PREFACE

Imparting first aid has become necessary in our day to day life. There is no dearth of first-a manuals and text books used for various purposes. Each book has its importance and limitation depend on the situation for which it is designed. The approach, scope, techniques, practice and utility of first-a had changed considerably during these years due to advancement of medical care and availability many more user-friendly appliances and medicines. The awareness of general population has a increased. What was considered sophisticated technique decades back, has become basic knowled now since layman of today is more informed about health, diseases and basic medicare. Many of foreign text books designed for the developed society do not serve the needs of the Indian commu due to obvious socio-cultural differences and communication barriers. Particularly for industrial wor and miners need for a practical manual based on Indian conditions and written in simple understand language by majority was felt. While imparting first-aid training to different groups of participants as, industrial workers, miners, school students, nurses, drivers, police, NCC cadets and housewi was experienced that overloading the trainees with medical facts does not fulfill the objective of firs Rather different techniques should be explained in simple language with examples and demonstra emphasising their practical application.

This book is mainly designed for the employees working in the industries and mines who be given the responsibility of handling the first-aid boxes at the workplace after completion training. Workers of unorganised sector and self-employed persons will also be benefited. Case s for group exercise have been incorporated to assist action-oriented thinking process. Some comput flow charts for taking appropriate action during various conditions have been designed for quick refe Hope, this book will provide up-to-date information for the first-aiders and enrich their knowled

Suggestions and creative criticism from the readers will be most welcome.

(Dr. J. K. Mahapatra

INTRODUCTION

It is said that "Accidents do not happen but they are caused". But the person who is the cause of accident, may not be the victim. Of course, it is wise to work safely. But inspite of taking all precautions, sometimes accidents creep in and injury may follow, but not always. Many a times, a minor injury turns out to be serious if not attended in time. Either due to ignorance or due to nervousness, the onlookers gathered at the accident spot do not come forward to help the casualty. Those who try to do something, they fumble or they are dissuaded by others. Such a situation may arise either at the work place, on the road, in the home or play ground. It is therefore necessary for every responsible citizen to know the basic principles of first aid to help the fellow men. However, many people feel that first aid means only application of medicines or bandages to a wound or fractured limb. They also believe that it is not possible to render first aid without a first aid box. In many situations where there is possibility of accident, it is statutory to maintain first aid boxes with prescribed contents. But the knowledge in First aid is more important than the first aid material. In real practice, if a person knows what is to be done exactly at the time of an accident or sudden illness, he may be more useful.

The medical facilities have increased manifold in our country during last few decades. Particularly in the industries, mines, other manufacturing units and service sectors, medical services have been introduced as an important function to provide medicare to the employees at the workplace during emergency. Yet, need for first-aid cannot be eliminated completely. First-aid becomes necessary immediately after an accident or during sudden illness at workplace or home to manage the critical conditions. First-aid has its unique place in the entire medicare system. A first aider plays a vital role by rendering first-aid which is the first step of medical treatment. With the changing time, techniques of first-aid have also been changed over the years. Hence, the role of trained first-aiders to provide timely assistance has become more important. In the industrial community, where the chances of accident is high at the workplace, road and home, the employees and their family members should be trained to follow immediate correct steps before reaching the hospital or the doctor's clinic. In fact, if more people are trained in first-aid, they may be utilised during disasters, natural calamities and civil defence as volunteers.

In any industry, the first-aiders can reduce the load on medical services by taking care of the minor cases at the workplace itself and sending those victims to the factory clinic promptly for treatment. In fact, only a small number of all accident victims need to be treated by a doctor or in the hospital whereas majority of the cases get quick relief if timely first-aid is given. This is actually the real utility of first-aid training in large and small scale industries. In addition to this, first-aiders in factories and mines are required to be in change of first-aid boxes/ first-aid posts to render first-aid to their colleagues.

Homes are not free of accidents too. Modern gadgets available in the kitchen, various chemicals used daily, powered toys used by children and improper storage of left-over medicines are potential dangers in every house. Storage of insecticides and chemical fertilizers in rural homes are also increasing in villages. Everyone in the house should know what to do when somebody is injured or becomes ill suddenly. Placing the casualty in proper position and using material from the home first aid kit or medicine cupboard is expected in most of the houses today. Children, women and elderly persons may often need first-aid at home.

The road accidents are increasing not only on the national highways but in urban and rural ro Use of mopeds, scooters, motor cycles have increased manifold and thousands of victims die or bec injured every year in road accident. Shop keepers on the road side, students and even citizens train first aid can attend to road accident victims correctly before sending to the hospital. For this purp first aid boxes/kits should be kept in road side telephone booths, fuel filling stations (petrol pumps) public market p!aces for use of travellers. Trained persons should be available to handle these first boxes. This is considered as a social responsibility now.

Due to increased awareness about health among the public, practice of first aid is not confine medical or paramedical persons today. In fact, most of the lay people should have some knowledg first aid which should be brushed up with formal training by a professional expert or voluntary organis One life saved by a trained individual at the right time is a valuable social action and immense satisfa to the first-aider.

Every now and then we receive the mews of mass casualty caused due fire, rail & road accid drowning of boats or motor vehicles falling into river, cyclones, heat wave, flood, earth quake and m types of natural calamities. This involves a large numbers of persons who are injured simultaneo and have to be given medical aid urgently. The locations where such accidents occur are usually a from hospitals or medical aid centres. The rescue, transport and first aid care of these casulty is us arranged by the local people. If first aiders are available on the spot, they can better organise services by avoiding caotic situations.

First-aid care was initially limited to the battle fields to give immediate assistance to the injured soldiers. Subsequently, Red Cross Society and Ambulance Associations of different cou extended such facilities to the civilian population and popularised first aid movement all over the w In this era of industrialisation and increase of road traffic, the need for first-aid is felt during a wide of activities and therefore made statutory through various Acts & Rules.

The role of the first-aider as a first line of medical worker is important. Adequate knowledg and practice enables him to distinguish between serious and minor cases and exact first-aid care ne for each victim. His decision and action taken in each case determines the recovery process. H training in first-aid should be so designed to establish confidence and improve competence of the aider as a devoted professional though he was an ordinary layman before the training.

First-aid training should be imparted in simple and understandable language with audio-visua and practical demonstration. Each participate should be trained to handle the first-aid boxes kept workplace efficiently. Advanced or refresher training should be arranged at suitable intervals year) to refresh and update the knowledge. After the end of each first-aid training course, an exam should be conducted and the successful trainees should be awarded a 'Certificate of Competen serve as Certified first-aiders. Such certificates should preferably be recognised by the statutory auth so as to encourage and authorise the first-aider to handle the cases confidently. It should be bor mind that whatever the standard of first-aid care may be, it does not replace medical treatment. There the first-aider may refer cases to a doctor as and when necessary. A brigade of first-aiders dev through systematic training are not only quite useful for the organisation to which they belong but they serve an important social purpose by rendering their services for the community and the co the time of real need.

❑❑❑

1

PRINCIPLES OF FIRST-AID

DEFINITIONS :-

First-aid : It is the immediate skilled assistance given to a person in case of an accident, injury or sudden illness before medical aid is available.

Medical aid : Treatment given to the sufferer (patient) by a doctor or any other medical staff on the spot, in the home of the patient, in the doctor's chamber or clinics.

Casualty : The person who suffers and needs first-aid is called casualty or victim.

First - aider : A person who is trained in first-aid techniques to render first-aid care and holds a valid certificate issued by a recognised organisation or institution.

Diagnosis : The identification of the condition (s) what the casually suffered from.

Symptoms : What the casually complains of about his/her condition.

Signs : What the first-aider finds out himself during examination.

History : Details of the causes and effects of accident or illness given by the casualty or any other persons present at the time of incident.

OBJECTIVES OF FIRST-AID :

- To save life
- To prevent further complications
- To relieve pain and discomfort
- To promote early recovery

SCOPE OF FIRST-AID :

Diagnosis : Assessment and confirmation of the condition(s) that the casualty suffers from, should be done by considering the history of the case, symptoms and signs detected during examination.

Treatment : Life saving procedures should be adopted first and other condition should be treated subsequently.

Disposal : The casualty should be brought under medical care if required, as quickly as possible. The minor cases may be disposed off after giving appropriate first-aid.

Remember : The health of the casualty is the first consideration. Do not do anything to worsen it.

WHY FIRST-AID TRAINING ?

- First-aid knowledge gives a clear understanding of life process, death, disability and acute or chronic illness.
- Through first-aid training, a person is prepared to help others at the time of accident, sudden illness, natural calamities or disaster at the workplace, on the road, in the playground or at home. It creates humanitarian feeling for others and encourages a person to assist the needy and helpless.
- The first-aider is better able to take care of minor injury or illness. He can even guide others to help him by adopting correct procedure.
- Particularly in an industrial set up, out of all accidental injuries only 2% to 5% of cases need medical care. About 95% of the work injuries can be taken care by the first-aider by using a first aid box kept at the workplace for the purpose.
- In factories and mines, qualified first-aiders from amongst the employees should be made available round the clock to handle the first-aid boxes as per statutory provisions. More trained persons should be available on the shop floor to take the responsibilities.
- Persons engaged in hazardous jobs and dangerous operations may need first-aid sometime or other. As a preparation to this, a good number of persons should be trained in first-aid from amongst them.
- First aider has a major role to play as a volunteer during disasters, natural calamities and war time. This knowledge of first-aid becomes a civic responsibility.
- Number of power driven vehicles are increasing on the road and road accidents are also rising. First-aid can be rendered to the accident victims who may be a friend or a stranger travelling on high-way.
- Rail, bus, truck, boat or air accidents affecting many casualties at a time are increasing now-a-days. Basic knowledge in first-aid saves the life of fellow passengers and relatives.
- The expanding health needs and non-availability of medical facilities particularly in rural areas, farm houses, required training of more first-aiders to provide basic health care. The training can be given to selected villagers who may serve as basic health workers.
- First-aid training promotes safety awareness among various category of workers. This helps the individual encounter a variety of problem situations even in remote areas and to improvise first aid facilities.

❑❑❑

ACTION DURING AN EMERGENCY

Whenever a medical emergency arises, the first-aider should act quickly, calmly, correctly and in a systematic manner. In case of major accidents or disaster a first-aider may have to attend a number of cases at the same time. A methodical approach, sorting out casualties and dealing the serious cases on priority basis is important in such situations. The action is based on correct approach, quick assessment of the situation, through examination of the casualties, appropriate management, referral of serious cases and transporation of casualties by using available means.

APPROACH :

- Come forward voluntarily to offer help promptly.
- While approaching a casualty, ensure that you are not facing any danger.
- If there is further risk to the casualty, arrange for a prompt rescue to a safe place.
- Listen to the suggestion of the on-lookers, but decide your-self what to do exactly. Do not fumble.
- Do not do anything which may worsen the condition of the casualty.

ASSESSMENT :

- Immediately assess the situation and decide priorities of action.
- Minimise the risk of danger to casualty, yourself and the gathered crowd.
- Take care of the safety aspect in case of road accidents, poisonous gases & fumes, fire, water, chemicals and electrical contact.
- Ask others present on the spot of accident to help you. Many of them may be helpful and may volunteer to assist you.
- Decide the priorities of action on the basis of condition of the casualty and if any life saving action needed.
- Call for assistance from ambulance service, fire brigade, police (or internal security) known relatives of the victim or factory manger (in case of work accidents).
- While telephoning for assistance be brief and clear. Ensure that the other person understands what you spoke.
- When multiple casualties are there, attend those cases first which need your care most. Decide yourself. Do not get worried by shouts and suggestions of others.
- Proceed to attend the cases one after another and transport those cases quickly who need medical assistance.

EXAMINATION :

- Collect full history of how the incident occurred or the illness began from the casu accompanying persons. Consider them carefully.
- The symptoms may be described by a conscious casualty. If the casualty is unconsc the signs which may give clues to the diagnosis.
- You should be able to detect important signs during systematic examination of the ca
- The diagnosis of the case should be done by correlating the history with signs and sym a thorough examination.
- Some of the common symptoms and signs are :

Symptoms - Pain, tenderness, loss of sensation, loss of movement, feeling of cold or nausea, dryness of mouth, vomiting, fainting, difficulty in breathing, palpitation, una reeling of head etc.

Signs - Breathing difficulty, bleeding, wounds, colour of skin, foreign body, swelling vomit, involuntary passing of urine or stool, sweating, smell of alcohol or gas, nor increased heart rate, rapid pulse etc.

- If the casualty is conscious, examine thoroughly for a correct diagnosis.

WHAT TO LOOK FOR ?

- **Mouth-** Check breathing noting rate, depth, regularity, nature, odour if any. Disco dryness of lips, missing of any teeth or broken tooth, bleeding from floor of mo tongue, dentures, any foreign body or injury of any kind.
- **Nose -** Bleeding or any other secretion, movement of nostrils during breathing, ch of the skin on the tip of the nose.
- **Eyes -** Compare the pupils of both eyes They may be of unequal size, dilated or co blackening or bleeding around the eyes.
- **Face -** Look for the colour - paleness, flushing, bluish, feel the temperature an skin. Observe sweating on the forehead
- **Ears -** Foreign body, blood or yellow fluid, speak softly to test hearing.
- **Skull -** Swelling, fracture, irregularity or bleeding.
- **Neck and spine -** Test for movement of neck and limbs. Any associated pain? normal sensation is present. Any projection or swelling over the spine ?
- **Trunk-** Chest movement, deformity, depression, protrusion of ribs. Check both for irregularity and deformity.
- **Upper limb -** Check for deformity, swelling or fracture of all bones of arm, for fingers of both limbs.
- **Lower limb -** Check hips, thighs, kneecap, both bones of legs, ankles, feet and t deformity and fracture.
- **Some objects carried by the casualty -** May give clues about identification and identity card, diary, medical prescription, caution card etc.

MANAGEMENT :

* **To preserve life :**
  - Maintain clear airway.
  - Take care of unconsciousness.
  - Apply resuscitation.
  - Control bleeding promptly.
  - Prevent shock

* **To prevent worsening of the condition**
  - Dress wounds
  - Immobilise fractures
  - Keep the victim in comfortable (prone, semiprone, supine, recovery, cardiac, shock, knee chest) position.

* **To promote recovery**
  - Gain confidence of the casualty
  - Relieve pain and discomfort
  - Protect from complications and bad climate
  - Arrange for transport
  - Record the case in the ambulance room/factory clinic in case of work injury.

* **Follow up action**
  - Accompany the casualty to hospital if possible. Explain the doctor about the condition of the casualty and action already taken.
  - If the condition of the casualty is alright, send him to home or workplace accompanied by a friend, co-worker or relative.
  - Keep the clothes and valuable objects (ornament, wrist watch, money etc.) of the casualty in safe custody and handover them to family members after the crisis is over.

TAKE ACTION ON PRIORITY

1. Make sure that there is no further danger to yourself or the casualty.
2. Act promptly and methodically giving priority to serious conditions.
3. Take care of the unconscious victim first.
4. Adopt life saving action promptly.
5. Keep the casualty in correct and comfortable position.
6. Prevent shock.
7. Stop bleeding and dress the wounds.
8. Immobilise fractures.
9. Consider the possibility of poisoning.
10. Observer the casualty for sometime before transporting to the hospital.
11. Transport the casualty in a comfortable position quickly.
12. Report the incident to the police when necessary.

❑❑❑

3

LIFE-SAVING ACTIONS

There are three vital functions of human body to keep a person alive and active. These are Breathing, Blood circulation and Consciousness. The vital organs which carry out these functions are air passage and lungs, heart and blood vessels & brain and nervous system respectively. If these three functions are normal, in most cases there is no danger to life. On the contrary, if any of these functions are affected badly, then life is at risk and life saving actions are required urgently. Therefore a first aider should be able to identify the life threatening conditions and act immediately to save life. A first-aider may come across one or more casualties who may need help at the same time. Considering their condition, the cases have to be attended on priority basis by the first-aider.

The first aider may come across the casualties in different states. Various conditions have to be identified quickly so that appropriate first aid can be planned.

Identification of various states of the casualty

	Life	Sleep	Shock	Unconsciousness	Death
Vital functions (Organs)	All normal	All normal	Depressed	Temporary absence of one or more functions; Can be resuscitated	Permanent absence of all functions Cannot be brought back to life
Breathing (Lungs)	normal	normal	Depressed	May be affected (asphyxia)	Absent
Blood circulation (Heart)	normal	normal	Greatly affected	May be affected (circulatary faidure)	Absent
Consciousness (Brain)	normal	semiconscious and can be aroused easily	Absent	Absent temporarily	Absent

After quick examination of the casualty the first aid should be given in a systematic manner by taking life saving achiors.

LIFE SAVING ACTIONS ARE :

- Care of the Unconscious victim
- Cardio-Pulmonary Resuscitation (CPR)
- Artificial Respiration (Expired Air Resuscitation)

- External Cardiac Compression (ECC)
- Controlling Blood Loss.
- Preventing Shock.

CARE OF THE UNCONSCIOUS VICTIM

Unconsciousness : Is a state resembling sleep from which the person cannot be roused easily. It may be partial (**stupor**) or complete **(coma).** Breathing may or may not be affected in an unconscious victim.

When breathing is absent. The condition is called **Asphyxia**. This condition leads to unconsciousness. If not attended immediately it can cause death. Asphyxia and unconsciousness should be differntiated from shock and death.

Causes of unconsciousness :

Accidental causes : Partial drowning, Electric shock, Head injury, Attempted suicide, Poisoning, Heat stroke , Gassing due to poisonous gases like coal gas, Carbon monoxide.

Medical causes : Epilepsy, Hysteria, Stroke, Diabetes, Heart arrest, Alcoholism, Drug addiction, Diseases of Brain, Heart, Lungs, Liver or Kidneys.

Management :

1. *Assess the condition of the victim and probable cause by a quick examination.* Differentiate unconsciousness from sleep, shock and death.
2. *Remove the casualty from the source of danger* : If any e. g. gas, fire,electricity, road traffic etc. Otherwise give first-aid on the spot to save time.
3. *Keep the victim in recovery position* : The victim is made to lie down with the face downwards and head turned to one side, elbows bent, hands resting under the head one leg bent at the knee and feet resting on the ground comfortably.

(Fig.2. Victim kept in recovery position)

4. *Look for the signs and symptoms to confirm diagnosis*: Paleness of face, absence of breathing, difficulty in breathing, choked airway, non-response to spoken words or painful stimulation, convulsions, absence of pulse or heart beat, sweat on the forehead, smell of alcohol or drugs, froth coming out of the mouth, tongue may be drawn in, head injury and severe bleeding etc.
5. *Loosen tight clothing's : Especially around the neck, chest or waist*. Loosen shoe-laces, belt, neck-tie etc.
6. *Remove false teeth, spectacles, wrist watch, contents of chest pocket and keep them safely.*
7. *If there is difficulty or absence or breathing, start 'mouth to mouth breathing'* or use a breathing apparatus (resuscitatior) if available by placing the victim in supine (face upward) position.
8. *If heart beat is also absent, apply external cardiac compression* and continue Cardio-Pulmonary Resuscitation (CPR)
9. If breathing and heart functions are normal, *send the casualty quickly to a doctor or hospital* in lying down position.
10. Do not slap or throw water on the face to wake up the victim.
11. Do not give the victim any thing to drink.
12. Do not blow through the ears.
13. Do not transport the casualty in sitting position.
14. Use Oxygen, if available.

(Fig. 3.Mouth to Mouth Breathing.)

CARDIO-PULMONARY RESUSCITATION (CPR) :

Resuscitation is a life-saving procedure adopted by taking care of the Airway, Breathing, Circulation and related emergency care. Resuscitation method applied to restore the functions of heart and lungs is termed as Cardio-pulmonary Resuscitation (CPR). Resuscitation should be tried when a person collapses suddenly due to sever injury, partial drowning, electric shock, chest injury, heart arrest, certain diseases (stroke, heart disease), poisoning, suffocation, gassing, asphyxia, convulsions (fits) etc.

Cardio-pulmonary Resuscitation consists of two parts : Expired Air Resuscitation (EAR) and External Cardiac Compression (E.C.C.). Before starting CPR a few things should be checked :

Airway : the airway (breathing passage) of the casualty may be blocked or narrowed down due to several reasons-head may be tilted back,tongue may slip back, loss of muscle control, muscle spasm (contraction), impairment of reflexes, saliva or vomited material in the back of throat and physical obstruction by some foreign body (loose tooth, food material etc.).

Blockage of airway will cause laboured effort during breathing, noisy breathing, choking sensation, movement of nostrils and drawing in of the chest wall.

To clear the airway, the victim should be put in supine or recovery position with head turned to one side. Mouth should be cleaned with a swab or a piece of gauze and bent index finger should be used

to remove the foreign body (half chewed pan, broken teeth, nuts, chewing gum etc.) physically. Once the airway is clear, breathing may start automatically.

Breathing : To check breathing, look for the up and down movement in the lower part of chest and abdomen. Listen and feel for air passing through nose and mouth. Abnormal (wheezing, gurgling) chest sounds may be produced during breathing. If breathing is absent, start Expired Air Resuscitation by mouth to-mouth or mouth-to-nose method. Use a resuscitation apparatus if available.

Circulation : Heart and blood vessels are responsible for blood circulation throughout the body. To assess the condition of blood circulation, the first-aider should feel the pulse at the wrist on the thumb side and at the neck on both sides of wind pipe (Carotid pulse) and listen to the heart beat on the left side of chest. If pulse and heart beat are present, probably there is no danger to the circulation. If absent, apply External Cardiac Compression by placing the victim in supine position.

Consciousness : In most of the cases, when breathing and heart beat are absent, the victim is unconscious. If the victim is conscious, then CPR may not be required. In cases of unconsciousness arising due to diabetic coma (or hypoglycemic coma) hepatic coma (due to liver disease) brain diseases (encephalitis, meningitis,stroke) and kidney failure, CPR may not be of much use.

