. They attach themselves firmly to the skin. Mites and Ticks may carry typhus and may transmit it to the person. Leeches are normally harmless, but they suck blood from the victim.

MANAGEMENT→

1. Don't try to remove the insects manually, their mouth part may remain in the skin and may cause inflammation and infection.
2. Put the burning of a cigarette to the body of the ticks and leeches. They will fall off.
3. Application of common salt results in leech dropping off.
4. Mites are so small that they can't easily be seen to be removed by hand.
5. Clean the area with mentholated spirit.
6. Apply weak ammonia or bicarbonate of soda or antihistamine ointment. This will relieve irritation.

4. **STINGS OF BEES, WASPS, FLEAS AND HORNETS:-** The stings of bees, wasps, etc., can cause a lot of pain. The area may swell. Sometimes the person may suffer from shock.

MANAGEMENT→

1. A sting should be removed with forceps, or with the tip of a sterilized needle.
2. Apply weak ammonia or bicarbonate of soda or antihistamine ointment to the area. This will relieve the pain.

D. CONVULSIONS →

There are convulsions that occur in children. The usual cause is high temperature caused by infective disease or infection of lung, throat or ear.

SIGNS & SYMPTOMS→

1. Twitches of the limbs, head and body.
2. Paleness of the face (later blueness).
3. Upturned eyes.
4. Holding of breath with foaming at the mouth.

MANAGEMENT→

1. Follow the general steps laid down.
2. Remember to keep child warm.
3. Consult the doctor for treatment and further management.

E. EPILEPSY →

Epilepsy is a disease of the young. Usually in the beginning the attacks of convulsions are rare, but they become more and more frequent later. The casualty hurts himself when he falls down.

Epilepsy May Be Minor or Major

(a) In minor Epilepsy, the casualty becomes pale, his eyes become fixed and staring and he becomes unconscious for few seconds. He resumes his work soon as though nothing had happened. Watch the casualty for development of a major attack, if any. Treat as for fainting.

(b) Major Epilepsy is a serious matter. The attack always follows headache, restlessness or a feeling of dullness. The casualty is aware that immediately he is going to get an attack of an epileptic fit.

The fit itself has the following four phases:

1. Sudden loss of consciousness which makes him falls to the ground. He may cry or scream.
2. The body becomes rigid for a few seconds. The face is flushed.
3. The fits begin in full force; the casualty may injure himself by striking against hard or sharp objects. There is frothing at the mouth and he may bite his tongue. He may pass urine and motion as these get out of control.
4. The attack lasts for a few minutes, the convulsion stops. The casualty is dazed and confused. He may act in a strange manner without knowing what he is doing. After some time, he becomes normal again.

MANAGEMENT→

1. Just keep the casualty under control, do not use force to stop the convulsions. Remove objects that may cause injuries.
2. Prevent biting of tongue by inserting a spoon wrapped in a handkerchief near the back teeth, when the jaws are relaxed.
3. Wipe froth from the mouth.
4. Follow the general rules for treating unconsciousness.
5. Watch for recurrence, if any. Leave the casualty after making sure he is aware of his surroundings. Advise him to see a doctor.

Generally →

1. Sudden unconsciousness.
2. Rigidity and arching of the back.
3. Convulsive movements.

In Epilepsy, the following sequence is common→

1. The Casualty suddenly falls unconscious, often letting out a cry.
2. He becomes rigid, arching his back.
3. Breathing may cease. The lips may show a grey-blue tinge (Cyanosis) and the face and neck may become red and puffy.
4. Convulsive movements begin. The jaw may be clenched and breathing may be noisy.

Saliva may appear at the mouth and may be blood-stained if the lips or tongue have been bitten.

1. There may be loss of bladder or bowel control.
2. Muscles relax and breathing becomes normal; the casualty recovers consciousness, usually within a few minutes. He may feel dazed, or act strangely. He may be unaware of his actions.
3. After a seizure, the casualty may feel tired and fall into a deep sleep.