EXPIRED AIR RESUSCITATION (E.A.R.):

There are two methods for giving Expired Air Resuscitation mouth-to-mouth and mouth-to-nose methods. Mouth-to-mouth method is commonly used, which is simple, convenient to apply, effective, can be applied for a longer period without fatigue and does not harm either the victim or the first-aider.

Procedure :

1. Make the casualty lie down on his back (supine position) on the floor, on a cot, table hand bed or any raised platform. Kneel or sit comfortably on one side of the causalty's head so that your mouth can come over the mouth of the casualty conveniently.
2. Clean the mouth of the victim quickly and remove if there is any foreign body, false teeth, vomited matter etc. Make sure that the tongue is forward and mouth is dry.
3. Tilt the victim's head well back. A small pillow may be placed under the neck.
4. Hold his chin up in one hand and pinch his nose with the other.

(Fig. 4. Expired air resuscitation method.)

5. Take a deep breath, place your mouth over the mouth of the casualty and blow gently until the chest rises. Observe the chest.
6. Remove your mouth and wait until the chest sinks back again to its usual position.
7. Take a deep breath and blow once again gently.
8. Give first six blows quickly and thereafter at the rate of ten to fifteen times per minute.
9. Continue this procedure till the victim breathes normally.
10. In case of a child, your mouth covers both nose and the mouth of the child. Blow gently through the mouth and nose. Do not pinch the nose.

(Fig. 5. Application of EAR method in case of a child.)

REMEMBER

- Do not blow very hard ; blow till the chest rises, not harder than that. Blow still gently in case of women and children. If you blow harder and quicker, you may feel exhausted. Hold your breath for a few seconds at intervals and start again.
- Inspite of your blowing, if the chest fails to rise, the airway may be blocked lower down or sufficient air is not entering into the lungs. It may be because; the chin has not been pushed back properly. Adjust the position of the chin and try again.

  Victim's mouth is not sufficiently open due to muscle spasm or due to falling in of the lips (specially if teeth are absent). Blow through the nose.

  There may be injury to the tongue or teeth. Turn the mouth to one side pull out the tongue, clear the mouth and start blowing again.

  The air may be entering into the stomach instead of lungs. In this case, the abdomen bulges out. Press gently over the stomach below the rib margin on the left side. The air and a little food matter may come out with a gurgle. Clean the mouth and continue blowing again.
- Carry on artificial respiration until the natural breathing is restored. Watch for a few minutes. When you are sure that your assistance is not required, stop the procedure, but keep a constant watch.

* E. A. R. should be given for at least half an hour or till the victim breathes normally. Never discontinue this thinking that the victim is dead.
* A Resuscitator or Breathing apparatus may be used inplace of E.A.R. if available.

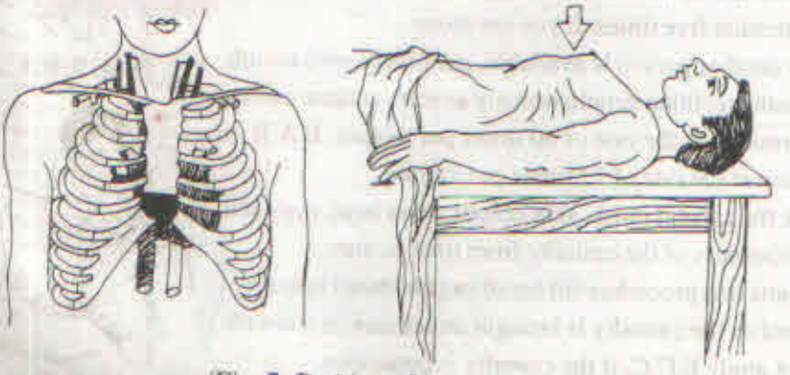
(Fig. 6. Resuscitator.)

EXTERNAL CARDIAC COMPRESSION(E. C. C.)

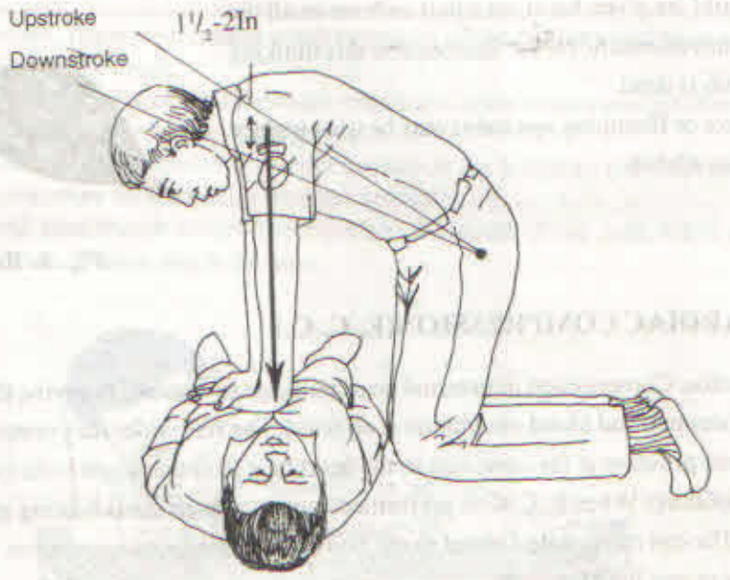
External Cardiac Compression or external heart massage is required to revive the heart function when the heart has stopped and blood circulation is affected. The first-aider may restore heart function by applying rhythmic pressure at the same rate as the heart beat over the breast bone (sternum) and the back bone (spinal column). When E. C. C. is performed correctly, heart starts beating spontaneously. In order to provide sufficient oxygenated blood to the body tissue, artificial respiration to be performed simultaneously to continue lung function.

Procedure :

1. Place the casualty lying on the back (supine) on a hard surface (floor, bench, table or wooden cot). Do not use a cushioned bed or a matress.
2. Stand, sit or kneel on the right side of the victim facing towards him.
3. Locate the correct compression point by placing the base of your palm on the lower half of the breast bone of the victim. Place the other palm over the first.



(Fig. 7. Position of heart.)



(Fig. 8. Position to Perform heart compressions.)

4. Your hands (not palms) should be perpendicular to the chest of the casualty.
5. Give five sharp presses at one second interval each, taking half a second to press and half a second to release pressure. The pressure should be applied by wrist movement without jerky movement of hands.
6. Give mouth-to-mouth breathing once and thereafter heart compression five times. If you are alone.
7. When another person is available, ask him to give mouth-to-mouth breathing simultaneously as you continue cardiac compression at the rate of 60 times per minute. E A R to be given at the rate of 12 times per minute.
8. Check the carotid pulse, skin colour, heart beat, eyes and consciousness of the casualty from time to time.
9. Continue this procedure till breathing and heart beat are restored or the casualty is brought under care of a doctor.
10. Do not apply E.C.C. if the casualty is conscious.

(Fig. 9. E.C.C. Procedu

(Fig. 10. E.C.C. Procedure

THE (A)(B)(C) OF

Read the diagram in columns from left to right and follow the red or green lines according to the patient's condition.

APPROACH

DANGER
Establish there is no danger to yourself or the patient from outside elements; Electricity, Gas, Falling Masonry, Traffic etc.

IS THE PATIENT CONSCIOUS ?
(Establish by gentle shaking & shouting)
No Yes

PLACE IN RECOVERY POSITION
OBSERVE (A)(B)(C)
CONTROL EXTERNAL BLEEDING

(A) AIRWAY

OPEN AIRWAY
1. Place patient on back
2. Clear mouth of obstructions
3. Tilt head to open airway
4. Support jaw & CALL FOR HELP

Tilt head
and Support jaw

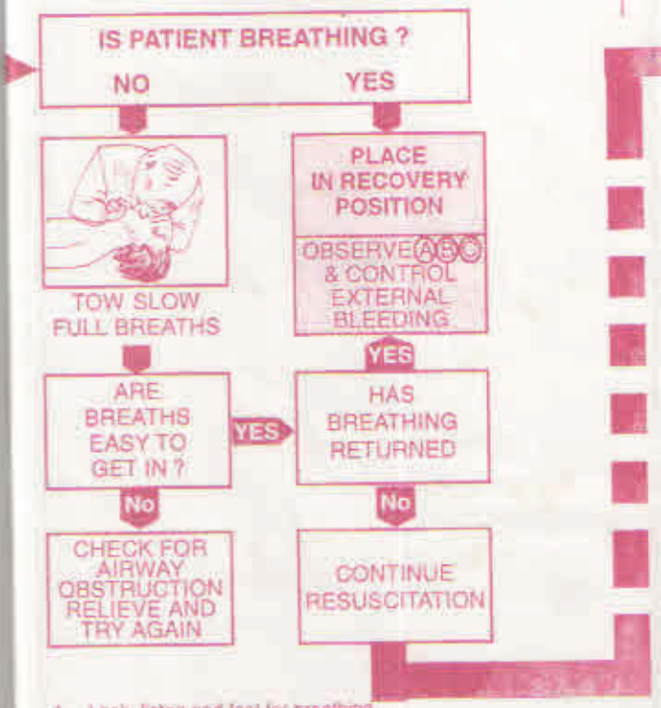
1. Establish there is no danger to yourself or the casualty. For instance the patient may be unconscious due to electric shock or gas leak, so check the relevant supply.
2. Establish consciousness of the casualty by shouting "WAKE - UP" loudly 2-3 times and shaking the shoulder gently, remembering the possibility of a neck or other upper body injury.
3. Place casualty in recovery position.

IF THE CASUALTY IS UNCONSCIOUS

1. Open Airway
   Inspect the casualty's mouth and throat; Remove blood, vomit, loose teeth or broken dentures. Leave well fitting full dentures in place as it will assist in expired air respiration if this is necessary.
2. If there is any doubt whether the casualty is breathing adequately, tilt the head and support the jaw as shown in the diagram. This will open the airway. At this point check again to see if the casualty is breathing (see B Breathing).

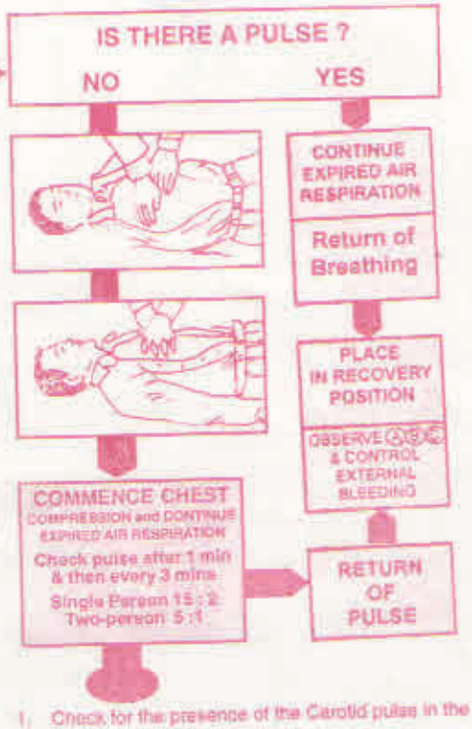
RESUSCITATION

Ⓑ BREATHING



1. Look, listen and feel for breathing
2. Kneel beside casualty, tilt his head back and raise the chin upwards thus opening the airway. Remember to clear the mouth of any obstructions and commence Expired Air Respiration. Open casualty's mouth and pinch his nose. Open your mouth, take a breath, seal his mouth with yours and breathe firmly into it. Breathe just firmly enough to raise the casualty's chest. Remove your mouth and allow his chest to fall.
3. As soon as the casualty's breathing returns place him in the recovery position. Vomiting often occurs when breathing returns and placing the casualty in the recovery position will prevent him from choking of vomiting does occur.
4. If there are no signs of life after two breaths, check if there is a pulse (see C Circulation).

Ⓒ CIRCULATION



1. Check for the presence of the Carotid pulse in the neck.
2. To commence External Chest Compression (E.C.C.) place the casualty flat on his back. Apply interlocked hands two finger breadths above the lower end of the breastbone and commence chest compression. Keep your hands on the chest at all times, this will minimise chest damage.
3. The rates for E.C.C. are as follows : *Working alone* : 15 Cardiac compressions (rate approximately 80 compressions per minute) followed by 2 inflations. *With assistance* : 5 cardiac compressions (rate 60 compressions per minute) followed by 1 inflation.
4. If spontaneous pulse does not return, prepare to continue E.C.C. until skilled help arrives.
5. External bleeding should be controlled by direct pressure over the wound, using a clean dressing such as a handkerchief. When a pulse is detected, elevation of both lower legs on a suitable support will reduce the severity of shock.

CONTROLLING BLOOD LOSS :

Heart and the blood vessels (Arteries, Arterioles, Capillaries, Venules and Veins) constitute the circulatory system of human body. Due to pumping action of heart, arteries carry oxygen-rich blood to the cells and tissues and veins bring back carbondioxide-rich blood to the heart. The oxygenation of blood takes place in the lungs and brought back to the heart for circulation again. The capillaries are formed at the junction of arterioles and venules and are responsible for exchange of fluids and gases to and from the tissue. Veins carry blood towards the heart and are placed superficially under the skin whereas arteries carry blood away from the heart and are located deep down.

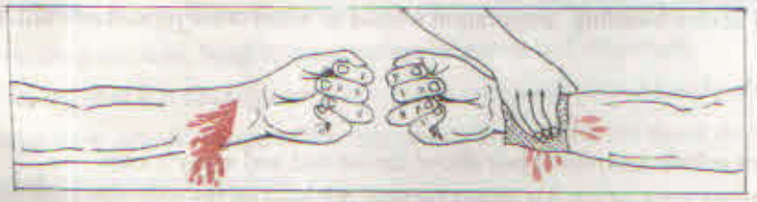
When skin is cut, bleeding occurs. Bleeding from the artery comes out with pressure, but venous bleeding is comparatively slower. Blood from the capillaries oozes out gently. Stopping of bleeding and clotting of blood are natural protective phenomena of the body. Body always tries to prevent blood loss by this mechanism automatically. If enough (about 200 ml) blood is lost within a short time, serious reactions take place inside the body. If this blood loss is not controlled quickly or if blood volume is not maintained by replacement of blood or similar fluid, there is risk to life. Blood is a rare commodity which is not easily available and need to be donated to the causalty by another person of the same blood group. Therefore, control of blood loss is considered as a life saving procedure particularly in case of severe trauma. Blood loss can be controlled by applying direct pressure over the wound, applying a pad and pressure bandage over the wound and by elevating the injured part. Pressure bandage or a Tourniquet may be applied to press the bleeding blood vessel and rest may be given to the casualty to stop the blood flow.

Direct pressure :

Direct pressure over the wound is the best way to stop bleeding in most of the cases. The pressure compresses the cut blood vessels, reduces the blood flow and helps in quick clot formation. The direct pressure should be applied for 5 to 15 minutes.

Procedure:

1. place the thumb, fingers or the palm directly over the wound.
2. Apply a sterile dressing pad over the wound and continue pressure on bleeding points of the wound.



(Fig. 11. (a) Bleeding form hand (b) Application of Direct Pressure.)

3. Check every 5 minutes if the bleeding had stopped.
4. Readjust pressure if bleeding has not stopped.
5. When the bleeding is from the cavity, sterile gauze pack may be used.

Elevation :

The body part should be elevated raised above the level of the victim's heart when there is bleeding from the hand, neck, arm or leg so that downward blood flow is stopped.

Procedure :

(Fig. 12. Elevation.)

1. Make the casualty lie down in a comfortable position with the body turned to bleeding side.
2. Raise the injured body part and keep it raised till the blood flow stops and clot formation takes place.
3. If the bleeding does not stop, adopt other procedures.

Pressure bandage : Pressure bandage applied over the wound presses the blood vessels as in case of direct pressure. More than one pressure bandage may be required to stop bleeding.

Procedure :

1. Apply a sterile dressing to cover the entire wound.
2. Apply a roller bandage or a broad bandage made out of a triangular bandage firmly but not tightly.
3. If the bleeding is severe and the bandage is partially soaked with blood, apply another bandage more firmly over the first one without removing it.

Tourniquet :

Tourniquet is a cotton or rubber band used to stop excess bleeding. It should be applied above the wound only in case of severe bleeding, amputation wound or when other procedures fail. It should be used carefully.

Procedure:

1. Place a cotton or rubber tourniquet just above the wound and apply a knot.
2. Place a short, strong stick or similar object (pencil, dot pen) on the previous knot and tie it with another two knots.

(Fig. 13. How to Apply a Tourniquet.)

3. Twist the stick to tighten the tourniquet till the bleeding just stops.
4. Fix the stick in place with the loose ends of the tourniquet with a bandage.
5. Do not cover the tourniquet with a bandage.
6. Attach a tag indicating position of the tourniquet and time of application at a prominent position of the victim e.g.T.1030.
7. Loosen the tourniquet for a few seconds if the casualty has to be transported through a long distance and watch if the bleeding has stopped.

Rest :

In case of severe bleeding particularly in case of head injury, nose bleed, vaginal bleeding or bleeding through urinary passage, the casualty should be given bedrest to control blood loss.

PREVENTING SHOCK :

Shock is a condition of severe depression of the vital functions of the body, particularly the blood circulation. It may follow severe injury, excess bleeding, extensive burn, body fluid loss, severe pain, drug reaction, heart disease, severe infection and snake bite.

Primary shock is usually nervous in origin and occurs immediately after an event.

Secondary shock occurs a few minutes or hours after the event due to severe fluid loss and peripheral circulatory failure.

Shock is a serious and life threatening condition which should be prevented.

CAUSES AND EFFECTS OF SHOCK

Some of the major causes of shock are as follows:

- Allergic reactions
- Bites or stings of poisonous snakes or insects
- Poisons.
- Exposure to extremes of heat and cold.
- Emotional stress.
- Myocardial infarction.
- Spinal injures.
- Severe trauma
- Severe pain
- Loss of blood
- Severe burns
- Electrical shock
- Gas poisoning
- Certain illnesses

Resulting in one or more of :

- Failure of heart to pump sufficient blood.
- Severe blood or fluid loss so that there is insufficient blood in the system.
- Enlargement : dilation of blood vessels so that there is insufficient blood to fill them.
- Breathing problems result in insufficient oxygen traveling through the system.

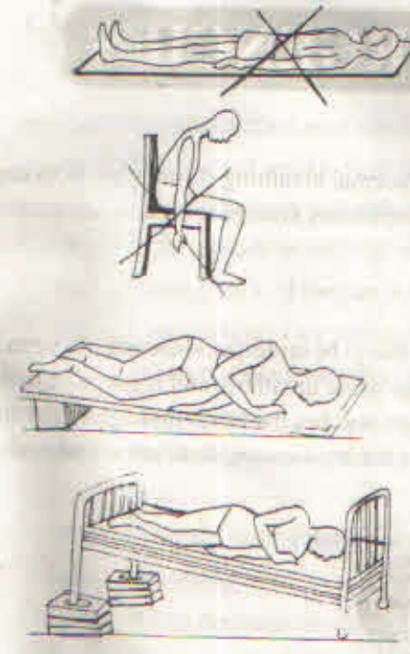
(Fig. 14.)

How to recognise shock ?

(i) The face of the victim looks pale, anxious or worried.
(ii) The victim may have a vacant look and does not respond to questions.
(iii) The skin, hand and feet feel cold and moist.
(iv) Drops of sweat appear on the face and forehead.
(v) The victim may be restless, talkative or dull and dazed.
(vi) Breathing is rapid, shallow and irregular.
(vii) Pulse may be normal or slow at first but becomes rapid and feeble gradually.
(viii) Reeling of head, thirst, dryness of mouth, nausea and vomiting may be felt.
(ix) External signs which caused shock may be present such as injury, bleeding, burn, snake bite electric shock, heat exposure etc.
(x) In most cases of shock, the victim is usually semiconscious.

Management :

1. Make the casualty lie down on one side with legs slightly bent and hand on sides. Raise the foot end of the bed by about 20 cms (shock position). Never keep the victim in sitting or supine position. Victim may be kept in recovery position also.



(Fig. 15. Shock position.)

2. Loosen the tight clothings round the neck, chest and waist. Loosen the shoes.
3. If it is a cold weather or the casualty feels cold, cover the body with a bed sheet or blanket.
4. Do not apply heat or massaging to keep the body warm.
5. Reassure the casualty. Speak words of comfort to remove fear, worry and anxiety.
6. Do not give anything to eat or drink. If the victim feels thirsty or dryness in mouth wet the lips with cotton soaked in water. Do not give hot drinks or alcohol to warm up the victim.
7. Check bleeding or any other cause of fluid loss.
8. Minimise pain by placing the victim in a comfortable position after recovery.
9. Swab the face with a moist towel gently.
10. Transfer the casualty in lying down position to the hospital if the condition does not improve.

In majority cases of shock, the victim recovers quickly. But if there is fluid loss, replacement of fluid becomes necessary. The first-aider should bear in mind that a primary shock victims may recover and may go to secondary shock due to profuse fluid loss.

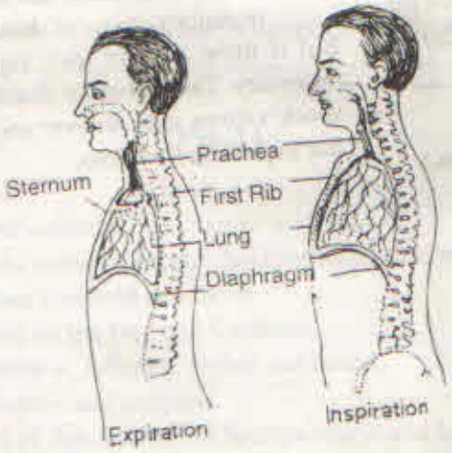
4

RESPIRATORY EMERGENCIES

DEFINITION : Respiratory emergency is a condition in which normal breathing stops or likely to stop and the quantity of oxygen for life support is not available. The respiratory emergencies may arise out of absence of breathing or obstructed breathing.