F. DIABETES →

- Diabetes is a long-term medical condition where the body cannot produce enough insulin. Sometimes those who have diabetes may have a diabetic emergency, where their blood sugar level becomes too high or too low. Both conditions could be serious and may need treatment in hospital.

- Insulin is a chemical produced by the pancreas (that lies behind the stomach). It regulates the blood sugar (glucose) levels in the body. When someone has diabetes, their body cannot keep the blood sugar level within the normal range. Their level can be higher or lower than normal blood sugar.

- There are two types of diabetes:
  - Type 1, known as insulin dependent diabetes
  - Type 2, non-insulin dependent diabetes.

- Someone with diabetes may have items with them which could lead you to suspect that they have diabetes:
  - they may be wearing a medical warning bracelet or necklace
  - they may be carrying glucose gel or glucose tablets
  - they could have medication, such as an insulin pen, a special pump or tablets and a glucose testing kit.

➢ **HYPERGLYCEMIA:-** This is where the blood sugar level is higher than normal. It may be caus ed by a person with diabetes who has not had the correct dose of medication. They may have eaten too much sugary or starchy food or, they may be unwell with an infection.

Signs & Symptoms –

- warm, dry skin
- rapid pulse and breathing
- fruity, sweet breath
- excessive thirst
- drowsiness, leading them to become unresponsive if not treated (also known as a diabetic coma)
- medical warning jewellery or medication.

Management –

1. If you suspect **hyper**glycaemia (high blood sugar), they need urgent treatment. Call 999 or 112 for emergency help and say that you suspect hyperglycaemia.
   - They may be wearing a medical bracelet or medallion, or have a card on them which can alert you to their condition.

2. While you wait for help to arrive, keep checking their breathing, pulse and whether they respond to you.
   - If they become unresponsive at any point, open their airway, check their breathing and prepare to start CPR.

➢ **HYPOGLYCEMIA:-** This is where the blood sugar level is lower than normal. It can be caused by an imbalance between the level of insulin and the level of glucose in the blood. Someone with diabetes may recognise the onset of a hypoglycaemic episode.

Signs & Symptoms –

- weakness, faintness or hunger,
- confusion and irrational behaviour,
- sweating with cold, clammy skin,
- rapid pulse,
- palpitations,
- trembling or shaking,
- deteriorating level of response,
- medical warning jewellery or medication.

Management –

1. If you suspect hypoglycaemia (low blood sugar), help the person to sit down. If they have their own glucose gel or glucose tablets, help them take it. If not, you need to give them something sugary, such as an 150ml glass of fruit juice or non-diet fizzy drink; three teaspoons of sugar or sugar lumps; or three sweets such as jelly babies.

2. If they improve quickly, give them more of the sugary food or drink and let them rest. If they have their blood glucose testing kit with them, help them use it to check their blood sugar level. Stay with them until they feel completely better.

3. If they do not improve quickly, look for any other reason why they could be unwell and call for emergency help.

4. Keep monitoring their breathing and level of response while waiting for help to arrive
   - If they are not fully alert, don't try to give them something to eat or drink as they may choke.
   - If they become unresponsive at any point, open their airway, check their breathing and prepare to give CPR.