BREATHING FOR LIFE :

To understand respiratory emergency, respiratory system has to be understood clearly. Oxygen is essential for sustaining life. Oxygen in air is drawn in by the lungs while breathing and is supplied to the tissues of the body through blood. Carbondioxide from the tissues reaches the lungs through blood and breathed out into the atmosphere. Breathing occurs in three phases *inspiration*, *expiration* and *pause*. The rate of respiration is 12-18 times per minute.



(Fig.16. Respiratory System.)

Initially, the chest size increases due to contraction of the respiratory muscles attached to the ribs and flattening of the dome-shaped muscle (diaphragm) which separates the chest and abdominal cavities. Air is drawn in (inspiration) into the lungs passing through nose or mouth, trachea and bronchi and

finally reaches the air sacs (alveoli). Gases are exchanged at the air sacs where blood vessels carry oxygen dissolved in blood to the tissues of the body. At the same time, Carbondioxide from the blood enters the air sacs. Chest cavity decreases in size as the muscles relax. Air within the lungs is exhaled (expiration) and Carbondioxide passes out through the airway. A small pause is maintained after each expiration.

CAUSES OF RESPIRATORY EMERGENCIES :

The causes may be due to lack of Oxygen, obstruction to the air passage, failure of respiratory mechanism and depression of respiratory center in the brain.

(a) Presence of smoke, toxic gases, fumes and other pollutants in air. Carbon monoxide or Cyanide prevent oxygen to combine with haemoglobin of blood.

(b) High altitude or underground mining.

(c) Falling back of tongue in an unconscious person.

(d) Constriction of air passage caused due to acute asthma, laryngitis, diphtheria, tonsillitis, spasm of larynx, swelling after burn or due to swallowing corrosive chemicals and direct injury to air passage.

(e) Solid objects (broken tooth, vomit, food material, nuts, chocolates etc.) stuck up in the air way.

(f) Hanging, strangulation or throttling.

(g) Drowning.

(h) When the respiratory control centre in the brain is depressed due to head injury, drugs, certain diseases or lack of oxygen.

(i) Spinal injury, electric shock, pressure on the chest wall etc. which paralyse breathing muscles.

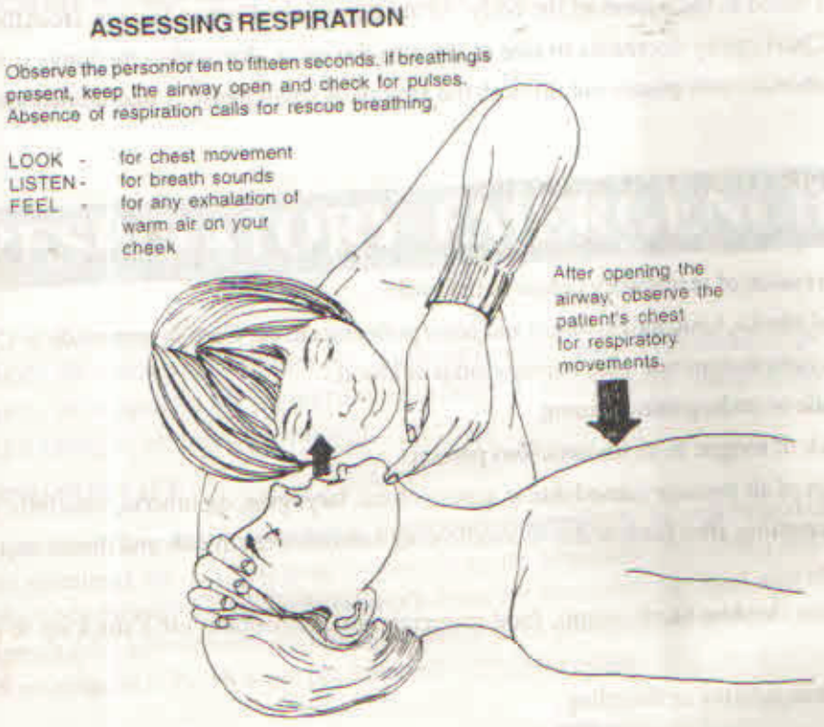
(j) Compression and collapse of lungs due to internal bleeding into the chest cavity and open wound of chest.

(k) Diseases of lungs, heart or brain (Rabies, Tetanus, Poliomyclitis, Encephalitis etc.).

Symptoms and signs :

(i) If there is absence of breathing the casualty is unconscious.

(ii) If there is difficulty in breathing or obstruction, the casualty gasps for breath to draw more oxygen and respiration becomes noisy.



(Fig. 17. Assessing respiration)

Management :

1. Remove the casualty away from the cause or get rid of the cause.
2. Check air way, breathing,pulse, heart function and consciousness quickly.
3. Clear the obstruction of the air way, if any and keep the victim in supine position with head turned to one side.
4. Give artificial respiration with the help of a resuscitator or Expired Air Resuscitation (E. A. R.) by mouth-to-mouth method *(other methods of artificial respiration are not so effective).*
5. Continue artificial respiration till the casualty breathes normally or the doctor takes charge of the case.

SUFFOCATION :

Suffocation is caused when air is prevented from reaching the air passage by an external obstruction.

Causes :

(a) Smothering - Mouth and nose is covered with a soft object to prevent air entry. It may be accidental or intentional.
(b) An infant or small child's mouth and nose may be blocked by mother's breast during sleep by a soft pillow when the child sleeps in face downward position.
(c) A child may be suffocated by bed clothing , plastic bag or material covering the nose and mouth accidentally.
(d) A person buried under earth, sand or debris during construction or demolition activities.
(e) Locked up in a confined space (manhole, sewer, old well) for a long period.

Symptoms and signs :

Same as lack of oxygen or asphyxia.

Management :

1. Remove obstruction quickly and take the victim to fresh air.
2. If the casualty is conscious and breathing normally watch and observe.
3. Give artificial respiration if breathing is absent.
4. Send the casualty to the doctor soon.

STRANGULATION, THROTTLING AND HANGING :

Air way obstruction may be caused due to pressure on the wind pipe from outside and thereby prevents air entry.

Causes :

(a) Strangulation - Compersian of wind pipe deliberately or accidentally.
(b) Throttling - Squeezing or pressing a person's throat deliberately to prevent air entry.
(c) Hanging - Accidental or intentional suspension of the body by the neck with the help of a noose (loop) with a view to commit suicide or murder.

Symptoms and signs :

(i) Symptoms and signs of oxygen lack .
(ii) Congestion of face and prominent neck veins.
(iii) Constriction may be seen round the neck.
(iv) A mark may be seen in front of the neck.
(v) Tongue may be protruding out.
(vi) Casualty may pass urine or stool unknowingly.

Management :

1. If the casualty is still hanging, lift the body to make the knot loose.
2. Cut the noose and constrictive band around the neck.
3. If the casualty is unconscious and not breathing, apply E.A.R. immediately. Use Oxygen if available.
4. Treat for shock if the casualty is dazed.
5. Transport the casualty with the help of an ambulance.

CHOKING :

Choking is caused when the airway is partially or totally obstructed by any object which enters the wind pipe instead of food pipe. Although choking may occur in any age group children are the common victims.

(Fig. 18. Choking)

Causes :

(a) When half-chewed food material, drinks or small objects, are swallowed hurriedly, it may enter the wind pipe.

(b) Elderly people and small children cannot chew or swallow food properly due to absence of teeth, weak reflexes, age or disease.

(c) Young children put every object (a coin, pebble, nuts, chewing gums etc) into the mouth out of curiosity and some of them may choke the air passage.

(d) Alcoholics and persons using dentures have decreased chewing sensation in the mouth and likely to choke.

(e) Talking and laughing loudly while taking food, may allow food material into the air passage instead of food passage.

(f) Even if the object is not large enough to block the air passage completely, the spasm (constriction) caused due to reflex action may choke the passage.

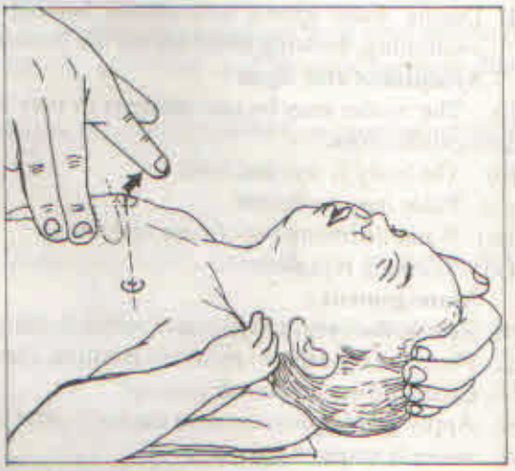
Symptoms and signs :

(i) The person is unable to speak, cry or cough and may be holding the neck for relief.
(ii) Paleness of face and prominent neck veins.
(iii) Breathing is noisy.
(iv) Laboured breathing with flaring of nostrils.
(v) Collapse and unconsciousness may follow.

Management :

1. If the victim is conscious, encourage to keep on coughing to expel the object.
2. Clean the mouth of the victim and find out if the object is still there.
3. Ask the casualty bend down. Apply two gentle blows and the back between the shoulder blades using heel of your palm.
4. Check the mouth again. Take out the object with your bent finger if visible.
5. If the casualty is an infant or child, sit or kneel down holding the child on the lap with the face downward, head low and give two back slaps gently.

(Fig. 19. Back blow in infant.)



(Fig. 20. Chest thrusts in infant.)

6. If the object does not come out, make the casuality lie on the side. Place the palm of your one hand against the lower fold of the armpit and the other palm beside if and give two downward thrusts quickly.
7. If the casualty is unconscious, turn him on to the surpine face up-ward position and give artificial respiration and transport the casualty to the hospital.

DROWNING :

The obstruction to the air passage occurs in case of drowning due to entry of water into the lungs leading to asphyxia.

Causes :

(a) While crossing a river or lake by a boat the boat may sink due to overloading, high tide, dangerous water surface, bad weather or inefficient steering.

(b) During fishing or playing on docks, bridges and sea shore a person may fall into water.

(c) Children may fall accidentally into the walls, cisterns water reservoirs, waterfilled pots, unprotected swimming pools or tanks.

(d) During water sports, recreational boating and swimming, drowing cases are not uncommon.

(Fig. 21. Drowning)

Symptoms and signs :

(i) The victim may be unconscious or may have breathing difficulties.

(ii) The body is wet and cold.

(iii) Pulse may be absent

(iv) Water dribbling out of nose and mouth.

(v) Vomiting is present.

Management :

1. Rescue the victim from water without going very close.
2. Place the casualty in recovery position after rescue from water, with the help of some object.
3. Clean the mouth and air passage.
4. Apply gently pressure over the back after turning and head to one side so that some amount of water is vomited out.
5. Start mouth-to-mouth breathing immediately after placing the victim in supine position.
6. Do not apply any pressure over the chest or abdomen to take out water.
7. If the causalty is conscious, keep the body warm by covering with a blanket and send for further medical treatment.

REMEMBER : Artificial respiration given immediately saves the life of the victim and prevents lung complications.

INHALATION OF GASES AND FUMES :

(a) Due to air pollution or contamination of the atmosphere with toxic gases, smoke, fumes and vapours, the oxygen level in the atmosphere is reduced to a very low level. Inhalation of this polluted air leads to asphyxia and produces many side effects. Sudden release of toxic gases are high risk to life.

Causes :

(b) Smoke may be inhaled while entering into a close space during heavy fire.
(c) Toxic gases like Ammonia, Chlorine, Carbonmonoxide, Nitrous oxide, Methane etc are let out into the atmosphere during certain industrial operations.
(d) Entering into a confined space (sewer, gas holder, underground cellar, unused deep well) for cleaning and maintenance.
(e) Explosion causing release of toxic gases and fumes.
(f) Inhalation of gases and vapours during industrial operation (Pickeing, annealing, Metal Coating, Degreasing, Spray Painting).
(g) Burning coal in a confined room with doors and windows closed.

Symptoms and signs :

(i) Smoke irritates the throat causing coughing, sneezing watering from nose and eyes and choking sensation. The body may be burnt or charred.
(ii) Irritation to the respiratory passage and asphyxia by noxious gases and their toxic effect.
(iii) Nausea, vomiting, froth coming out of mouth, giddiness and unconsciousness due to Carbonmonoxide inhalation.
(iv) Toxic material present in solvents, paints, thinners, absassive cleansers, degreasing agents may cause asphyxia and irritation to the skin and eyes.

Management :

1. Rescue the casualty from the site of danger to open air. Make sure that you are not in danger during rescue.
2. During rescue, ensure that the area is not filled with hot air, dense smoke, thick chemical vapour or fire. Take precautions before entering into a confined space.
3. Take out all contaminated clothing.
4. Clean the mouth and airway.
5. Give mouth-to-mouth respiration (E.A.R.) if the victim is not breathing.
6. Use oxygen if available.
7. Clean the face of the victim repeatedly with a wet towel.
8. Transfer the casualty to the hospital.

5

INJURIES AND WOUNDS

DEFINITION :

Any damage caused to the skin or deeper tissues of the body termed as **Injury** or **Trauma**. Injury may be external (open) or internal (closed) in nature. Sprain, fracture, head injury, all wounds and burns come under the category of injury in broad sense.

Wound is defined as a break in the continuity of skin with or without damage to the deeper tissues. The wound is associated with bleeding, however slight it may be (e.g. abrasion to crush injuries).

Causes :

(a) Accidents causing injury are very common in our country. Accidents at work, home, road, railways, water surface and play ground may be encountered with verieties of injuries. The common causes are due to material handling, moving machinery, falls, motor vehicle accidents, handling sharp objects, tools and weapons. However every accident does not end up with an injury to the victim. Sometimes innocent persons are involved in an accident due to fault of somebody at a crowded place or social gathering and sustain injury.

(b) Animal bites and insect stings also cause injury and wounds.

Types of Wound

Abrasion : It is a liner cut in skin surface with slight bleeding. It is caused by nail, pin, thorn, glass or rough edge of any instrument. It heals up even without treatment.

Grazes : When the body is rubbed against any rough object, uneven surface or road, grazes are caused. The surface of the graze may look red although there may not be much bleeding. If not infected, grazes are covered with a black crust and heal quickly.

(Fig. 22. Graze)

Incised wound : This is caused by sharp instruments or objects such as blade razor, knife, sheet metal, glass piece etc. The edges of the wound are regular and it bleeds freely because the blood vessels are clean cut. Stitches may be required for quick healing and to minimise scar formation.

(Fig. 23. Incised Wound)

Lacerated wound : It is usually caused due to heavy blunt instruments or objects and by machines. The margin is irregular and sometimes a part of the skin is missing. It does not bleed freely because the blood vessels are only torn and twisted. It takes longer time to heal and a scar may remain. The chance of infection is also more in such wounds.

Punctured wound : It is caused by stab or by any sharp pointed instrument like needle, knife, bayonet, bullet, screw driver, arrow etc. The opening of the wound is very small and there is very little bleeding visible outside. The margin of the wound is usually clean cut and there may not be any gap between the margins. The inner structures or internal organs may be damaged leading to serious complications. Sometimes the weapon sticks to the wound.

Contused wound : It is a crush wound with bruising of the tissues around. It is caused by the direct heavy blow by a blunt object or may be caused if the body part is pressed by a heavy object like packing box or stone. Blow with a hammer, stone, paper weight or cricket ball may cause such injuries.

Amputation : When a part of the body is completely cut and separated, it is called amputation or amputated wound. A finger, hand or leg may be cut at different levels by railway accident, by a cutting machine or sharp weapon. Bleeding becomes sever in such wounds.

(Fig. 24.Foreign body in the wound)

The wounds are classified as **minor** or **major** depending on their location, nature and condition.

- Small cuts, abrasions small grazes etc are classified as minor wounds.
- Wounds on head, face, eyes and abdomen are major wounds.
- All incised, lacerated, punctured crushed and amputated wounds are major.
- Wounds are major if there is severe bleeding from the wound, extensive damage to the tissue.
- Wound soiled with dust and dirt are considered as major wounds too.

Management :

The objective of wound treatment is to stop bleeding immediately, to prevent infection, to reduce pain and to minimise further complications.

Minor wounds :

1. Clean the wound with water or diluted dettol. Never use undiluted dettol or strong antiseptics directly over the wound.
2. Put one or two drops of dettol in a cup of warm water. Take a piece of sterile gauze, soak it and apply gently over the wound.

3. After cleaning the wound, dry the wound and apply mild antiseptic solution or cover it with sterile dressing or medicated dressing (band-aid, handy plast).
4. If spray dressing for wounds is available this may be used.
5. Do not apply a benzoin seal or any ointment specially if it is a soiled wound or if there is a chan of infection.
6. In case of grazes, touch the wound gently with any antiseptic solution (Mercurochrome or Betadi solution). Spray dressing is much better.
7. Advise the casualty to take anti-tetanus injection or tetanus toxoid.

Major wounds :

1. Make the casualty lie down comfortably on a bed, bench, table or on the floor.
2. Study the position, nature and condition of the wound carefully and quickly.
3. *Check bleeding*, if present by applying direct pressure, pressure bandage or a tourniquet.
4. Do not apply iodine, benzoin or any ointment directly to the wound surface.
5. *Clean the wound* with mild antiseptic solution and swab it dry. **Do not** use spirit, concentrat dettol or strong antiseptics for cleaning the wound.
6. *Do not pull out the foreignbody* (knife, bullet, arrow, nail etc). Objects which can be remov easily (a glass piece, pin, thorn, metal chip etc.) should be taken out gently.
7. *Put a sterile dressing over the wound surface and bandage* it firmly. The dressing and banda should be large enough to cover the wound completely.
8. *Spray the wound surface completely* if spray dressing is available and cover with a bandage.
9. *Clean the surrounding of the wound with a piece of wet gauze* if dried blood, dust and d sticking to the skin surface around the wound.
10. *Send the casualty to the hospital* while keeping the injured part well supported in a comfortab position.

How to dress the wound ?

1. Clean your hands with soap and water thoroughly taking special care to clean the nails and fingers.
2. Dry the hand with sterile gauze pieces. Do not use a towel or handkerchief.
3. Take a piece of gauze, soak it with diluted dettol or warm water and clean the wound gently from inwards to outwards.

(Fig. 25. Cleaning the wound.

4. Take a readymade sterile dressing from the First-Aid Box.
5. Hold it between thumb and index finger of both hands and twist gently to break the paper pack Cut the plastic wrapper with a pair of scissors if the dressing if kept in a plastic cover.
6. Open the bandage carefully without touching the central sterile pad.

(Fig. 26. Application of ready made dressing)

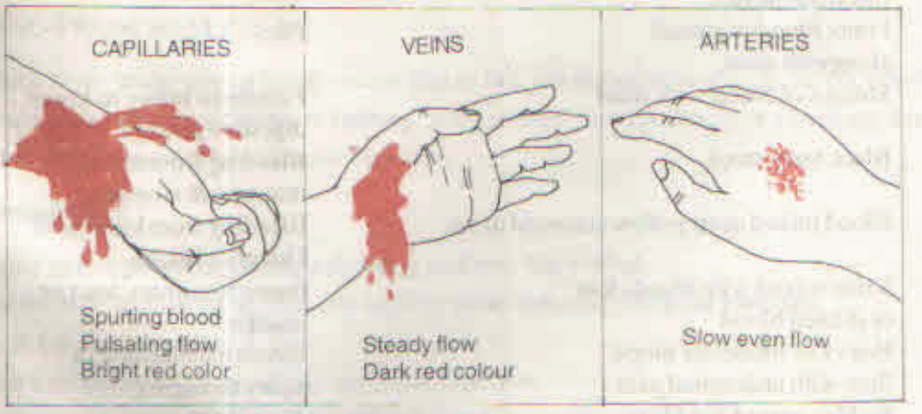
7. Place the pad over the wound keeping the stitched bandage towards the top.
8. Wrap the smaller end of the bandage first and finally the rolled up portion and tie the knot on one side.
9. More than one bandage may be required for large wounds.
10. If sterile dressing is not available, cover the wound with sterile gauze pieces, cotton pad and bandage firmly and fix the end with adhesive plaster or a knot.

BLEEDING :

Bleeding or **haemorrhage** is a serious condition following an injury or wound. It may be external (visible) or internal (concealed) in nature.

External Bleeding :

External bleeding occurs when there is a deep cut or laceration in the skin. Bleeding many occur from an artery, vein or capillaries. Sometimes many blood vessels are cut at a time causing profuse bleeding. Major bleeding should be stopped or controlled to prevent blood loss which is necessary to preserve the life, otherwise circulatory collapse causing shock may endanger the life of the victim.



(Fig. 27. Bleeding from different blood vessels)

Internal Bleeding :

Due to injury or diseases of the internal organs, blood may be collected inside the body cavities and does not flow out. Internal bleeding is not revealed and amount of blood loss cannot be estimated easily. Although the blood is not actually lost from the body, it is lost from the circulatory system; hence circulatory collapse occurs quickly. Clot formed inside the body cavity causes further complication in vital organs. Sometimes bleeding from internal organs may come out through different openings (ear, nose, eyes, mouth, anus, urinary passage & vagina in female). Internal bleeding should be suspected after a violent injury such as head injury, crush injury, abdominal blows, blast injury or chest injury.

How to Recognise Sources of Internal Bleeding ?

Opening	Description	Probable cause
Nose	Profuse flow of bright red coloured blood	Injury to nose, fracture of nasal bone, nasal polyp or high blood pressure.
	Tickling of reddish yellow liquid.	Skull fracture
Ear	Continuous flow of bright red blood.	Injury to ear drum
	Trickling of straw-colored or reddish yellow fluid.	Skull fracture
Mouth	Blood comes out during coughing with sputum (haemoptysis)	Upper air way injury or diseases of lungs (Tb).
	Blood spat out	Jaw fracture
	Dark reddish brown coffee coloured blood vomited out mixed with food particle (haematemesis).	Injury to digestive track, or bleeding ulcer of stomach.
Anus	Frank blood is passed alongwith stool.	Piles
	Streaks of blood with stool	Fissure or injury to lower digestive passage.
	Black tarry stool	Bleeding from upper intestine & stomach.
Urethra	Blood mixed deep yellow coloured urine.	Bleeding from kidneys or Urinary bladder.
	Urine mixed with blood clots or diluted blood	Injury to urinary tract or bladder.
Vagina	Heavy or moderate blood flow with abdominal pain	Menstrual bleeding or injury to vagina.
	Sudden sever blood loss and severe pain	Abortion or uterine bleeding.

In addition to the above, bleeding through different orifices (openings) may occur due to cancer of organs.

Symptoms and Signs :

(i) History of severe injury or illness.
(ii) Bleeding occur through one or more orifices (openings) of the body.
(iii) When casualty tries to stand up, he feels giddy and faints.
(iv) Face looks pale, skin is cold and clammy.
(v) The person becomes restless or excited.
(vi) The casualty complaints of severe thirst and dryness of mouth.
(vii) Pulse is weak and rapid at first and may not be felt later.
(viii) Breathing may be hurried or laboured.
(ix) Condition worsens very quickly and the victim collapses due to circulatory failure and shock.

Management :

1. Keep the victim at rest in recovery or supine position with leg end slightly raised (except in case of head injury).
2. Stop bleeding if possible or turn the body so that more blood does not accumulate in the cavity.
3. Give nothing by mouth.
4. Check breathing, heart-beat, pulse rate and consciousness quickly and perform CPR if necessary. Usually the victim suffers from shock due to internal bleeding.
5. Transfer the casualty to the hospital in lying down position.

BLEEDING FROM SCALP :

Injury to the scalp (top of head) occurs due to fall, triking against objects, fall of objects from a height, road accident, sports accidents or fighting. Scalp wounds bleed profusely or a swelling (haematoma) appears due to collection of blood under the skin.

Management :

1. Apply gentle pressure placing a dressing pad over the wound.
2. Cut the hair around the wound and apply a clean dressing and head bandage.
3. Look for skull fracture, if any.
4. Check consciousness, breathing and heart function.
5. Transport the casualty to the hospital in lying down position.

BLEEDING FROM THE EAR :

Bleeding from the ear may occur due to injury, rupture of ear drum or skull fracture. Ear drum may be ruptured during driving, while staying very close to an impact noise (gun firing, bomb blast, forging or revetting operation). When skull fracture is there, blood mixed with yellowish cerebro-spiral fluid of brain may come out through one or both ears.

Symptoms and Signs :

(i) Severe pain inside the ear.
(ii) Blood flows out of the ear canal.
(iii) Severe headache and throbbing sensation on the forehead.
(iv) Hearing is lost temporarily.
(v) Some casualties may become unconscious.

Management :

1. Make the casualty lie down or sit with head tilted to the affected side.
2. Do not plug the ear.
3. Apply a sterile dry dressing over the ear and bandage lightly.
4. Transfer the casualty to the hospital in lying down position with head turned to affected side.

BLEEDING FROM THE NOSE :

Bleeding from the nose is a common and comparatively less serious condition. Painless bleeding may occur due to exposure to excess cold or heat, growth inside the nasal cavity (polyp) or due to high blood pressure. Blood dribbles down through the nostrils due to injury to the nose or skull fracture which is a serious condition.

Management :

1. Make the casualty sit down on a stool with head bent forward and downwards.
2. Ask him to breathe through the mouth.
3. Advise him not to blow the nose and not to bend the head backwards.
4. Pinch the nose below the hard part with index finger and thumb.
5. Do not plug or close the nostrils.
6. Apply ice or cold compress on the nose.
7. Do not put water or any medicine thorough the nose.
8. After the bleeding is stopped, clean the nose and the face with a wet towel or gauze soaked in water.

(Fig. 28. Bleeding from the nose.)

9. If injury to nose or skull is suspected, consult a doctor.

BLEEDING FROM THE MOUTH :

Bleeding from the mouth may occur due to spongy gums, injured tongue, laceration of mouth or lips, jaw fracture or from a tooth socket. Most of the mouth bleeding stop automatically due to action of saliva except in case of jaw fracture where a blood vessel may be damaged badly.

Management :

1. If there is bleeding from gums or tooth socket, place a clean gauze piece or cotton swab and ask the person to bite it hard.
2. If bleeding does not stop after 10 minutes, apply a sterile pad on the bleeding point and apply pressure.
3. Ask the victim to spit out blood and saliva and not to swallow.
4. Do not rinse the mouth and do not disturb the blood clot.
5. If there is fracture of jaw bone or a tooth has come out of the socket, seek prompt dental advice.
6. Advise the victim to avoid hot drinks for at least 12 hrs.

BLACK EYE :

Due to head injury or direct blow on the eye, bleeding may occur into the eye ball and eye is turned swollen and black all around. This is called **black eye**.

Management :

Apply an eye pad and bandage over the affected eye and send the casualty to the hospital quickly. Do not apply any medicine or ointment.

VAGINAL BLEEDING :

Vaginal bleeding may occur due to menstrual disorder, threatened abortion, due to cancer of the cervix of uterus or infection after child birth. Although such cases are not commonly encountered by a first-aider, sometimes emergency situations may arise.

Management :

1. Lay the woman on the bed with head and shoulders slightly raised, knees slightly bent and a pillow placed under the knee joint to keep the abdominal muscles relaxed.
2. Place a sanitary pad or clean dressing at the entrance of the vagina and bandage firmly.
3. If bleeding is profuse, the patient may suffer from shock. Look for signs and symptoms of shock.
4. Transfer the casualty to the hospital immediately.

SPECIFIC INJURIES :

Injuries to the different parts of the body lead to specific problems and each injury has to be dealt specifically. Bleeding , wound and damage to the internal structures may be caused due to various injuries.

HEAD INJURY :

Head injury is a serious condition which may occur due to fall from height. Automobile accident, striking against an object, getting a blow from a flying object or struck by a blunt weapon. There may be severe bleeding, fracture of skull or concealed haemorrhage without visible external signs. If a blood clot presses over the brain, there may be concussion or compression. It should not be neglected.

Symptoms and Signs :

(I) The victim may be semi-conscious or unconscious.
(II) Nausea and vomiting may be present.
(III) Restlessness and delirium.
(IV) Convulsion or fits.
(V) Pupils of the eyes may be of unequal size and irregular.
(VI) Pupils may be constricted or dilated.
(VII) Clear or blood tinged yellow fluid coming through the ears or nose.
(VIII) The condition of the victim may deteriorate very fast.

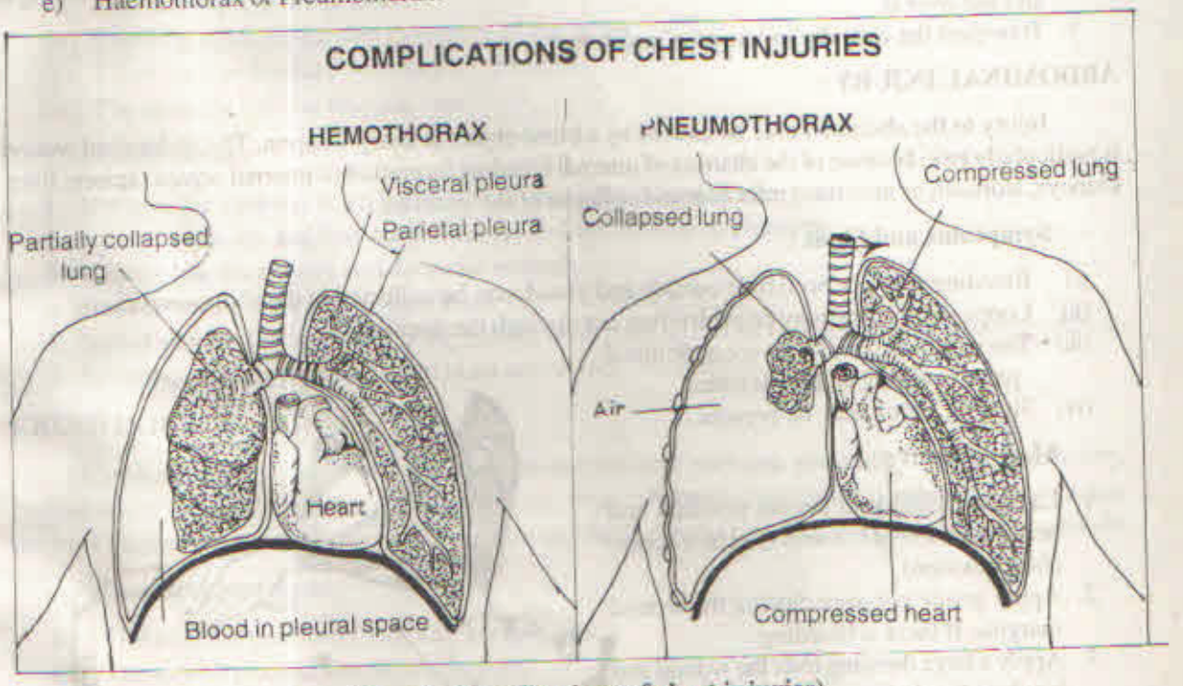
Management :

1. Keep the victim in lying down position without raising the head end or foot end.
2. Turn the head towards the injured side.
3. Do not keep a pillow under the head.
4. The external wound if any should be dressed with a sterile dressing.
5. Check the consciousness, breathing and heart rate quickly.
6. Treat for shock.
7. Give nothing by mouth.
8. Send the casualty in lying down position to the hospital quickly for further treatment or keeping the case under observation for sometime.

CHEST INJURY :

Chest injury may occur due to automobile accident, fall from height, pressure over the chest due to heavy objects or debris, bomb blast, penetrating wound caused due to knife, bullet or arrow etc. The injury may be closed or open with a sucking wound and collapse of the lungs. The broken ribs may injure the heart or the lungs leading to emergency conditions. The common chest injuries may belong to the fallowing category.

a) Sucking open wound.
b) Penetrating wound.
c) Compression of lungs.
d) Crushed injury.
e) Haemothorax or Preumothorax.



(Fig. 29. Complications of chest injuries)

Symptoms and Signs :

(i) Casualty feels severe pain on the chest.
(ii) Inability to breathe or cough.
(iii) Feels discomfort in lying down position and prefers to be in sitting or prop up position.
(iv) Breathing is shallow due to presence of air in the chest cavity. (Pneumothorax)
(v) The weapon (bullet, arrow) etc may be present in the wound.
(vi) There may be bleeding through the wound or frothy bright red blood is coughed out.
(vii) The victim invariably suffers from shock.
(viii) There may be further complications due to collapse of lungs.

Management :

1. Keep the casualty in semiprone, prop up or sitting position as he feels comfortable
2. Keep the air way clear by cleaning the mouth and throat.

Management :

1. Apply a tourniquet closer to the amputated part.
2. Raise the part slightly to reduce blood flow.
3. Cover the amputated end with a sterile bandage or a triangular bandage.
4. Treat for shock.
5. Wrap the separated portion with clean bandage or clean cloth and send the same to the hospital alongwith the casualty.
6. Quick transportation of the casualty to the hospital is of utmost importance.

BLUNT INJURY OR BRUISE :

Injury caused by a heavy blunt object such as stone, cricket ball, paper weight, hammer or a lathi results in a **bruise** or **contusion**. This is a simple injury where the skin is not damaged but the underlying soft tissue is damaged and blood collects under the skin. When fingers are pressed between door hinges or head strikes against hard surface, bruise is caused.

Management :

1. Apply pressure over the surface for 5 minutes.
2. Apply cold compress, ice cubes or a wet bandage.
3. Never try to drain the collected blood from a bruise.

INJURY TO THE GENITAL ORGANS :

Injury to the genital organs may occur due to kicks, blows, horse riding, machinery or by sharp weapons. The victim complains of severe pain, swelling of the part and bleeding.

Management :

1. Save any torn tissue or skin for repair and subsequent skin grafting.
2. Place a pad over the wound and apply direct pressure to stop bleeding.
3. Give first aid for shock.
4. Dress the part using dry sterile dressing.
5. Apply no medicines, ointments or antiseptic solutions.
6. Send the victim to the hospital in lying down position.

HAND INJURIES :

Hand injuries are very common in day-to-day work particularly in factories and mines. Such injuries should be given special care to avoid infection, deformity, contracture or amputation subsequently.

Management :

1. Keep the victim in a comfortable position and elevate the injured part above the level of the heart.
2. Cover the hand with a sterile bandage, clean cloth pad or triangular bandage and apply direct pressure to stop bleeding.

3. Put sterile gauze pieces between the fingers and dress the hand with a sterile dressing and apply a large roller bandage or hand bandage (by a triangular bandage) to cover the hand completely.
4. Put the hand in a sling or keep it raised and supported during transportation to the hospital.

INJURIES TO LEGS AND FEET :

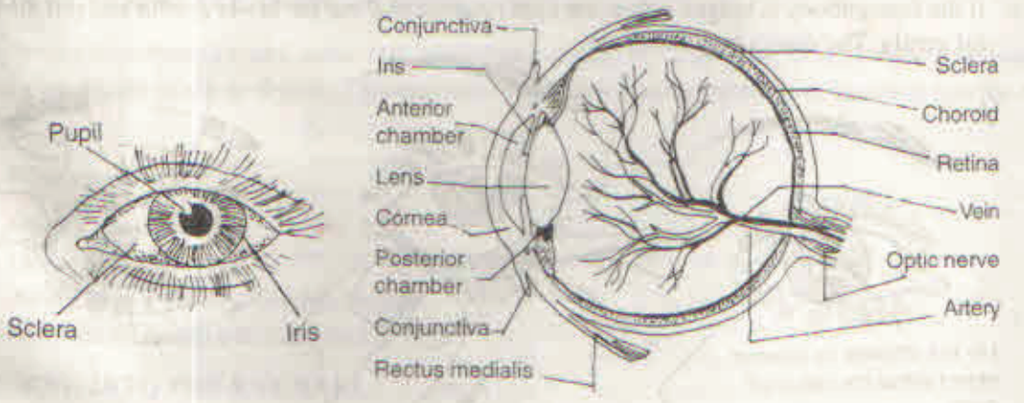
Serious or minor wounds to lower part of leg and foot are very common and may incapacitate a person. Elderly people, diabetics and poorly nourished persons react very badly to these injuries because of inadequate blood circulation. Infection and gangrene of foot may occur following the wound.

Management :

1. Cover the wound with a sterile dressing or clean pad.
2. Examine the toes and look for swelling, colour change etc.
3. Do not allow the victim to walk.
4. Do not raise the leg or foot.
5. Cover the part with a foot bandage using a roller or triangular bandage.
6. Transport the causalty in lying down position to hospital.

EYE INJURIES :

Eyes are one of the vital and most sensitive organ of the body. A slight carelessness while dealing with eye injuries may cause serious after-effects and even blindness. In our day-to-day life and during work eye injuries are very common and one should know how to deal with such cases. A first-aider may across the following types of eye injuries.



(Fig. 31. Structure of Eye)

FOREIGN BODY IN THE EYE :

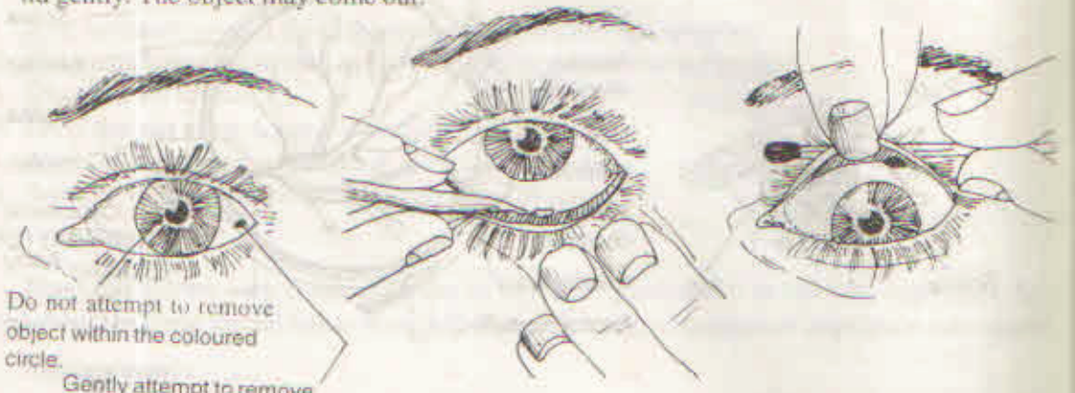
Anything such as a dust particle, a metal chip, a glass piece, and insect, a drop of chemical or any liquid or powder may enter into the eye(s) which are called foreign bodies. Once foreign body enters into the eyes, they are closed involuntarily due to reflex action and tear flows out to flush the offending agent. During this process, the solid particle may come out off the eyes and liquid substances are diluted although the irritation still persists. In some cases, the object may stick to the eye ball or lodged on one corner of the eye.

Symptoms and signs :

(i) A peculiar sensation (foreignbody sensation) is felt in the eye.
(ii) Redness and burning sensation.
(iii) Watering from the eye.
(iv) Pain is felt while opening the eye.
(v) The victim is unable to look at the light (photophobia).
(vi) Vision may be affected.

Management :

1. Make the victim sit on a stool; examine the eyes from behind in bright light.
2. If the victim is wearing contact lens or spectacles ask him/her to remove it and keep safely.
3. Open the eyes gently and locate the foreignbody.
4. Ask the victim not to rub the eyes.
5. Wash the eyes with clean water from a wash bottle, eye fountain or running tap.
6. If the foreignbody is lodged below the upper eyelid, pull out the lower eye lid and roll the upper lid gently. The object may come out.



(Fig. 32. Removing Foreignbody in the Eye)

7. If the foreignbody is on the cornea, do not disturb it and apply an eye pad.
8. If the foreignbody has come out or it is a chemical substance, wash the eye repeatedly with clean water or normal saline and apply an eye pad.

FLYING OBJECTS IN THE EYE :

While going in cycle or scooter, flying particles may enter the eye with speed and get lodged in conductiva, sclera, cornea or may enter deep into the eye ball. Flying particles may enter the eyes with force during grinding, chipping, chisselling or abrassive operations. A scratch may be produced on the eye ball. A live insect may bite the eye ball and can cause injury.

Symptoms and signs :

(i) The signs and symptoms vary according to the size, nature and force with which the object enters the eye ball.
(ii) Foreignbody sensation.
(iii) Watering from the eyes.
(iv) Complete loss of vision (back out) if the object has gone deep.
(v) Reddening of eye ball with variable degree of pain.

Management :

Effort should not be made to take out the foreignbody. Apply an eye pad and bandage and send the casualty to a doctor/hospital.

MINOR CUTS AND ABRASION OF THE EYEBALL :

Scractches, abrasions and minor cuts of the eye ball may be caused due to hard objects, splinters, broken glass pieces or sharp objects. This may turn into a serious condition due to bleeding into the eye ball.

Management :

1. Do not wash the eyes.
2. Do not rub the eyes.
3. Apply an eye pad and bandage firmly.
4. Send the victim to a doctor quickly.

BLEEDING INTO THE EYE BALL :

Due to direct injury, head injury or certain diseases painless bleeding may occur into the eye ball and patches of blood seen under the conjuctiva. Such cases should be referred to an eye specialist to evaluate and treat the condition.

EXPOSURE TO INFRA-RED RAYS :

The eyes may be exposed to infra-red rays in industries during wlding, gas cutting, inspecting molten metal or electric arc furnace without using eye protection (blue-glass goggles).

Symptoms and signs

(i) Eyes may look red and swollen after sometime of exposure.
(ii) Pain, burning sensation and watering from the eyes.
(iii) Unable to look at the light.

Management :

Such cases need special care by eye specialists and should be sent to a doctor/hospital immediately.

EXPOSURE TO CHEMICAL SUBSTANCES :

Eyes may be exposed to irritant gases, fumes and chemical substances such as Chlorine, Ammonia, Sulphur-dioxide, Lime dust, Acetylene etc, which irritate the eyes continuously.

Symptoms and signs :

(i) The eyes become red and swollen.
(ii) Continuous watering and with watering from the nose.

Management :

1. The victim should be taken away from the source of exposure.
2. Eyes to be washed repeated with cold water.
3. Soothing eye drop may be put in the eye if available and a doctor to be consulted.

ELECTRICAL INJURIES

Use of electrical equipment and appliances is increasing in factories, homes, workshops, farms, offices and shops. Electrical accidents may cause bodily injuries and even instant death to an individual. The electrical injury may be caused due to following reasons :

(a) Passage of electrical current from a high or low voltage supply or from lightning may result in stoppage of breathing and /or heart activity. This leads to electrocution or electric shock.
(b) Severe burns may be produced on the body at the point of entry and where it leaves the body (exit). Higher the voltage, the more extensive the burns.
(c) High voltage current found in powerlines and overhead cables may drag the exposed person due to strong electro-magnetic field. The victim dies immediately due to strong current passing through the body. Severe burn and associated body injury may also be there.
(d) Severe burn may be caused due to electric flash over.
(e) Low voltage appliances and cables may cause electrical in juries due to defective insulation, short-circuiting or defective plugs and switches. Using these appliances with wet hands or on the wet surface increases the further risk.

(f) Lightning occurring during thunder storm produces electric current of extremely short duration which may strike and isolated person standing on a flat area. The clothings of the person may catch fire also.