UNIT 14

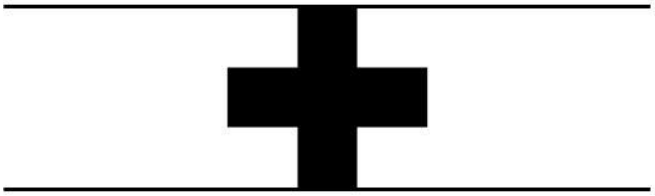
FIRST AID IN LEGISLATION

A. THE MINES ACT, 1952

Sl. No.	SECTION	STIPULA TION
1.	**Section 21(1)**	In every mine there shall be provided and maintained so as to be readily accessible during all working hours such number of first-aid boxes or cupboards equipped with such contents as may be prescribed
2.	**Section 21(2)**	Nothing except the prescribed contents shall be kept in a first-aid box or cupboard or room.
3.	**Section 21(3)**	Every first-aid box or cupboard shall be kept in the charge of a responsible person who is trained in such first-aid treatment as may be prescribed and who shall always be readily available during the working hours of the mines.
4.	**Section 21(4)**	In every mine there shall be made to as to be readily available such arrangements as may be prescribed for the conveyance to hospitals or dispensaries of persons who, while employed in the mine suffer bodily injury or become ill.
5.	**Section 21(5)**	In every mine wherein more than 150 persons are employed there shall be provided and maintained a first-aid room of such size with such equipment and in the charge of such medical and nursing staff as may be prescribed.
6.	**Section 58(ff)**	The Central Government may, by notification in the Official Gazette, make rule consistent with this Act for providing for the supply and maintenance of medical appliances and comforts and for prescribing the contents and number of first-aid boxes and cupboards, the training in first-aid work, the size and equipment of first-aid rooms and staff in charge thereof and the arrangements for conveyance of injured persons to hospitals or dispensaries;

B. THE COAL MINES REGULATIONS, 2017

Sl. No.	REGULA TION	STIPULA TION
1.	**Regulation 44(i)**	**Duties of the Safety Officer:** It shall be the duty of the Safety Officer to provide assistance in the formulation of programme for training at the mine level, including vocational training, training in gas testing, and training in first aid, etc.;
2.	**Regulation 174(e)**	**Whitewashing:** The roof and sides of every first aid station belowground shall be kept effectively whitewashed.
3.	**Regulation 175(1)(b)(viii)**	**General Lighting:** Adequate general lighting arrangements shall be provided during working hours at every first aid station belowground.
4.	**Regulation 241(1)**	**Use and supply of Helmet:** No person shall go into, or work, or be allowed to go into, or work in a mine, other than the precincts of a mine occupied by an office building, canteen, crèche, rest shelter, first aid room or any other building of a similar type, unless he wears a helmet of such type as may be approved by the Chief Inspector by a general or special order in writing.
5.	**Regulation 252(1)**	**Emergency Response and Evacuation Plan:** The Owner, Agent and Manager of every mine shall have a comprehensive programme in place to respond to an injury, illness or emergency that may occur at each mine including foreseeable industrial and natural disasters which shall include immediate first-aid treatment, medical treatment, transportation and evacuation of injured persons procedures to respond to emergencies that arise at the mine and make arrangements for the rescue of persons incapacitated or trapped in coal mines.



Conventions for preparing Plans and Sections - Symbol of Underground First Aid Station in a Plan as required under the Coal Mines Regulations, 2017

C. THE METALLIFEROUS MINES REGULATIONS, 1961

Sl. No.	REGULA TION	STIPULA TION
1.	**Regulation 41(6)**	**Duties of persons employed in mines:** Every person receiving an injury in the course of his duty shall, as soon as possible report the same to an official who shall arrange for the necessary first-aid to the injured person.
2.	**Regulation 175(1)(b)(vii)**	**Lighting and Safety Lamps:** Adequate general lighting arrangements shall be provided during working hours at every first aid station belowground.
3.	**Regulation 182(A)(1)**	**Use and supply of Helmet:** No person shall go into, or work, or be allowed to go into, or work in a mine, other than the precincts of a mine occupied by an office building, canteen, crèche, rest shelter, first aid room or any other building of a similar type, unless he wears a helmet of such type as may be approved by the Chief Inspector by a general or special order in writing.

D. THE MINES RULES, 1955

Chapter VI of the Mines Rules, 1955 termed "First Aid and Medical Appliances" deals with the First Aid Qualifications, Persons, etc., which are portrayed below:

Sl. No.	RULE	STIPULA TION
1.	**Rule 40(1)**	It shall be the duty of the owner, agent or manager of a mine to see that adequate and suitable arrangements are made for the training of persons in first-aid and the provision of such equipment as is prescribed in these rules.
2.	**Rule 40(2)(a)**	It shall be the duty of the owner, agent or manager to see that adequate and suitable arrangements are made for the speedy removal from the mine to a dispensary or hospital, of persons employed in the mine who while on duty suffers from serious bodily injury or illness of a serious nature.
3.	**Rule 40(2)(b)**	Unless otherwise approved by an order in writing of the Chief Inspector or an Inspector and subject to such conditions as may be specified therein, the arrangements for the purpose of clause(a) shall be by means of a proper ambulance van, and in case such ambulance van is not readily available in spite of proper and timely requisition, it may be by other suitable motor vehicle in which the person can be taken in a supine condition on a stretcher.)
4.	**Rule 41**	**First Aid Qualifications:** No person other than qualified nurse, dresser, compounder-cum-dresser or medical practitioner shall be appointed to render first-aid, or to be in charge of a first-aid station referred to in rule 44,unless he is the holder of a valid first-aid certificate of the standard of St. John's Ambulance Association (India).
5.	**Rule 42(1)**	The owner, agent or manager of a mine shall see that every first-aid station provided under rule 44 is placed, during every working shift, in charge of a person holding qualifications specified in rule 41. The persons in charge of a first aid station in any shift should be readily available throughout the shift.
6.	**Rule 42(2)**	The name and designation of every person appointed to be in charge of a first -aid station shall be prominently, displayed at every first-aid station.
7.	**Rule 42(3)**	An up-to-date list of persons appointed to be in charge of first-aid stations in the mine shall be kept in the office of the mine and also displayed prominently at the first-aid room.

8.	**Rule 43(1)**	At every mine employing more than 150 persons on any one day of the preceding calendar year, there shall be provided and maintained in good order a suitable first-aid room.
9.	**Rule 43(2)**	The first-aid room shall be situated at a convenient place on the surface of the mine and shall be used only for first-aid work.
10.	**Rule 43(3)**	The first-aid room shall have a floor space of not less than 10 square metres and shall contain at least the equipment specified in the Second Schedule.
11.	**Rule 43(4)(a)**	The first-aid room shall be in charge of a qualified medical practitioner, where the number of persons ordinarily employed in a mine is more than 1000, such medical practitioner shall be a whole time employee at the mine.
12.	**Rule 43(4)(b)**	The medical practitioner referred to in clause (a) shall be assisted by a nurse and a dresser or a compounder and a dresser who are qualified in the Allopathic system of medicine. Whenever the Chief Inspector feels it necessary, he may require by an order in writing that such number of additional nurse or compounders or dressers shall be appointed to assist the medical practitioner as may be specified by him.
13.	**Rule 43(4)(c)**	The nurse, compounder or dresser referred to in clause (b) shall be whole time employee of the mine and shall be readily available at the first-aid room throughout the period when persons work at the mine : *Provided that wherein conformity with any other law in force, or otherwise an adequately equipped hospital or dispensary belonging to the owner of the mine or to any Mines Welfare Organisation is provided and maintained at or in the immediate vicinity of the mine, the Chief Inspector or an Inspector authorized by him in this behalf may grant exemption from the provision of this sub-rule subject to such conditions as he may specify in writing.*
14.	**Rule 43(5)**	Every person who suffers an injury during the course of work shall report for examination or treatment at the first aid room, hospital or dispensary, as the case may be, before leaving the mine, irrespective of first-aid having been rendered at or near the place of work.
15.	**Rule 44(1)**	At every mine there shall be provided and maintained first-aid equipment as prescribed in the Third Schedule, at conveniently accessible stations where injured persons may receive first-aid treatment, as follows: (a) above ground, a first- aid station – (i) at the top of every shaft or incline where men or material are normally wound or hauled; (ii) in every workshop; (iii) at every screening plant and loading place; and (iv) at every other place where more than 50 persons are employed at any one time. (b) In every opencast working, one first-aid station for every 50 persons or part thereof, employed at any one time; and (c) below ground, one first-aid station - (i) at the bottom of every shaft where men or material are normally wound, and at or near every plant; (ii) near the drive end of every haulage; (iii) in or at the entrance to every district or section of the mine; *Provided that nothing in this sub-rule shall be construed to require the provision of a first aid station within 300 metres of another first-aid station.*
16.	**Rule 45**	Not with standing anything contained in rule 42, every Overman, Foreman, Sirdar, Mate, Shot-firer, Blaster, Electrician and Mechanic in a mine shall hold the first aid qualifications specified in rule 41 and shall carry, while on duty, a first-aid outfit consisting of one large sterilised dressing, one small sterilised dressing and an ampoule of tincture of iodine or other suitable antiseptic, and such outfit shall be securely packed to protect it against dirt and water.
17.	**Rule 45A(1)**	Every person receiving an injury in the course of his duty shall, as soon as possible, report the same to an official. Where the person receiving an injury is not in a position to report the same to an official, it shall be the duty of the person who first comes to know of it to report the same to an official. The official shall make such arrangements for rendering first aid to the injured as