ELECTRIC SHOCK :

It is the bodily reaction resulting from the passage of an electric current. The reaction may vary from slight tingling sensation or twitching of muscles to a severe condition of sudden unconsciousness with stoppage of breathing and/or heart beat temporarily. If attended quickly the victim may be revived.

Symptoms and signs :

(i) Sudden pain and tingling sensation at the point of contact.
(ii) The victim may be thrown away from the source of electricity or may be still in contact with it.
(iii) The victim cries loudly for help and faints.
(iv) There may be twitching of muscles and limbs may be contracted.
(v) Breathing, pulse and heart beat may be absent.
(vi) In some cases, heart may beat very fast and stops finally.
(vii) Skin may look black and charred at the point of entry of current. There may be an exit wound.

Management :

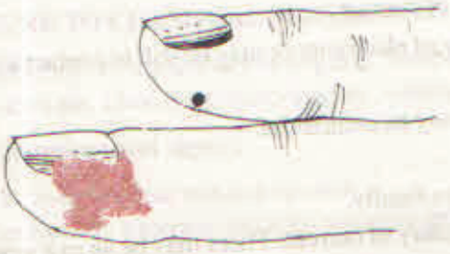
1. Switch off the current immediately.
2. Separate the victim from the electrical contact by using a non conductor object (wooden, woolen or rubber object). Do not touch the body of the victim.
3. Make the victim lie in supine position and check breathing, pulse, heart beat and consciousness quickly.
4. If not breathing, give artificial respiration by E.A.R. (mouth-to-mouth) method or by using a resuscitator.
5. If heart has also stopped continue Cardio-pulmonary resuscitation (CPR) till the person recover.
6. Treat the electric burn and other injuries.
7. Transfer the casualty in lying down position to the hospital.

INJURIES FROM HIGH VOLTAGE ELECTRICITY :

A strong electromagnetic field surround the high voltage current found in overhead cables and power lines. A person may come in contact with these lines accidentally while doing some repair job or the line may be snapped and touch the body. Due to strong current and sudden muscular contraction, the victim may be thrown away at a certain distance and may sustain head injury, fracture and of course severe burn. Death occurs in many cases.

Management :

1. If the victim is still in contact with, or even 6 meters away from the high voltage line, never approach to rescue the victim until the powerline is cut off by the authorised persons.
2. Even insulated material (wood or rubber) should not be used to separate the victim as they will not protect the rescuer.
3. Do not allow any one to come closer to the victim and never touch the victim.
4. Ask for assistance from the Electrical Department.
5. After the current is cut off, the victim may be resuscitated and sent to the hospital.



(Fig. 33. Electrical Burn showing internal damage.)

ELECTRICAL BURN :

Electrical burn may occur due to passage of electric current or due to electric flash over. The electrical burn may look minor from the external appearance but more damage may be caused to the underlying deeper tissues. Such burns take longer time to heal.

Management :

1. The burnt area should be cleaned with antiseptic solution, dried and dressed with a dry dressing.
2. No colored ointment should be applied to the burn

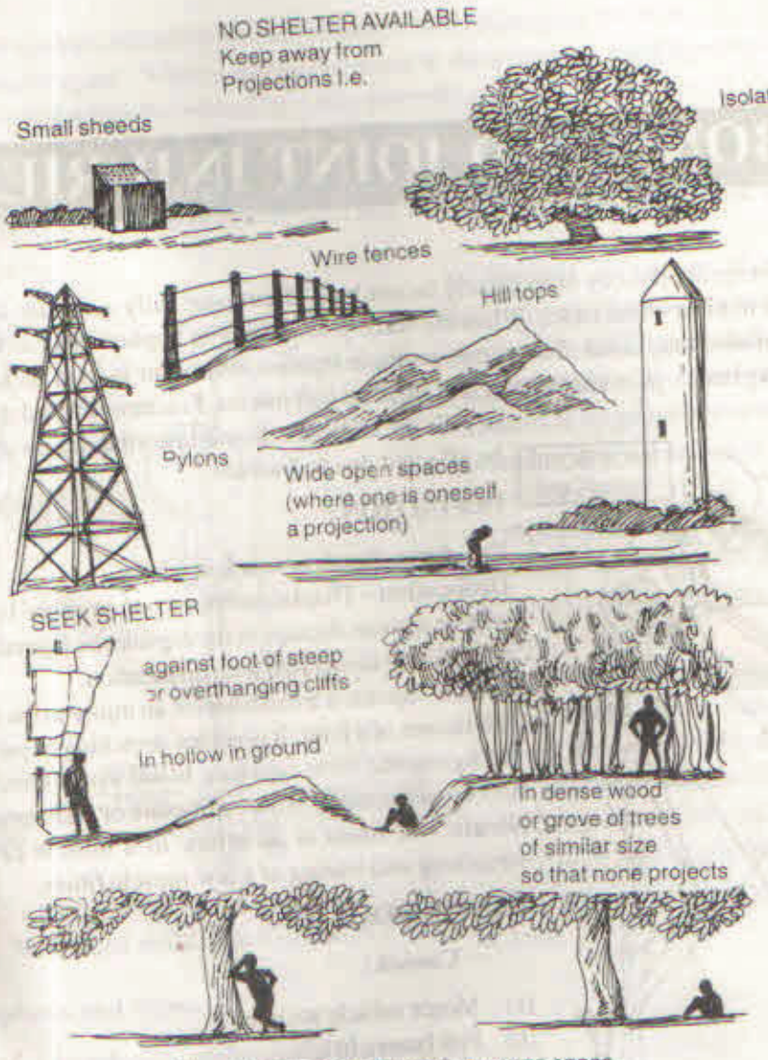
LIGHTNING :

During thunderstorm and lightning, very high voltage electric current is generated for an extreme short duration. It may hit a person and cause instant death. In most cases the lightning passes off witho causing any damage to individual.

While working outdoors or taking shelter outside or inside a person may be affected by lightni particularly in open fields and plane areas.

Precautions :

1. If lightning is expected and you are outdoors take shelter in the hollow of the ground, in between the grove of trees or several feet away from a single tree. Do not lean against the tr
2. Sit a little away from walls and rocks.
3. Keep away from projections like single tall tree, tall buildings, statue, towers, pillars, electric towers, pylons etc.
4. Do not stand erect in open field and never run. Lie down flat on the ground.
5. If travelling in a car or on a scooter in a stormy weather, park it on the road side and never down from the vehicle.

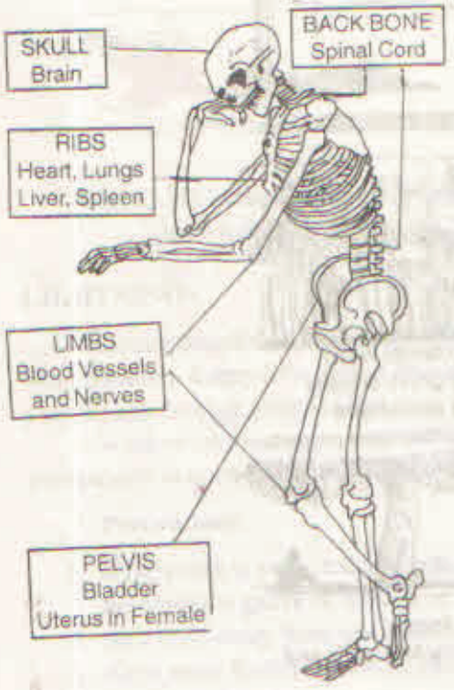


(Fig. 34. Precautions during lightning.)

6

BONE AND JOINT INJURIES

Various forces act directly or indirectly on our body during our daily activities and body tries to absorb this force in most of the cases. When the force is too strong or applied in an awkward position bone and joint injuries may occur. Sometimes multiple injuries may occur in road accidents or factory accidents affecting bones, joints ligaments, and adjacent soft tissues. Fractures caused due to slips, trips or falls are common. Sometime vital organs of the body may be affected due to fracture.



(Fig. 35. SKELETON Protects vital organs.)

DEFINITION :

Fracture - Break or crack in a bone.

Dislocation - Displacement of one or more bones at a joint with or without damage to the capsules or ligaments. A fracture may also be associated with dislocation.

Sprain - Sprain is a condition of an injury to the ligaments and soft tissues of a joint. It involves stretching or partial tearing of the ligaments, joint capsules, blood vessels and surrounding soft tissues, usually without fracture or dislocation.

Strain - A strain is an injury to a muscle resulting from stretching and tearing of a few muscle fibres.

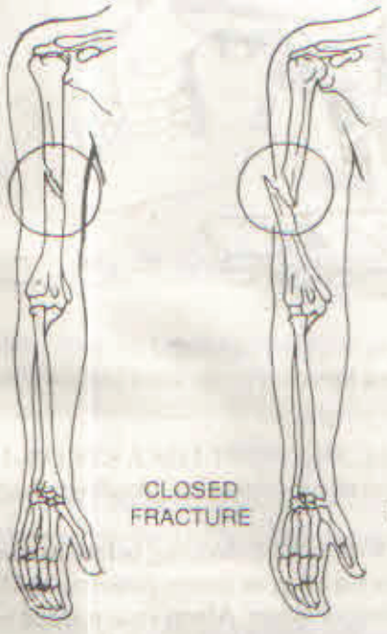
FRACTURES

Causes :

(a) Motor vehicle accident.
(b) Fall from a height.
(c) Sudden slipping on the floor, road, staircase or bathroom
(d) Struck by heavy object accidentally.
(e) Assault with lathi, bullet injury and brick-batting.
(f) Brittle bone in old age, children and due to certain diseases (pathological fracture)

Types :

* ***Simple or closed*** - When the bone is broken without damaging the skin.
* ***Compound or open*** - When a wound is present at the fracture site and the end(s)of broken bone may be seen through the wound or it may protrude out.
* ***Complicated*** - When come important organ of the body like brain, lungs, heart, kidney, liver, etc are injured due to fractured bone and results in serious complications.
* ***Comminuted*** - When the bone is broken into several pieces at the same place. It may be open or closed type.



(Fig. 36. Closed and Open Fractures.)

* **Multiple** - Fracture of several bones at different sites mostly caused due to road accidents or fall from a height.
* **Depressed** - The broken bone is pushed inwards at the point of fracture and may press the underlying tissue/organ. It is common in fracture of skull.
* **Impacted** - Sometimes one part of the broken bone is driven into the other part or another bone due to application of strong force at the site of fracture.
* **Green stick** - The bone is either cracked or partly broken. It is common among children whose bones are not fully developed.
* **Fracture dislocation**- fracture of the bone associated with dislocation of bones of the nearby joint may occur. When wrist or elbow bones are fractured, this type of deformity may be seen.

Symptoms and Signs:

(i) Pain and tenderness at the site of fracture.
(ii) Swelling.
(iii) Deformity - Shortening of limb, angulation, over riding.
(iv) Loss of function and movement.
(v) The bone ends may protrude out and seen through the wound in case of compound fracture.

The diagnosis of fracture should be confirmed by X' Ray.

Management :

1. Treat the fracture on the spot as far as possible without disturbing the casualty very much particularly if ambulance can be called to the spot.
2. All cases of suspected fracture it should be treated as a case of fracture. Neglect may cause serious complications.
3. Do not make the casualty walk or move. If shifting is necessary, do it gently and carefully with the help of a stretcher with adequate support to the injured part.

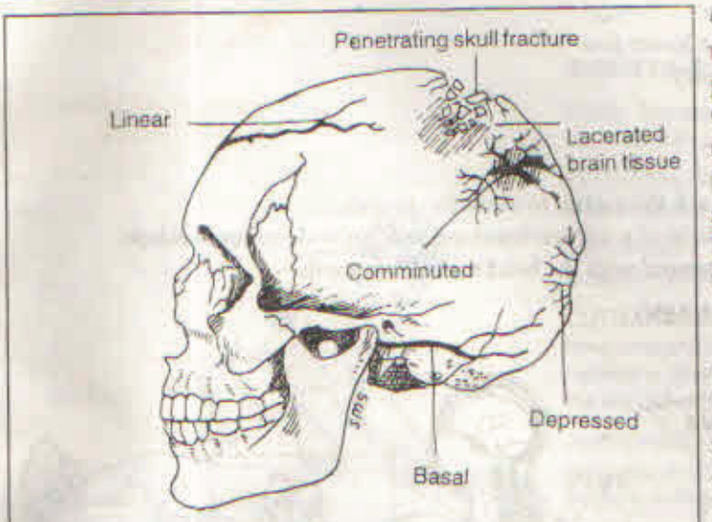
(Fig. 37. Shifting the casualty in a Strecher)

4. Do not try to set the bones.
5. Let the injured part rest in a comfortable position.
6. Assess the condition of the victim giving special attention to consciousness, bleeding, shock and unnatural position, if any.
7. Do not push in or pull out the protruding bone. Cover it with a sterile dressing before bandaging.
8. Guard against shock which may be caused due to excess bleeding or severe pain.
9. Immobilise the fracture by using suitable bandages, splints or slings. Always use padded splints covering two joints below and above the site of fracture to restrict movement fully.
10. In case of skull, jaw bone, pelvis or any complicated fracture, send the victim to the hospital quickly.
11. Special care should be taken while transporting a case of injury to back bone.

FRACTURE OF DIFFERENT BONES

SKULL :

Fracture of the front and top portion of skull is not very common unless very strong force is applied directly. Fracture of base of the skull, back portion (occipital region) or sides (temporal region) are common and serious conditions which lead to brain injury and internal bleeding. The depressed fragment of bone from a fractured skull presses over the brain causing bleeding and results in concussion or compression.



(Fig. 38. Types of Skull fracture)

Concussion causes immediate unconsciousness, short recovery and persistent headache.

Compression causes gradual unconsciousness as the victim moves from awareness to headache, confusion and coma after the accident or injury. Both the conditions may also exist together.

Management :

1. If the victim is unconscious, make him lie down with the injured side downwards. Do not raise the head or do not put any pillow under the head.
2. If the victim is conscious, place him in prop-up (half sitting) position with the head turned to the injured side and shoulders well-supported.
3. There may be bleeding or discharge through the ear or nose. Cover the ear/nose with a sterile dressing and bandage without blocking the openings.
4. Transfer the casualty to the hospital in lying down position.

FACIAL BONES AND UPPER JAW (MAXILLA) :

Injuries to the face may result in fracture of upper jaw or cheek bone, nasal bones and orbit (eye cavity). Severe swelling of face and vision disturbance may be seen.

Management :

1. Clean the effected area gently with cold water.
2. Apply cold compress.
3. Transfer the casualty to the hospital.

LOWER JAW (MANDIBLE) :

Lower jaw fracture is caused usually due to a heavy blow or violent force. It mostly occurs on one side. Dislocation of lower jaw is more common than fracture.

Signs and Symptoms :

(i) Severe pain increases by swallowing and jaw movement.
(ii) Difficulty in speaking and swallowing.
(iii) Dribbling of blood-strained saliva.

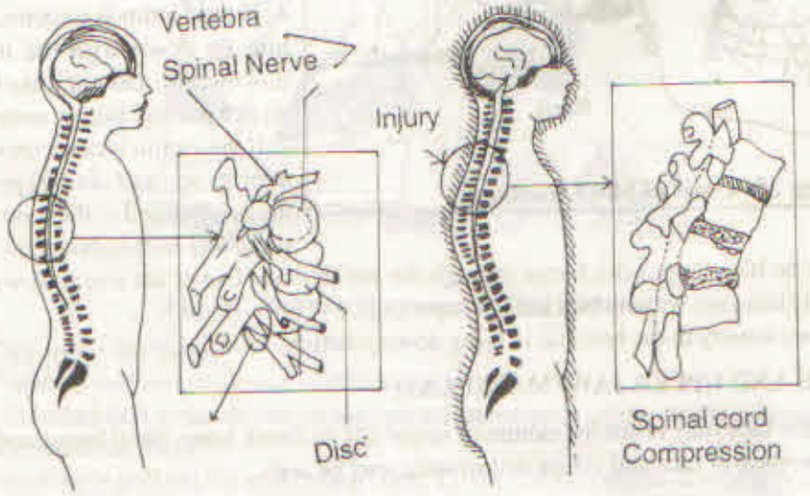
(Fig. 39. Jaw Bandage)

(iv) Two rows of teeth are uneven.
(v) Swelling and tenderness of the lower jaw.
(vi) Mouth cannot be closed properly.

Management :

1. Ask the victim not to speak.
2. Support the fractured side and ask the victim to close the mouth.
3. Apply a jaw bandage with the help of a narrow bandage or 5 cm wide roller bandage.
4. Transport the casualty to the hospital with the head bent downwards.

BACKBONE (VERTEBRAL COLUMN) :



(Fig. 40. Injury to Back bone)

The backbone is composed of 33 units of small bones (vertebra) placed one over the other fr neck to the buttock. The spinal cord which is an elongation of brain runs through a canal formed these bones and controls many peripheral functions of the body through nerve fibres. Fracture of b bone (spine) may occur due to direct or indirect force affecting single or a group of vertebra invari damaging the spinal cord. Automobile accident, fall from height, lifting heavy weight, sports injury cause fracture of spine.

Symptoms and Signs :

(i) History of sudden pain particularly during jerky movement.
(ii) Pain and tenderness at the site of injury.
(iii) Loss of sensation and movement below the site of injury.

SIGNS OF POSSIBLE SPINAL CORD INJURY

PAIN. The patient may be aware of unprovoked pain in the area of injury

TENDERNESS. Gently touching the suspected area may result in incresased pain.

DEFORMITY. Deformity is rare, although there may be an abnormal bend or bony prominence.

CUTS AND BRUISES. Patients with neck fractures may have cuts and bruises on the head or face. Patients with injuries in other areas of the spine will have bruises on the shoulders, back, or abdomen.

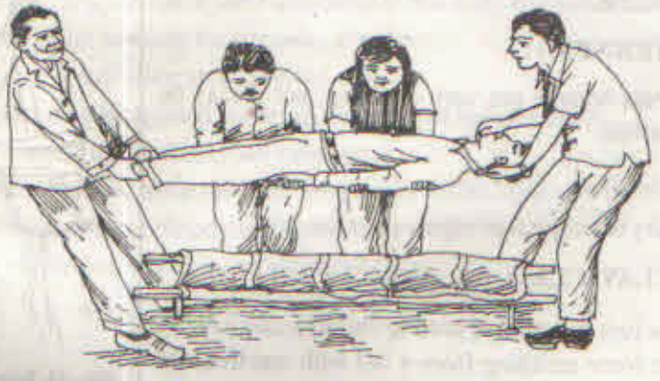
PARALYSIS. If the patient is unable to move or feels on sensation in some part of his body, he may have a spinal fracture, with cord injury.

PAINFUL MOVEMENT. If the patient tries to move, the pain may increase – never try the injured area for the patient

(Fig. 41. Signs of possible spinal cord injury.)

Management :

1. Transport the casualty in supine position taking care not to bend the head or neck.
2. Use hard stretcher while transporting and lifting.



(Fig. 42. Transporting a casualty with back bone injury.)

3. Four persons should lift the victim, keeping him in horizontal position, two persons holding the head and leg ends and two persons should support his back with their hands.
4. The movement of the stretcher/vehicle should be slow and gentle during transportation.

RIBS :

Due to application of direct force, chest compression, automobile accident or accidental fall one or more ribs may be fractured. The fractured ribs may penetrate the chest and injure the heart and lung causing complications.

Symptoms and Signs :

(i) Sharp pain is felt at the site of fracture.
(ii) Pain aggravated during coughing and breathing.
(iii) Open chest wound may be present.
(iv) Signs of internal bleeding in the chest may be there.

Management :

If simple fracture :

1. Apply two broad bandages one overlaping the other around the chest without removing the dress.
2. Ask the victim to breathe out and tie the knots below the arm pit.
3. Support the arm on the injured side with a sling.

If complicated fracture :

1. Do not apply any bandage but cover the wound with sterile gauze pieces.
2. Make the casualty lie down with the head and shoulder raised and body inclined towards the injured side.
3. Keep the hand on the injured side in an arm sling.
4. Guard against shock.

BREAST BONE (STERNUM) :

Fracture of breast bone is not very common, but it may be associated with rib fracture.

Management :

Send the casualty to hospital in supine position.

COLLAR BONE (CLAVICLE) :

Collar bone fracture is common among children and usually occurs due to indirect force resulting from a fall with outstretched hand or impact on shoulder.

(Fig. 43. Immobilizing a fractured collar bone or clavicle)

Symptoms and Signs :

(i) Pain and tenderness over the bone.
(ii) Drooping of shoulder.
(iii) Broken bone ends may be felt just under the skin.
(iv) Outer broken end may project downwards.
(v) Difficulty in raising the hand.

Management :

1. Support the arm of the injured side.
2. Place paddings between the chest and upper arm. Support the forearm of the injured side in a triangular sling.
3. Fix the upper arm the the chest wall with a broad bandage.
4. Transfer the casualty to the hospital in sitting position.

SHOULDER BLADE (SCAPULA) :

Fracture of shoulder blade is not very common. It may occur due to direct blow or automobile accident. Dislocation of shoulder may be associated with this fracture.

Management :

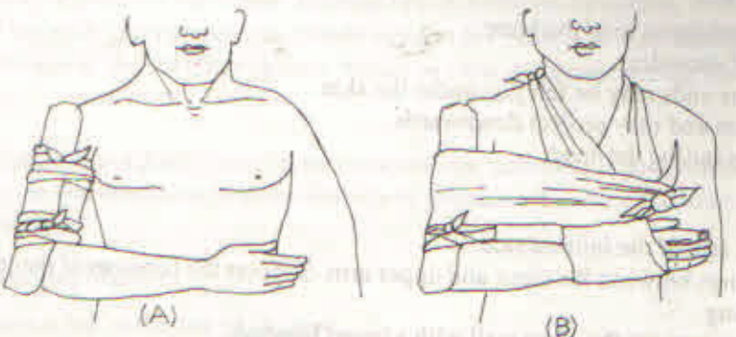
Support the upper limb of the injured side by a triangular sling and fix the upper arm with the chest wall and transfer the casualty to the hospital in sitting position.

UPPER ARM (HUMERUS) :

The upper arm bone may break near the shoulder (upper end) at the elbow (lower end) or in the middle (shaft).

Management :

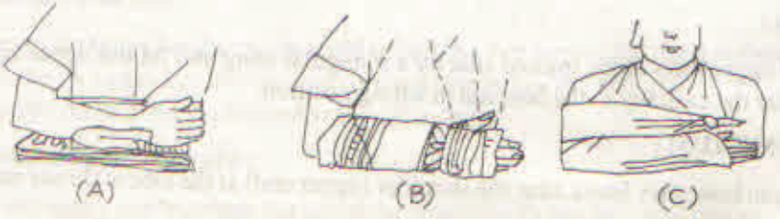
1. Make the victim sit comfortably.
2. Ask the victim to support the injured arm close to the body and bend the hand across the chest so that the fingers point towards the opposite shoulder.
3. Apply a collar and cuff sling at the injured side.
4. A padded splint may be applied covering shoulder and elbow joints.
5. Fix the arm to the chest with a broad bandage.
6. If elbow cannot be bent, keep the limb on the side of the body and fix with broad bandages.
7. Check the pulse to ensure blood circulation to the limb.
8. Transfer the victim to the hospital in sitting position.



(Fig. 44. Application of padded splint covering elbow & shoulder joints.)

FOREARM (RADIUS AND ULNA) :

One or two bones of the fore arm may break. Fracture of both bones at the wrist with associat dislocation of the wrist joint is very common. Upper ends of the bones may also break at the elbow



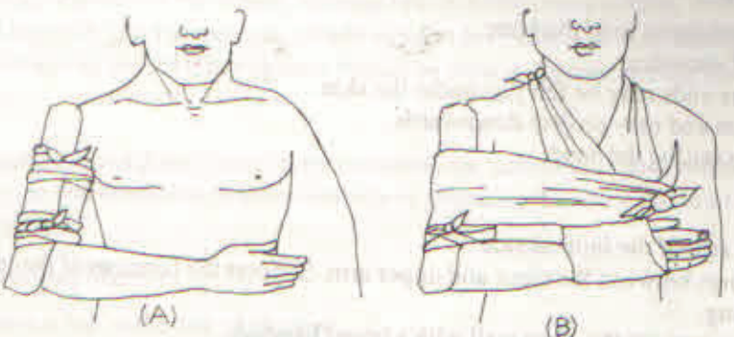
(Fig. 45. Supporting forearms covering elbow & wrist joints.)

Management :

1. Make the victim lie down or sit comfortably.
2. Support the forearm with elbow bent and apply one padded splint covering the elbow and th wrist joints.
3. Apply an arm sling.
4. If elbow cannot be bent easily, place the limb on the side of the body, give padding between th body and injured part and fix it to the body with the help of broad bandages.
5. Check the pulse and ensure blood circulation to the limb.
6. Transfer the casualty to the hospital.

HAND AND FINGERS :

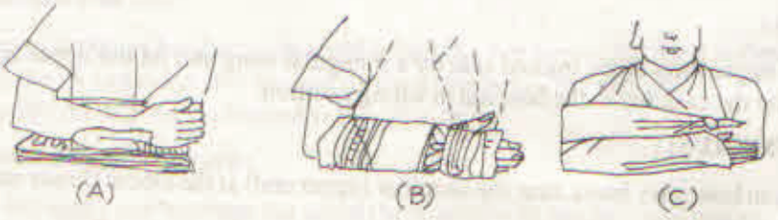
Fracture of the small bones of wrist (carpal bones), bones of the hand (metacarpals) and finge bones (phallanges) may occur usually due to direct force or crush injury. In most cases the fracture i associated with lacerated wound and severe bleeding. The casualty feels severe pain, swelling an unable to move the fingers. Blood vessels and nerves may also be damaged.



(Fig. 44. Application of padded splint covering elbow & shoulder joints.)

FOREARM (RADIUS AND ULNA) :

One or two bones of the fore arm may break. Fracture of both bones at the wrist with associat dislocation of the wrist joint is very common. Upper ends of the bones may also break at the elbow



(Fig. 45. Supporting forearms covering elbow & wrist joints.)

Management :

1. Make the victim lie down or sit comfortably.
2. Support the forearm with elbow bent and apply one padded splint covering the elbow and th wrist joints.
3. Apply an arm sling.
4. If elbow cannot be bent easily, place the limb on the side of the body, give padding between th body and injured part and fix it to the body with the help of broad bandages.
5. Check the pulse and ensure blood circulation to the limb.
6. Transfer the casualty to the hospital.

HAND AND FINGERS :

Fracture of the small bones of wrist (carpal bones), bones of the hand (metacarpals) and finge bones (phallanges) may occur usually due to direct force or crush injury. In most cases the fracture i associated with lacerated wound and severe bleeding. The casualty feels severe pain, swelling an unable to move the fingers. Blood vessels and nerves may also be damaged.

Management :

1. Control bleeding and cover the wound.
2. Place the hand gently on soft padding and apply a hand bandage using a triangular or roller bandage.
3. Support the hand with an arm sling.
4. Guard against shock and transfer to hospital.

If a single finger is affected, apply a finger dressing and finger splint and fix it to the nearby finger with a bandage or adhessive plaster.

HIP BONE (PELVIS) :

The pelvic girdle is composed of three pairs of bones and attached to the backbone behind. These bones may fracture due to fall direct impact or automobile accident and may damage urinary bladder or urinary passage.

(Fig. 46. Hip bandage.)

Symptoms and Signs :

(i) Pain is felt at the hip region or lower part of abdomen and becomes acute during coughing and taking deep breath.
(ii) Signs of shock are present.
(iii) Urine may be deeply coloured or blood-tinged.
(iv) Person has the urge to pass urine but unable to pass.

Management :

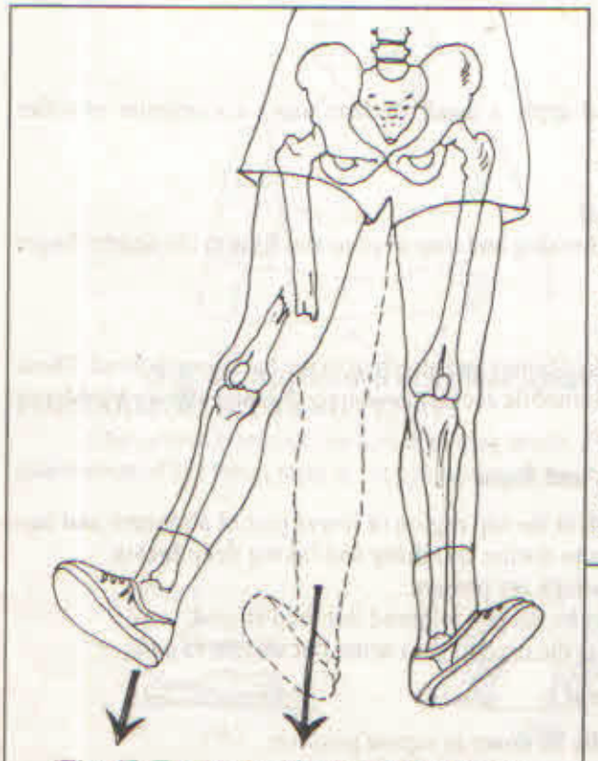
1. Make the casualty lie down in supine position.
2. Apply a broad bandage at the centre of hip joint of the affected side and second broad bandage overlapping the first on the lower half.
3. Put paddings between the knees and ankles.
4. Apply a figure of 8 bandage round the ankles and feet.
5. Apply a broad bandage round the both knees.
6. Transport the casualty in lying down position.

THIGH (FEMUR) :

Fracture of thigh bone is more common in old age and it usually breaks at the neck or upper part. Fall in the bathroom, from staircase or traffic accidents cause such fracture. If the leg is twisted with a jerky movement, fracture of femur may occur.

Signs and Symptoms :

(i) Sever pain, tenderness and swelling at the site of fracture.
(ii) Leg cannot be raised or moved.
(iii) Shortening or angulation of the affected limb.
(iv) Signs of shock may be present.



(Fig. 47. Fracture of Right Thigh Bone.)

Management :

1. Lay the casualty in supine position comfortably.
2. Apply sufficient padding between the knees and ankles.
3. Gently bring the two legs close to each other and apply a figure of 8 bandage around the ankles and feet.
4. Apply a broad bandage across the knees to keep the legs secured.
5. If splint is available, apply a long padded splint from the arm pit (axilla) to the ankle and tie it with five broad bandages to the leg and the body.
6. Transport the casualty to the hospital in a stretcher or ambulance in lying down position.

(Fig. 48. Application of splint & bandage in case of fracture of Thigh bone.)

KNEE CAP (PATELLA) :

Fracture of knee cap may occur due to violent leg movement or direct force. Dislocation is more common than the fracture as the triangular bone slide in front of the knee joint due to muscle movement. When the fracture or dislocation occurs, the leg becomes swollen, knee joint is locked and movement becomes painful.

Management :

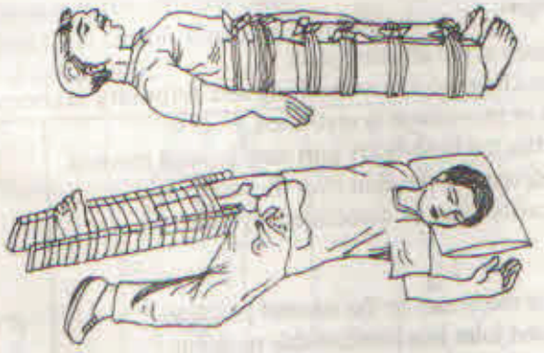
1. Make the victim lie down on the back and raise the shoulder and head gently. Keep the injured leg slightly raised also.
2. Apply a padded spint under the leg extending from buttock to the heal and secure them with bandages.
3. Apply a broad bandage on the thigh, a narrow bandage just above the knee cap and a figure of 8 bandage round the ankle and the feet.
4. Transport the casualty in lying down position with leg end slightly raised.

LEG BONES (TIBIA AND FIBULA) :

One or both bones of the lower leg may be broken mostly at the lower end above the ankle when the leg slips or twisted. The victim may not have any symptom immediately but may get pain and swelling after some hours or days.

Management :

1. Make the casualty lie down in supine position.
2. Bring the two feet close together and tie them with a figure of 8 bandage.
3. Apply two bandages below and above the fracture site tying both legs and another broad bandage around both knees.
4. Send the casualty to the hospital in supine position.



(Fig. 48. Immobilisation of Fractured Bones of Lower Limb.)

ANKLE AND FOOT :

Fracture of the bones of foot (metatarsals) and ankle (tarsal bones) are often caused being pressed by heavy object, being runover by a vehicle or while jumping. It is difficult to distinguish between pain and fracture of ankle. When in doubt, it should be treated as a case of fracture.

Symptoms and Signs :

(i) Sever pain and throbbing sensation.
(ii) Tenderness.

(iii) Swelling.
(iv) Loss of movement.
(v) Deformity of the bony arch of the foot may be prominently visible.

Management :

1. Make the casualty lie down and raise the injured foot gently.
2. Remove the shoes and shocks.
3. Control bleeding if any, dress the wound and bandage firmly.
4. Give sufficient padding and apply a leg bandage using a triangular or roller bandage.
5. If there is not external injury, ice pack may be applied to reduce pain and swelling.
6. Keep the injured foot slightly raised as the casualty takes rest.

DISLOCATION

Displacement of bone end from the joint may take place due to great force and stretching or contraction of muscles. Dislocation is common in shoulder, lower jaw, elbow, fingers, hip, knee cap and wrist.

Symptoms and signs :

(i) Sickening boring pain at the affected joint.
(ii) Shape of the joint is changed due to swelling and deformity in comparison to healthy side.
(iii) The joint is locked or movement is restricted.
(iv) Deformity of the affected limb/body part may be well marked.
(v) Stretching and reddening of the skin over the joint.
(v) Fracture and dislocation may be associated together.

Management :

1. Do not try to replace the bones to the normal position.
2. Support the dislocated joint in a comfortable position.
3. Apply sufficient padding over the dislocation and bandage firmly.
4. Seek medical help immediately.
5. If there is dislocation of lower jaw, apply a jaw bandage and transport the casualty to the hospital.

SPRAIN :

Sprain is caused when ligaments, joint capsules, muscle tendon and blood vessels, around a joint are overstretched and torn due to excess stretching movement at a joint. Ankle knee and wrist joints are commonly affected by sprain. Sprain and dislocation/fracture may be present together at the same time.

Symptoms and signs :

(i) Sever throbbing pain felt at the joint.
(ii) Swelling and stretching of skin occur immediately or after some time.
(iii) Joint movement is restricted and very painful.

Management :

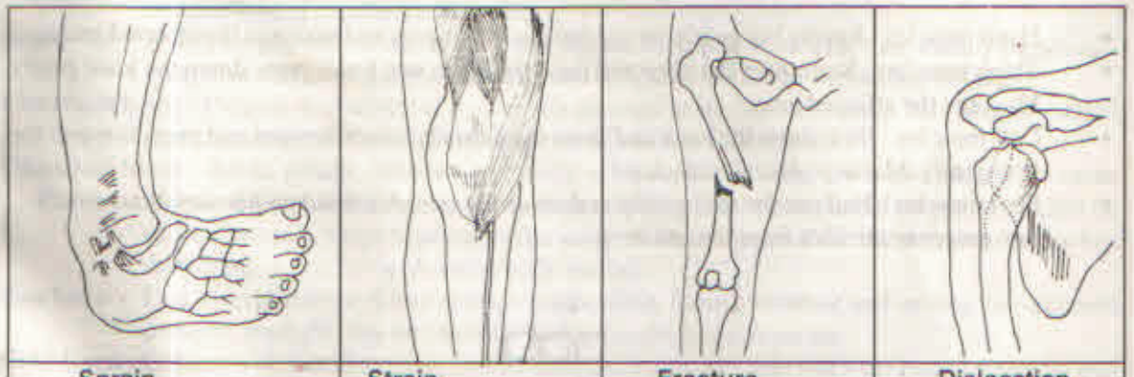
1. In case of ankle sprain, if pain and swelling is not much do not remove the shoes but loosen the shoe-lace. Remove the shoes and shocks if swelling increases later on.
2. In case of sprain over any joint, apply cold compress for about 15 to 30 minutes. Then apply a wet bandage with sufficient padding.
3. Keep the affected limb slightly raised and give rest to the part.
4. Massaging or application of any ointment immediately is not advised.
5. If spray dressing for sprain is available spray it neatly over the affected part.
6. Advise the casualty to start the movement of the part early.
7. If association of fracture or dislocation is suspected, send the casualty to the hospital.

STRAIN.

Muscle strain may occur due to stretching of muscles, awkward position, wrong posture during work or sudden jerky movement. Muscles of neck back, thigh and calf are usually affected.

Symptoms and signs :

(i) Severe pain and tenderness at the affected sight.
(ii) Swelling, tense skin and local rise of skin temperature.
(iii) Movement is restricted and painful.



Sprain	Strain	Fracture	Dislocation
Pain on movement	Immediate burning pain	Pain tenderness	Pain
Tenderness	Little swelling	Deformity	Deformity
Painful movement swelling	Little discoloration	Loss of use swelling	Loss of movement
Redness		Bruising Crepitus (grating) Exposed bone ends.	Sprain

(Fig. 49. Difference between various injuries.)

Management :

1. Rest to the affected part.
2. Dry heat (hot water bag) application locally.
3. In case of back strain, a hard bed should be used while taking rest.
4. Use analgesic (pain reducing) tablet, if available.
5. Pain relieving balm or spray dressing for sprain may be used if available followed by application of dry warm compress.

MUSCLE CRAMP

Muscle cramp is a sudden, involuntary and painful contraction of a muscle or group of muscl
It occurs all on a sudden usually during playing, swimming or while doing exercise. Due to fatig
(tiredness), diarrhoea, body fluidloss (excess sweating)and in case of Diabetic patients muscle cra
may occur.

Symptoms and signs :

(i) Sudden pain over the affected muscles.
(ii) Feeling of spasm or tightness.
(iii) The victim is unable to relax the contracted muscle to resting position.

Management :

- Hand muscles - Firmly but gently straighten out the fingers and massage the affected area.
- Thigh muscles - Straighten the knee and raise the leg in one hand, press down the knee gent
  Massage the affected area.
- Calf muscles - Straighten the knee and draw the casualty's foot upward and press towards t
  skin gently. Massage the calf muscles.
- Foot muscles - Pull out the toes gently and assist the casualty stand on his toes. Start gentl
  movement of the foot from the ankle.

❑❑❑

7

BURNS AND SCALDS

DEFINITION :

Burn is the tissue damage caused by dry heat of flame, hot object, ,molten metal, electricity etc.

Scald is caused due to moist heat of boilling water, steam, hot liquid, hot oil, coal tar or chemical liquids (acid, alkali) which produce heat.

VARIETIES OF BURN

Dry burn - Usually caused due to fire, hot object or hot metal. It may be superficial or deep depending on temperature and time of contact with the body. Friction with fast moving objects may produce friction burn.

Molten metal burn - In metal industries, serious type of deep dry burn may be caused due to spillage or splashing of molten metal or slag.

Scald - Scalds may be caused due to hot water, steam, hot liquid or oil which are usually superficial, extensive and most painful. Blisters and red patches may be formed on the skin.

Electrical burn - Extensive charring of tissue with damage to deeper structures. This may be caused due to passage of electric current or due to electric flash over.

Chemical burn - Acids, alkalis, solvents, synthetic substances and other corossive chemicals cause chemical burn of different severity depending on their strength and property. Alkalis do more damage. Chemical powders like cement, lime, chemical fertilizers cause burn when they come in contact with moist body surface.

Sun burn - Due to exposure to direct sunrays particularly during summer and among fair-skinned persons, sunburn may be caused which are superficial in nature.

Cold burn - Contact with liquid oxygen, liquid nitrogen, dry ice etc. skin loses temperature rapidly and cold burn is caused.

Radiation burn - Exposure to X'Ray, LASER beam or other radiation sources may cause radiation burn which are not very common.

FACTORS INFLUENCING BURN HEALING

Area Affected (Body Surface Burnt) :

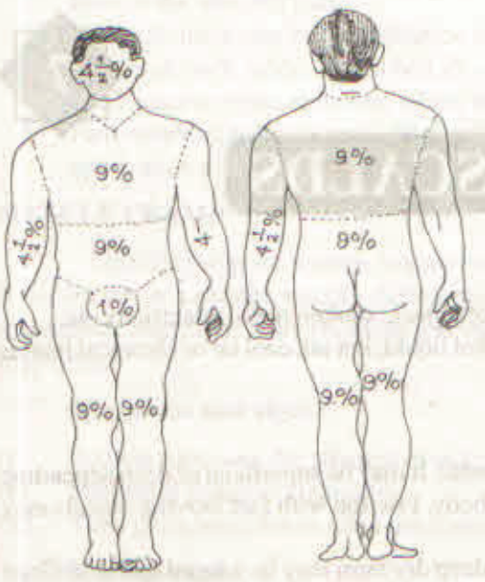
⇒ If less than 5% of the body surface is affected then, healing takes place quickly.

⇒ The casualty may suffer from shock if more than 15% of body surface is burnt.

⇒ Any burn affecting more than 30% of the body surface is very serious.

⇒ If hand, face and genital organs are affected, it takes more time to heal.

⇒ The body surface can be calculated by using '**Rule of 9**' as shown in the adjoining figure.



(Fig. 50. Body surface Burnt : Rule of 9)

DEPTH OF BURN :

Superfical or Red patch (First Degree) Red of skin with painful swelling around may occur and upper layer of skin is affected.

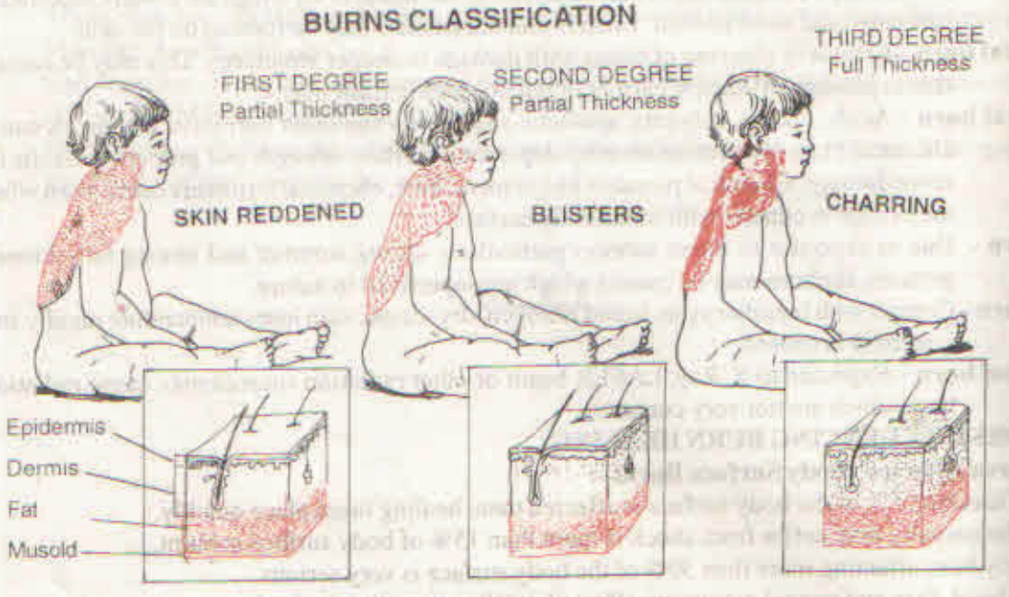
Intermediate (Second degree) - Blister swollen red area around it is seen when the sk affected without damage to the underlying tissue very painful and chance of infection is more.