		may be required. If in the opinion of the official the injury is of such a nature as to require immediate attention by the medical practitioner he shall arrange for the medical practitioner to be called.
18.	**Rule 45A(2)**	If an official who is required to carry a first-aid outfit under Rule 45 receives information about injury to a work person, he shall himself attend to the injured person.
19.	**Rule 45A(3)**	It shall be the duty of the person in charge of the nearest first-aid station provided under Rule 44 to render such first-aid to the injured person as may be necessary.

E. THE FACTORIES ACT, 1948

Sl. No.	RULE	STIPULA TION
1.	**Rule 45(1)**	**First Aid Appliances:** There shall in every factory be provided and maintained so as to be readily accessible during all working hours first-aid boxes or cupboards equipped with the prescribed contents, and the number of such boxes or cupboards to be provided and maintained shall not be less than one for every one hundred and fifty workers ordinarily employed at any one time in the factory.
2.	**Rule 45(2)**	**First Aid Appliances:** There shall in every factory be provided and maintained so as to be readily accessible during all working hours first-aid boxes or cupboards equipped with the prescribed contents, and the number of such boxes or cupboards to be provided and maintained shall not be less than one for every one hundred and fifty workers ordinarily employed at any one time in the factory.
3.	**Rule 45(3)**	Each first-aid box or cupboard shall be kept in the charge of a separate responsible person, who holds a certificate in first-aid treatment recognized by the State Government and who shall always be readily available during the working hours of the factory.
4.	**Rule 45(4)**	In every factory wherein more than five hundred workers are ordinarily employed there shall be provided and maintained an ambulance room of the prescribed size, containing the prescribed equipment and in the charge of such medical and nursing staff as may be prescribed and those facilities shall always be made readily available during the working hours of the factory.

F. THE OCCUPATIONAL SAFETY, HEALTH & WORK CONDITIONS CODE, 2020

Sl. No.	SECTION	STIPULA TION
1.	**Section 24(1)(viii)**	The employer shall be responsible to provide and maintain in his establishment such welfare facilities for the employees as may be prescribed by the Central Government, including, adequate first-aid boxes or cupboards with contents readily accessible during all working hours;
2.	**Section 136(zzi)(ii)**	The Central Government may, by notification, make regulations consistent with this Code requiring protective works to be constructed by the owner, agent or manager of a mine before the mine is closed, and in the event of non-compliance, for getting such works executed by any other agency and for recovering the expenses thereof from such owner in the same manner as an arrear of land revenue; providing for the ambulance rooms, first aid and rescue facilities and arrangements for the removal of dock workers to the nearest place of treatment;