Deep (Third degree) - The skin and underlying tissue is affected. The surface may look open or charred and usually less painful (due to dar of nerve endings). Infection, complications contracture of skin may occur.

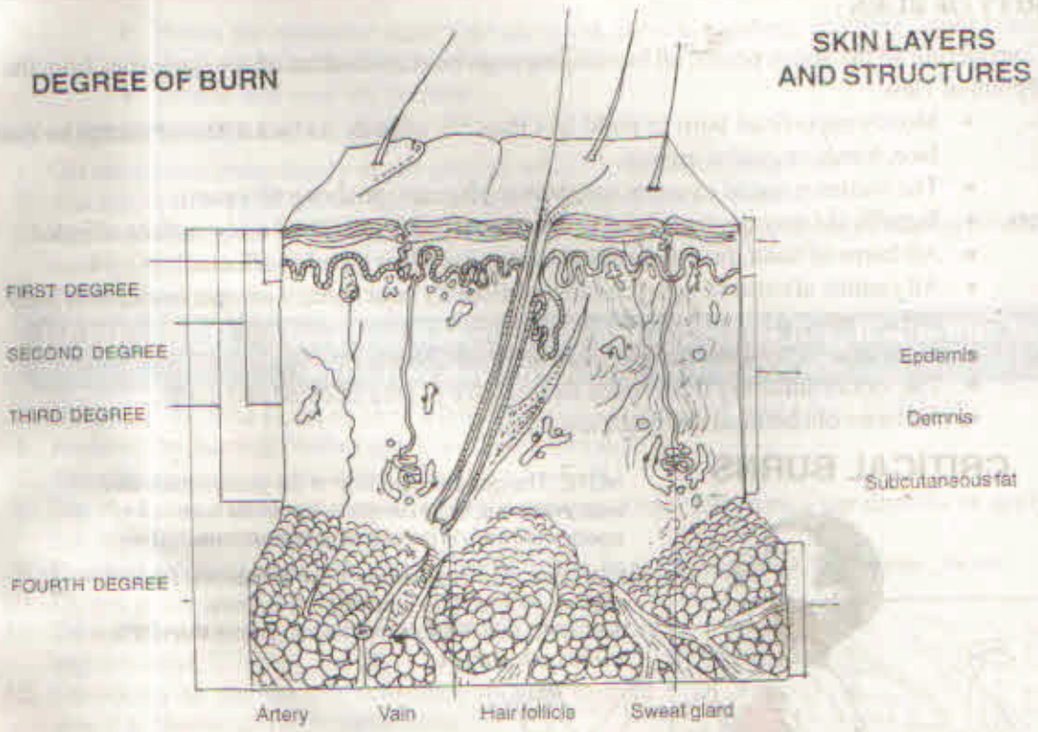
CAUSATIVE AGENT :

The reaction of the body varies dependin the causative agent. Molten metal, electricity and s acids cause deeper burns and it takes longer ti heal.

More damage is caused due to steam (bec of latent heat) than hot water.



(Fig. 51. Burns classification)



(Fig. 52. Degree of burn , Skin layers and structures.)

Difference between Burn and Scald

	Burn	Scald
Cause :	Dry heat	Moist heat
Depth :	Deep	Superficial
Blister :	Not common	Most common
Pain :	Less	More
Healing :	Delayed	Quick
Scar :	Remains	Moscar
Complications :	More chances	Possible
First aid :	Cold water	Cold water

AGE AND SEX :

Children, women and elderly people are affected badly and take more time to recover.

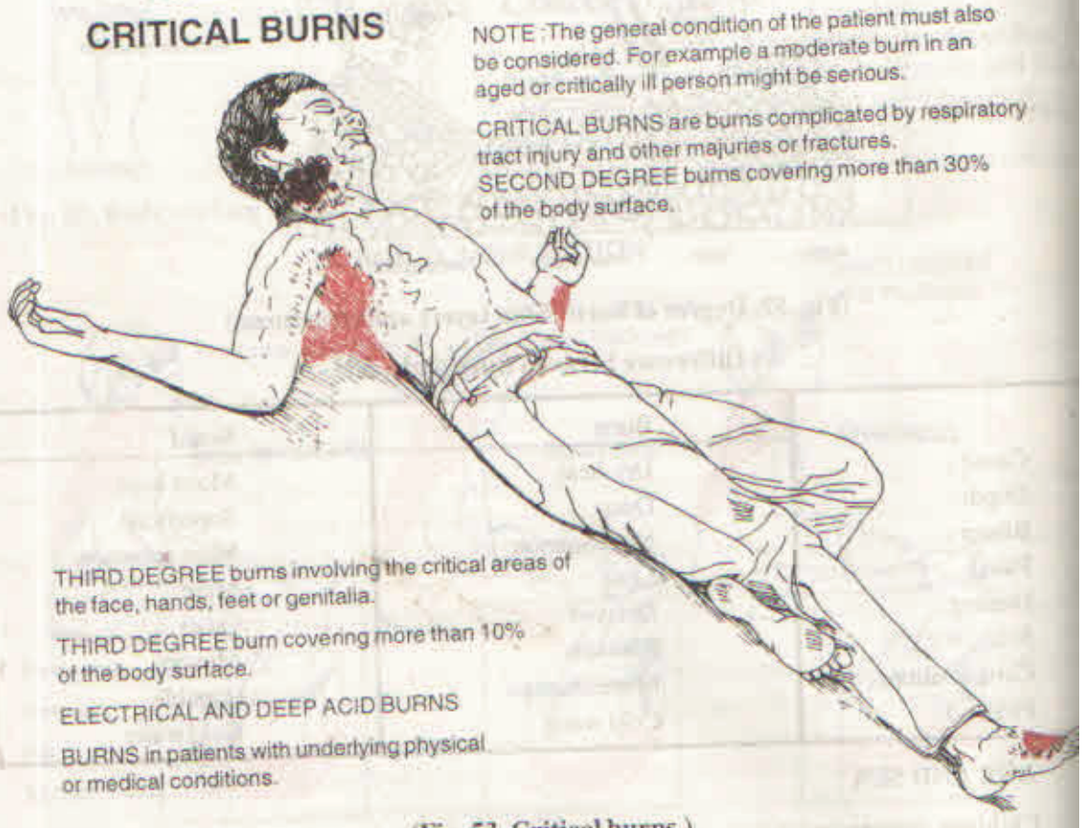
SEVERITY OF BURN :

Considering all the above points, all burn injuries can be classified into three categories from the first-aid point of view :

Minor -
- Mostly superficial burn or scald less than 5% of body surface affected except on the face, hands or genital organs.
- The victim is not of extreme age (below 10 years, or above 60 years).

Moderate -
- Burn/Scald may be superficial or deep usually 5% to 30% of body surface affected.
- All burns of hand, face and genital organs even less then 5% affected.
- All victims of extreme ages (children and elderly) and females irrespective of their body surface affected.

Serious -
- More than 30% of the body surface affected or critical.
- The victim suffering from shock irrespective of area affected and depth.
- All cases of chemical and electrical burns.



(Fig. 53. Critical burns.)

- When the causative agent (hot chemical, coaltar, synthetic clothing, molten metal or slag) sticks to the body for longer period.
- Infants and very old persons.

MANAGEMENT OF BURN CASES :

1. Get the victim immediately on the ground, when clothes have caught fire.
2. Ask the victim not to run but lie down quietly without any movement.
3. Approach the victim with a wet towel, wet bed sheet, a thick cloth, mattress or blanket (if available readily) and cover the body.
4. Put out fire immediately by using clean water.

REMEMBER : Never use water to put out source of fire, if it is due to kerosine, petrol, oil, gas or electricity.

5. If alone roll on the floor, on the carpet or grass lawn and pour water over your body.
6. Remove the burning clothes quickly - do not feel shy.
7. Take the casualty to a safer place and give first-aid.
8. Dip the burnt part in cold water or apply running cold water from a tap directly or apply wet bandage for atleast ten minutes.
9. Remove anything constrictive - ring, wrist watch, bangles, bracelets, belt, shoes, tie etc.
10. Do not prick or cut the blisters.
11. Do not try to remove any portion of the skin even if it appears dead.
12. Do not try to remove any substance sticking to burn area e.g. chemicals pitch, burnt dress.
13. Do not apply any ointment, lotion, oil or any substance (people may suggest many things) on the burnt surface.
14. Cover the burnt surface with a piece of sterile gauze or clean cloth.
15. Do not apply any cotton, bandage or adhesive dressing.
16. Use a spray dressing for burn if available.
17. Prevent shock and transport the casualty quickly to the hospital.

Fig. 54. Application of Cold Water on The Burn Area.)

18. In case of very small and superficial burns and scalds, apply any ointment or spray dressing after cooling down with water.

REMEMBER : Use water on the burn – Don't hesitate.

SPECIAL CARE FOR CHEMICAL BURNS :

Certain chemical substances, insecticides and additives which are used extensively in industries, laboratories, farms and small processing units (paints, chemicals and workshops) may come in contact with skin during handling resulting in chemical burns. Apart from the damage to the skin and underlying tissue locally, a few chemicals may get into the body through the skin and cause severe body reaction and even death. Corrosive and volatile chemicals may affect the eyes, mouth, nose and mucous membrane of the body as well. Therefore, special attention has to be paid while dealing with such cases.

Management :

1. Wash the affected area repeatedly with slowly running cold water for at least fifteen minutes.
2. Make sure that the washed out water does not affect the healthy skin again.
3. Use eye wash fountain or a wash bottle if the chemical enters the eye.
4. Do not apply any ointment, lotion or bandage.
5. Cover the burnt area with a piece of gauze or clean cloth.
6. Apply an eye pad in each eye, if they are affected.
7. Gently remove the contaminated clothing.
8. Send the casualty to the hospital quickly.

REMEMBER : The aim of Fist aid of burn is to prevent shock to avoid infection and to assist in quick healing.

ELECTRICAL BURNS : Described in CHAPTER 5.

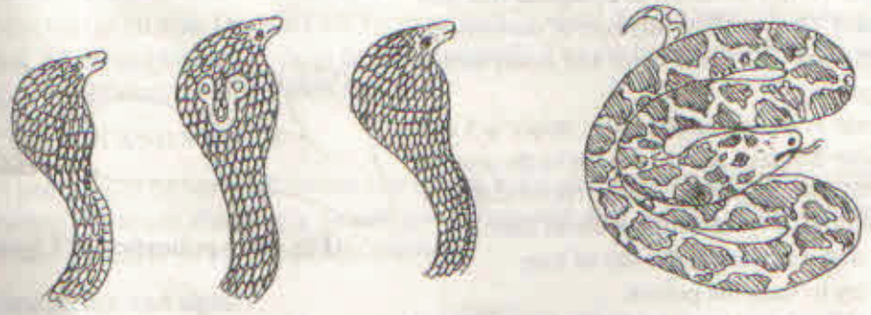
❑❑❑

8

BITES AND STINGS

SNAKE BITE :

Cases of snake bite are not very uncommon in our country although number of deaths have been reduced due to available medical facilities. Most of the snake bite cases occur due to non-poisonous snakes but many are bitten by poisonous snakes like cobra, king cobra, kraits, momfa tiger snakes, vipers and sea snakes.



(Fig. 55 / 56. Poisonous Snakes)

The snake venum which is a complex chemical substance, enters the body at the site of bite and affects the heart, nervous system, blood vessels, blood clotting mechanism, kidneys and respiratory system. Cobra poison produces generalised effect on heart and nervous system and may cause death. Viper or krait poison produce local reaction and induce bleeding after sometime. Since the snake bite produces panic in the mind of the victim and invariably produces shock, all these cases should be attended immediately and carefully without wasting time to decide whether the snake is poisonous or not.

Symptoms and signs :

(i) Two small puncture marks are seen at the site of the bite.
(ii) Swelling and burning sensation at the site.
(iii) Tingling sensation felt all over the body.
(iv) Disturbed vision.
(v) Bulging of the eye ball (ptosis).
(vi) Headache.
(vii) Nausea & Vomiting.
(viii) Sweating.
(ix) Froth coming out of mouth.
(x) Drowsiness and fainting.
(xi) Increased heart rate.
(xii) Delayed reaction of localised swelling, bleeding through orifices (openings), abdominal p... etc. may occur hours after krait or viper bite. The victim suffers from shock and may collap...

Management :

1. Reassure the casualty and speak the words of comfort.
2. Make the victim lie down at complete rest and keep calm. Do not allow any sort of movement.
3. Clean the site with plain water and cover with a sterile gauze.
4. If the bite is on the hand or leg, apply a 5 cm wide roller bandage about 5 cm above the wound firmly but not tightly. The constrictive band should stop the flow of lymph but not blood flow.
5. Do not make any cut at the site of bite.
6. Do not try to suck the poison.
7. Treat for shock and send the victim immediately to hospital for antivenin treatment.

(Fig. 57. Application of Ligature.)

REMEMBER : Never delay medical treatment in case of snake bite.

DOG BITE :

Dog bite is a very common condition in India. A large number of unprotected pet dogs and ple... of stray dogs in rural and urban areas are the sources of danger particularly for the children and passe... Rabies (hydrophobia) is caused if a person is bitten by a mad dog for which no cure is available yet. B... it can be prevented if a course of antirabic injection taken immediately after the dog bite. Rabies is a v... disease which affects the brain of the victim and the virus present in the saliva of the mad dog pas... through the nerves to the brain. It takes 20-40 days to develop the disease after a mad dog bite. Teta...

may be caused due to infection of the dog- bite wound. Rabies may also occur after other animal bite e.g. jackal, wolf, cat, horse, monkey etc. who are infected by the virus earlier.

Symptoms and signs :

(i) History of dog bite by known or unknown dog without any provocation.
(ii) Presence of tooth mark, wound with laceration.
(iii) Bleeding or oozing of blood from the site of bite.
(iv) Dry saliva may be seen around the wound site.

Management :

1. Wash the wound immediately and repeatedly with running water.
2. Wash it again with potash solution, soap or diluted dettol water.
3. Cover with a sterile dressing and do not apply any bandage.
4. Send the victim to the hospital immediately.
5. Watch the dog and see of it develops symptoms of rabies or dies within 10 days.

REMEMBER : Consult a doctor for antirabic treatment and advice in all case of dog bite scratches and licks. Never take a chance as the disease is 100% fatal after it develops.

Infection of Human Diploid Cell Vaccine (HDCV) 1 ml. subcutaneously to be given on each of day 0, 3, 7, 14, 30 and booster does on day 90 (optional). The victim should complete the entire course of injection under medical supervision.

INSECT BITES AND STINGS :

A person may be bitten by insects like spider, ticks, ants accidentally. Bees, wasps, hornets may cause stings. These are alarmingly painful conditions and may lead to serious consequences in the children due to local or generalised body reactions.

Symptoms and signs :

(i) Severe pain and burning sensation at the site of bite/sting.
(ii) Sometimes the insect (bee, wasp) leave its sting in the skin.
(iii) Swelling and redness around the affected site.
(iv) Nausea and vomiting.
(v) If the victim is allergic to the venum (secreted toxic substance), there may be red blotchy swelling around the face, eyes, mouth, throat and may be all over the body.

Management :

1. Pull out the sting gently with a pair of fine forceps if it is present in the skin.
2. Apply cold compress or ice cubes at the site.

3. Vinegar diluted with water, sodi-bicarb paste, cold cream or a little tooth paste may be applied to the affected area.
4. Treat for shock in severe cases.
5. If the sting is inside the mouth give the victim a few ice cubes to suck and ask to rinse the mouth with ice-cold water repeatedly.

SCORPION STING :

In some parts of our country during construction work, in warehouses, farms and even inside the rarely used buildings, persons may be affected by black scorpion sting. A few varieties of scorpions liberate toxins at the site of sting which passes through the blood and affects the heart. Death due to scorpion sting have also been encountered.

Symptoms and signs :

(i) Severe pain and burning sensation at the site of sting.
(ii) Redness and swelling around the site.
(iii) Increased heart beat, palpitation and restlessness.
(iv) Profuse sweating.
(v) Salivation from the mouth.
(vi) Nausea and vomiting.
(vii) Muscular pain and twitching of muscles.
(viii) Body temperature may be raised slightly.

Management :

1. Apply a constrictive bandage above the site of sting.
2. Wash the affected area with running water.
3. Treat for shock and send the victim to the hospital quickly.

❑❑❑

9

HEAT DISORDERS

India is a tropical country. Most of our people tolerate extremes of temperature to a greater extent. Yet, cases of exposure to excess heat or extreme cold are seen in certain areas particularly during summer and winter seasons. When heat wave or cold wave blows many people are affected and even die in different part of the country.

Our normal body temperature is 37° C (98.4° F) and remains almost constant. When the outside temperature rises or falls, we feel hot or cold. Our body gains heat due to surrounding high temperature, strenuous exercise, hard work, high calorie food, metabolic activities taking place inside the body or due to infection. Body loses heat when outside temperature is very low, wind velocity is high, excess sweating, application of cold water to the body or due to certain diseases. However, the temperature regulatory centre in the brain of our body tries to balance the body temperature to a greater extent. When it fails to do so, heat disorders (**hypothermia**) or cold disorders (**hypothermia**) occur temporarily or permanently. These conditions may cause death if not taken care timely. Death due to scorching heat of sun and snow fall may also accur.

DEFINITIONS :

Hyperpyrexia - A condition of high rise of body temperature. It is caused mostly due to exposure to heat or infection.

Heat stroke - It is a reaction of the body to excess heat exposure causing rise in body temperature, disturbance in sweating mechanism and loss of body water and salt resulting in unconsciousness.

Sun stroke - It is a type of heat stroke caused due to exposure to sun rays directly. Particularly due to exposure to hot wave during summer, when outside temperature and humidity and high, **sun stroke** occurs.

Heat exhaustion - It is a gradual response to excess heat constantly and caused due to low intake of water and leads to tiredness, weakness and collapse.

Heat cramp - It is the body reaction caused due to loss of excess salt by heat exposure and is manifested by muscular cramps and stiffness particularly that of the calf muscles of leg. It may be associated with heat exhaustion also.

Prickly Heat - It is a reaction of the skin to the high temperature resulting in small reddish erruptions over the exposed part of the skin which vanish after some hours.It ching is caused due to Prickly heat.

Hypothermia - A condition of cooling down of body caused due to exposure to cold or due to some disease or drug when the body temperature falls below 35° C (90° F). A person usually recovers from moderate hyperthermia and severe condition below 24° C becomes fatal.

Frost bite - A condition which develop due to intense cold causing narrowing down (constriction) of blood vessels to such an extent that blood supply is almost cut off to the parts of the body exposed to cold for a prolonged period. This may result in freezing of the skin superficially or underlying deep tissues.

HEAT STROKE :

Causes :

(i) Exposure to direct sunrays during outdoor work (Sun Stroke).
(ii) Working in very hot workplaces without proper ventilation.
(iii) Not taking enough water or fluid during summer which may cause dehydration.
(iv) Strenuous exercise or hard work in hot environment.
(v) Exposed to hot wind blowing during summer (loo) in some parts of the country.

Symptoms and signs :

(i) The victim feels giddy and faints suddenly after long exposure to heat.
(ii) Face looks pale and sweating stops all on a sudden from the body amd particularly forehead.
(iii) Skin looks dry, red and feels very hot and red patches may be seen at places.
(iv) Body temperature rises very quickly and goes beyond 41° C (105° F) in most cases.
(v) The victim is irritable, talkative and confused.
(vi) Pulse is rapid, full and bounding.
(vii) Breathing is hard and laboured.
(viii) Nausea and vomiting may be felt.
(ix) The victim may be unconscious and in sever cases death may occur.

Management :

1. Take the casualty to a cooler place and make him lie down on a cot, bench or cemented floor.
2. Remove all outer clothings of the victim.
3. Apply cold water sponging all over the body or wash the body repeatedly with cold water.
4. Wash the head thoroghly twice or thrice and dry it with a towel.
5. Cool down the body further using fan, cooler or air conditioning facilities (if available).
6. Record temperature every minute.
7. Stop cooling the victim further when body temperature is 38° C. Keep the body dry and cover with a bed sheet.
8. If the victim is conscious, give glasses of cold water with a pinch of common salt and lemon to drink. Give ORS (oral rehydration solution) liquid to drink if available. Fruit juice, coconut water, glucose drink and soft drinks may be given.
9. Send the casualty to the hospital.

SUNSTROKE : Persons wrorking in construction work, in open fields or outdoors are exposed to excess heat of sun for a long time and therefore suffer from sunstroke. Children, elderly persons, malnourished individuals, persons working in bare body or with scanty clothing and if sufficient water is not consumed to compensate excesive sweating casused due to hot weather or hard work, symptoms of sunstroke appear. Particularly during summer season, when the atmosphesic temperature rises very high (beyond 45° C) and humidity is also high, hot wave blows and affects the body. In dry areas and deserts, the effect is more marked and sunstroke of severe type may occur. Death may also be caused. Death due to sunstroke from different parts of out country have been reporated.

Symptoms and signs :

(i) The victime feels giddy, confused and faints all on a sudden.
(ii) The skin looks reddish, burning hot to feel and red patches may be seen in different parts of the body.
(iii) Body temperature rises rapidly and may go beyond 41°C.
(iv) Sweating stops all on a sudden.
(v) Person feels thirsty and dryness of mouth.
(vi) Nausea and vomiting
(vii) Dehydration.
(viii) Pulse is rapid and bounding.
(ix) The victim may become deeply unconscious and death may follow.