CONTENTS OF A FIRST AID BOX

FIRST AID BOX – SMALL

Sl. No.	ITEM	QUANTITY
1.	Silver Sulfadiazine Ointment	01 Tube
2.	Band Aid	10 Strips
3.	Roller Bandage (5cm x 5m)	01
4.	Sterilized Cotton Wool (Absorbent)	01 Packet
5.	Scissors 7cm (Sharp/Blunt)	01
6.	Sterilized Dressings (Assorted Sizes)	02
7.	Paracetamol Tablets	01 Strip
8.	Mouth-to-Mouth Resuscitator (Plastic)	01
9.	Triangular Bandage	01
10.	Safety Pins	10

FIRST AID BOX – MEDIUM

Sl. No.	ITEM	QUANTITY
DRESSING MATERIAL		
1.	Sterilized Finger Dressing	10
2.	Sterilized Foot and Hand Dressings	10
3.	Sterilized Dressing – Large	10
4.	Sterilized Dressing – Extra Large	01
5.	Sterilized Field Dressing – Army Pattern	02
6.	Sterilized Shell Dressing	02
7.	Sterilized Burn Dressing – Small	04
8.	Sterilized Burn Dressing – Large	02
9.	Adhesive Dressing Strips	50
10.	Roller Bandage – 5cm x 5m	04
11.	Roller Bandage – 7.5cm x 5m	02
12.	Triangular Bandage – 90cm Broader Size	06
13.	Gauze – 7.5m x 75cm Compressed	01
14.	Sterilized Cotton – Absorbent	04
15.	Sterilized Eye Pads	06
16.	Adhesive Plaster – 2.5cm x 5m	01
17.	Silver Sulphadizine Skin Ointment	01
18.	Savlon/Dettol	01
19.	Paracetamol Tablet	50
20.	Chloromycetin Eye Applicaps	50
EQUIPMENT		
21.	Surgical Scissors – 12.5cm Sharp/Blunt	01 Pair
22.	Mouth-to-Mouth Resuscitator (Plastic)	01
23.	Split – Inflatable (3 Arms/3 Leg) – Set of 6	01 Set
MISCELLA NEOUS		
24.	Torch	01
25.	Safety Pins	01
26.	Scribbling Pad	01
27.	Record Card in Plastic Cover	01
28.	First Aid Leaflet Form	01

FIRST AID BOX – LARGE

Sl. No.	ITEM	QUANTITY
DRESSING MATERIAL		
1.	Sterilized Finger Dressing	18
2.	Sterilized Foot and Hand Dressings	24
3.	Sterilized Dressing – Large	20
4.	Sterilized Dressing – Extra Large	02
5.	Sterilized Field Dressing – Army Pattern	04
6.	Sterilized Shell Dressing	02
7.	Sterilized Burn Dressing – Small	06
8.	Sterilized Burn Dressing – Large	04
9.	Adhesive Dressing Strips	100
10.	Roller Bandage – 5cm x 5m	06
11.	Roller Bandage – 7.5cm x 5m	06
12.	Triangular Bandage – 90cm Broader Size	12
13.	Gauze – 7.5m x 75cm Compressed	01
14.	Sterilized Cotton – Absorbent	08
15.	Sterilized Eye Pads	06
16.	Adhesive Plaster – 2.5cm x 5m	02 Spools
17.	Silver Sulphadizine Skin Ointment	01
18.	Savlon/Dettol	01
19.	Paracetamol Tablet	50
20.	Chloromycetin Eye Applicaps	50
EQUIPMENT		
21.	Surgical Scissors – 12.5cm Sharp/Blunt	01 Pair
22.	Mouth-to-Mouth Resuscitator (Plastic)	01
23.	Split – Inflatable (3 Arms/3 Leg) – Set of 6	01 Set
MISCELLA NEOUS		
24.	Torch	01
25.	Safety Pins	01
26.	Scribbling Pad	01
27.	Record Card in Plastic Cover	01
28.	First Aid Leaflet Form	01
29.	Ambu Bag	01

Ashritha Mines & Minerals Association
First Aid Training Institute

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