Management :

1. The victim should be taken to a cooler place or shade and made to lie down comfortably.
2. If conscious a thorough body bath should be given till the body temperature comes to normal gradually.
3. If unconscious, cold sponging of body to be done with a wet towel to bring down body temperature.
4. Plenty of water with salt, cold drinks, ORS to be given to the victim after the body temerpature drops down.
5. The victim should be given rest in a cool room after recovery.
6. If condition does not improve within half-an-hour even adopting cooling procedure, the casualty shoued be taken to the hospital quickly for further treatment.

Remember : Drink plenty of cold water during summer to prevent sun stroke and remain indoors or under the shade during summer season when outside temperature is high.

HEAT EXHAUSTION :

Causes -

Working in a hot environment continuously and not taking water and salt to make up the body loss leads to heat exhaustion.

Symptoms and signs :

(i) The victim feels tired, weak, exhausted and restless.
(ii) Dizzines, headache and nausea may be felt.
(iii) Skin looks pale and moist.
(iv) Body temperature mostly remains normal.
(v) There may be excess sweating which may stop suddenly.
(vi) Pulse is rapid and weak.
(vii) Breathing becomes fast and shallow.
(viii) There may be muscle cramp.
(ix) The casualty may faint but does not become deeply unconscious as in case of heat stroke.

Management :

1. Transfer the casualty to a cooler place preferably to a well ventilated or air-cooled room.
2. Make the victim lie down in supine position and raise the foot end slightly.
3. Loosen clothings and tight bands.
4. Give sips of cold water with salt or glucose added to it at 10 to 15 minutes interval. ORS may also be given.
5. Apply slightly warm water sponging over the body to bring about sweating.
6. If vomiting occurs or condition does not improve, send the victim to the hospital quickly.

DIFFERENCE BETWEEN HEAT STROKE & HEAT EXHAUSTION

Heat Stroke	Heat Exhaustion
Skin is dry, hot and red	Skin is moist, cold and pale.
Body temperature raised	Body temperature normal or below normal.
Pupils constricted	Pupils dilated.
Pulse is strong and rapid	Pulse may be normal.
Sweating stops all of a sudden.	Sweating absent.
Victim may be unconscious.	Severe headache, nausea, vomiting and loss of appetite.
Cooling the body important	Warm water sponging required.

HEAT CRAMP :

Causes -

Heat cramp occurs due to loss of excess salt from the body because of excess sweating.

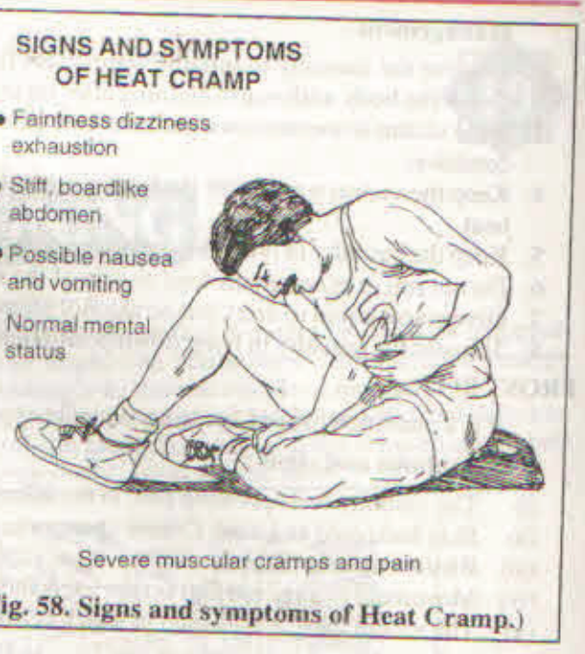
Symptoms and Signs :

(i) Stiffness and pain over the calf muscles of leg and abdominal muscles.
(ii) Body temperature is usually normal.
(iii) Nausea and vomiting.
(iv) Fainting attack and dizziness.
(v) Sweating still continues.
(vi) Mental condition normal.

Management :

1. Ask the victim to lie down or sit legs stretched with support to the calf muscles.
2. Gently massage the affected muscles.
3. Give sips of cold water with salt and glucose.

REMEMBER : Drink plenty of water to prevent heat disorders.



(Fig. 58. Signs and symptoms of Heat Cramp.)

EXPOSURE TO COLD :

When a person is exposed to intense cold for a prolonged period, the skin and underlying tissue of the exposed part are affected very badly causing **hypothermia** initially and **frostbite** later on.

Causes :

Body temperature falls below normal (37°C) due to low environmental temperature, snow fall, immersion in cold water, wearing wet clothes or exposure to cold wind in high altitudes etc.

Fine blood vessels (capillaries) of skin contract, reduced blood flow to the skin, skeletal muscles contract and relax rapidly. This causes shivering and cooling reactions all over the body and particularly in nose, cheeks, ears, fingers, feet and toes. Shivering is natural mechanism of body to generate heat.

HYPOTHERMIA

Signs and Symptoms :

(i) Feeling of pricking cold, shivering and numbness of exposed body part.
(ii) Skin looks pale and cold to touch.
(iii) Body temperature may be normal at first but falls below normal rapidly.
(iv) Body is affected gradually.
(v) Severe and uncontrollable shivering (rigor) may appear.
(vi) Speech becomes slurred.
(vii) The casualty feels drowsy, restless and severe pain over the exposed part.
(viii) Pulse, respiration and heart beat slow down.
(ix) The casualty may become unconscious.

Management :

1. Remove the casualty to suitable warm place from the cold environment.
2. Cover the body with warm clothing after taking out the wet or frozen clothing, if any.
3. If the victim is unconscious, perform. Life saving actions (E. A. R. or C. P. R.) depending on the condition.
4. Keep the victim warm with the help of a blanket, sleeping bag, hot water bottle or external dry heat.
5. Keep the casualty in lying down (supine or recovery) position even if conscious.
6. Do not rub or massage the legs or sole of the foot.
7. Give warm liquid to drink but no alcohol please.
8. Transfer the casualty in lying down position in stretcher or ambulance.

FROST BITE :

It is a condition caused due to severe cold exposure.

Symptoms and signs :

(i) The casualty feels pricking pain in the affected part followed by gradual numbness.
(ii) Skin feels cold and hard. Colour changes to pale or white and waxy, stiffness of the part is felt
(iii) Blisters may be formed.
(iv) Movement of exposed part is restricted and painful.
(v) The victim may be confused in shock or unconscious.

Management :

1. Cover the affected part with warm clothing and transfer the casualty to a warm place.
2. Remove the clothings and shoes gently.
3. Remove anything constrictive in nature (ring, wrist watch, constrictive bands etc.) from the affecte part.
4. Keep the affected parts (particularly the hands and legs) raised to reduce pain and swelling.
5. Cover frost-bitten ears, nose or face with your warm hand for sometime till the colour improv and sensation is felt.
6. Dip the feet and hands (if affected) in warm water.
7. Do not rub or massage the affected part.
8. Do not apply hot water bottle or dry heat in any form.
9. Do not break the blisters, if any.
10. Do not apply any lotion or ointment over the affected part.
11. Ask the victim to move the affected part gently, if he can.
12. Give some warm liquid to drink slowly.
13. Do not give hot drinks or alcohol.
14. Transfer the casualty to hospital.

REMEMBER : Special attention to be given to children and old persons to avoid exposure to heat and cold.

❑❑❑

10

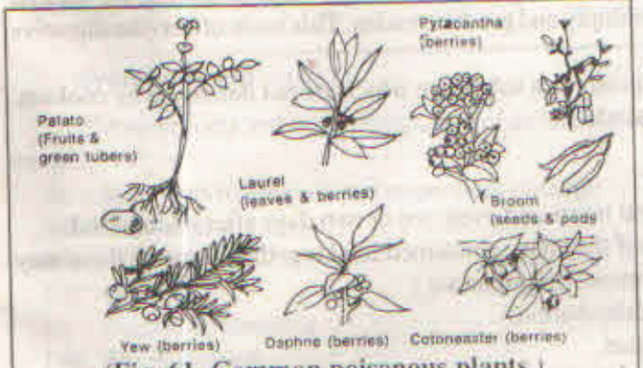
POISONING

A **poison** is any substance solid, liquid or gas in nature that if enters the body in sufficient quantity causes temporary or permanent damage or death. The poison may enter the body through mouth, nose or skin either accidentally or taken knowingly to commit suicide or murder.

Toxic chemical substances are used extensively in industry, agriculture, home and in our daily life. Medicines, insecticides, pesticides, detergents, petroleum products and toxic gases are used abundantly and chance of poisoning increases among those persons who use or handle them.

(Fig. 59. Accidental Poisoning by medicines.)

(Fig. 60. Poisonous house hold chemicals.)



(Fig. 61. Common poisonous plants.)

Poisoning may occur due to contaminated food and drink also.

Poisoning due to consumption of certain plants, fruits, mushroom, beans and poisonous seads may occur in rural areas.

ORAL POISONING :

Poisonous substance mixed with food and drink may be swallowed accidentally or taken to commit suicide or murder. The digestive system is disturbed due to oral poison and bodily reactions occur when absorbed in sufficient quantity.

Symptoms and Signs :

(i) The victim or other persons may give the history of taking poison.
(ii) Empty poison bottles, remnantts of food material or drink, vomited substance seen around may give the clue.
(iii) The victim may be conscious, restless, drowsy or unconscious.
(iv) Nausea and vomiting are common symptoms.
(v) Pain and burning sensation in mouth and throat.
(vi) If poison is corrosive in nature, tongue and lips may be swollen and burnt.
(vii) Peculiar smell may be coming from the mouth.
(viii) Pupils of the eyes may be dilated or contracted.
(ix) Breathing may be affected.

Management :

1. Try to induce vomiting if the person is conscious and poison is not corrossive in nature.
2. Give a saturated solution of salt to drink for inducing vomiting. Preserve the vomited material.
3. Prepare a universal antidote mixture by using following things :

Black powder of burnt toast or burnt rice-	2 table spoons.
Coffee powder-	2 table spoons.
Chalk powder -	1 table spoon.

Mix all the above substances in a glass of warm water and give the person to drink.
4. After vomiting is stopped, give plenty of warm milk, water, fruit juice, barely water or cocconet water to drink. Give small quantities at a time.
5. In case of opium poisoning, sleeping pills or excess alcohol, the victim becomes drowsy and sleepy. Try to keep him/her awake.
6. Watch the condition of the victim and send to the doctor or hospital quickly.

FOOD POISONING :

When a food material is contaminated with bacteria during cooking, storage or serving, the bacteria (Salmonella clostridium or Staphylococci) multiply and produce toxins. This toxin offsets the digestive system and may cause death.

Some type of sea food contain highly poisonous substance which are not destroyed by cooking. After eating this, food poisoning may be caused.

Symptoms and signs :

The symptoms and signs appear several hours and even one or two days after taking food. Many people may be affected at a time if they have consumed food together. Some of them may escape poisoning completely. The common symptoms are :

(i) Nausea vomiting, loose motion and dehydration.
(ii) Severe abdominal cramps or colicy pain.
(iii) Severe headache and body pain.

(iv) Rise in body temperature and profuse sweating.
(v) Weakness, faintness and collapse.

Management :

1. Give absolute be rest to the casualty.
2. Give plenty of fluid or ORS to prevent dehydration.
3. Arrange transfer to the hospital.

GAS POISONING :

Gas poisoning or gassing may be caused due to exposure to poisonous (noxious) gases in the factories, mines or at home. The noxious gases may be **simple asphyxiants, chemical asphyxiant, irritants or systemic poisons** depending on their action on the body.

Types of poisonous gases :

Simple asphyxiants-	**Irritantes-**
Acetylene	Ammonia
Carbondioxide	Chlorine
Ethane	Oleum
Methane	Phosgene
Nitrous Oxide	Sulphurdioxide
Chemical asphyxiants-	Triethylamine (TEA)
Carbon Monoxide	**Systemic Poisons-**
Cyanides	Arsine
Cyanogens	Carbon disulphide
Cyanogen Bromide/Chloride	Nickel Carbonyl
Ethylene Oxide	Phosphine
Hydrogen Sulphide	Stibine
	Methyl isocyanates (MIC)

Symptoms and signs :

The symptoms and signs of exposure of different gases are variable, but some common symptoms are given below :

(i) Irritations to the eyes and respiratory passage.
(ii) Headache
(iii) Giddiness
(iv) Cough
(v) Nausea & Vomiting
(vi) Breathlessness
(vii) Whizing sound during breathing

(viii) Convulsion
(ix) Unconsciousness and death in severe cases.

Management :

1. Transfer the casualty to open air or clean place. Take precaution during rescure.
2. Remove contaminated clothing.
3. Clear the air way and clean the mouth.
4. Give EAR and CPR, if required.
5. Give oxygen if available or use a breathing apparatus.
6. Send quickly to a doctor to give specific treatment.

Specific Management of Gas Poisoning

Gas	Effect	Specific Management
Acetylene Carbondioxide Hydrogen Nitrogen	Anaesthatic effect Headache Shortness of breath, Asphyxia Shortness of breath, Asphyxia	General Management as described earlier.
Carbon-monoxide	Headache, giddiness Nausea, vomiting Weakness, fits and unconsciousness	Artificial Respiration, Oxygen inhalation.
Cyanides	Odour of bitter almond in breath, Pink colouration of skin and mucosa, Mental confusion Fits & unconsciousness	No mouth-to-mouth Breathing, transfer to hospital urgently.
Ethylene Oxide	irritation of eyes, nose and throat. nausea, headache, breathing difficulty.	General management.
Hydrogen Sulphide	Irritation of eyes & respiratory system. difficulty in breathing, Chest pain unconsciousness.	Send to the hospital quickly.

Gas	Effect	Specific Management
Ammonia	Highly irritant cough, fits and unconsciousness.	Remove to fresh air. Give warm milk to drink if conscious. Transfer to hospital.
Cholorine	Irritant to skin, eyes, Lungs & mucosa cough and vomiting.	Send the victim to the hospital
Nitrogen Dioxide	Lung irritant, dizziness breathing difficulties.	Keep the victim under observation for 48 hrs. in the hospital.
Olium (A Solution of Sulphuric trioxide and Sulphuric acid)	Severe irritation, chemical burn.	Wash the affected part With 2% Sodi bicarb solution.
Phosgene	Severe irritation, shortness of breath, chest tightness, bloody sputum, irritation of conjuctiva & cornea.	Transfer to hospital quickly.
Sulphur dioxide	Burning pain in throat Altered sense of smell, ulteration of nasal septum, teeth affected.	General Management
Triethyl amine (TEA)	Violent cough, breath-lessness,cyanosis, irritation to eyes & skin.	Rest. Transfer to hospital.
Liquid Petroleum Gas (LPG)	Asphyxia, skin irritation, vision affected.	Rest. Dip the affected part in warm water for 20 minutes.
Arsine	Affects the blood and kidney.	Prompt hospitalisation
Carbon disulphide	Nerve poison, headache, giddiness, irregular breathing Unconsciousness.	Transfer to hospital

Gas	Effect	Specific Management
Methyl isocyanates (MIC)	Cough, breathlessness chest pain, watering from eyes.	Cover the face and eyes with wet cloth and transfer to the hospital. Avoid use of contact lens.

PESTICIDE POISONING :

Highly toxic substances composed of different chemicals are used to kill pests, rhodents, insects, weeds and harmful herbs. These are mostly used in gardens, fields and farms. Accidental poisoning or due to negligence in use of these substances poisoning may occur. Sometimes the case may turn fatal if not treated immediately. These substances are available in various brand names and fortunately their chemical property and antidote are indicated on the bottle/package. In case of poisoning, the container may be referred to for first aid and medical treatment.

Symptoms and signs :

(i) History of inhalation, ingestion or skin contact with the pesticide.
(ii) Irritation and burning sensation in mouth and throat.
(iii) Watering from the eyes and redness and blurred vision.
(iv) Pin point contraction of pupils of eyes.
(v) Cough.
(vi) Tightness in chest.
(vii) Breathing difficulty.
(viii) General weakness.
(ix) Headache, dizziness, confusion and slurred speech.
(x) Convulsion (fits).
(xi) Unconsciousness.

Management :

1. Remove the victim from the site of exposure.
2. Take out all contaminated clothing.
3. Wash the eyes, skin and hair with plenty of water to remove the pesticide.
4. Examine the pupils of the eyes-constricted, dilated or normal.
5. Look for breathing difficulties, unconsciousness and mental confusion and adopt CPR if required.
6. Send the casualty quickly to the hospital for specific treatment and use of antidote.Carry the pesticide container to the hospital for reference.

□□□

11

FOREIGNBODIES

DEFINITION -

When an external object enters the body through the skin or any natural opening it is called a **foreignbody**.

The foreignbody may stick to a wound, get lodged inside the body cavity or projecting out being partially embedded in deep tissues. Splinters, wood chips, metal pieces, glass fragments, thorn, nail, bullet, arrow and insects come under this category.

Foreignbodies may be loose, embedded projecting, penetrating or sharp-cutting in nature.

FOREIGNBODIES IN THE SKIN :

Cause :

Wood or metal pieces, glass pieces and bullets may enter the skin either accidentally or intentionally causing wound. The foreignbody may be lying loose on the wound surface or penetrating deep with or without projecting outside. A knife, an arrow or similar weapon may be projecting out of a wound. Fast moving foreignbodies enter very deep and get lodged in the tissue or organ.

Symptoms and signs :

(i) A wound is seen on the skin surface.
(ii) Foreignbody is visible in most cases.
(iii) Pain and tenderness felt in the area.
(iv) Bleeding may or may not be there depending on the nature of the wound and skin damage.

Management :

1. If the foreignbody is loose and multiple, wash the wound to remove them.
2. If the object is superficially sticking, use a pair of forceps to pull it out and dress the wound.
3. If the object is deeply embedded in the underlying tissue apply a ring pad or a slit gauze piece over the wound and bandage it excluding the foreignbody.
4. Once the foreignbody is removed from the wound fresh bleeding may start. Be prepared to stop the bleeding first.

(Fig. 62. Foreignbody in the Eye.)

FOREIGNBODIES IN THE EYES :

Eyes are very sensitive to foreignbodies. If the foreignbody is a flying particle, sharp-cutting object, an insect or chemical substance extensive eye injury followed by infection may be caused. So this has to be given special attention. This has been discussed earlier.

FOREIGNBODIES IN THE EAR :

Causes :

Children push in small objects through the ear canal while playing, may cause injury to ear drum. Small insects may enter the ear during sleep or rest and remain there.

Symptoms and signs :

(i) Pain and discomfort in the ear.
(ii) Vibration is felt due to movement of the insect inside the ear.
(iii) Impaired hearing on the affected side.
(iv) Injury and bleeding may be seen.

Management :

1. Examine the affected ear and see if there is any foreignbody.
2. If the object is clearly visible and in the outer part of the ear canal, remove it gently with a forcep or ear cleaner.
3. If an insect has entered the ear, turn the head so that the affected ear is in uppermost position. Put a few drops of warm oil liquid paraffin or lukewarm water into the ear, close the opening for 2-3 minutes and turn the head downwards so that the contents of the ear are drained out along with the insect.
4. If the foreignbody is deep inside, do not disturb it and send the victim to the hospital.

FOREIGNBODY IN THE NOSE :

Causes :

Many children insert various objects e.g. beads, pebbles, seeds, marbles, small coirs etc. playfully and nose may be choked.

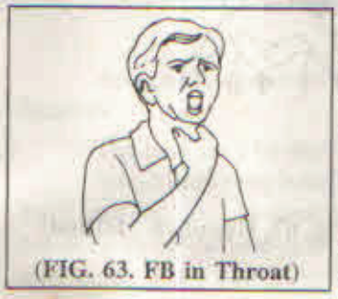
Symptoms and signs :

(i) The casualty feels difficulty in breathing through the nose. He may breathe through the mouth.
(ii) Nose may be swollen and looks red.
(iii) Clear or blood-stained discharge comes out of the nostrils.
(iv) Pain may be felt in some cases.

Management :

1. Advise the casualty to breathe through the mouth.
2. If the foreignbody is a rounded or smooth object and clearly visible, take it out with the help of a forcep.
3. In most cases it is better not to disturb the foreignbody and the casualty should be sent to the hospital.

FOREIGNBODY IN THE THROAT :



(FIG. 63. FB in Throat)

Causes :

Foreignbodies may get stuck in the throat accidentally, particularly in case of children and air passage may be choked. This is an serious condition and should be dealt as described under 'CHOKING'.

Management :

In case of adults :

1. Bend your index finger to take out the foreignbody from the throat if it is visible. But usually lies too far back and you may not be able to remove.
2. Make the casualty lie down in semiprone position and slap him firmly on the back between the shoulder blades. This may dislodge the foreignbody.
3. If it does not work try the Helmlich method as follows :
   - Stand behind the victim and place your arms around his waist.
   - Clench one of your hands into a fist over the child's stomach between the navel and the rib cage.
   - Grip the closed fist with the other hand.
   - Press your hands strongly against the abdominal wall, pressing slightly up wards sharply. This will bring out the foreignbody through the wind pipe.

(FIG. 64. Back Slap for adult.)

In case of children :

1. A small baby can be held upside down with the help of hand and apply sudden pressure on the back.
2. In case of an older child lie him on your bent knee and slap him hard on the back with flat of the hand between the shoulder blades. If it does not dislodge the foreignbody try Helmlich method.

(Fig. 65. Back pressure)

(Fig. 66. Back Slap)

(Fig. 67. Heimlich Method)

FOREIGNBODY IN THE FOOD PASSAGE :

Causes :

Fish bones, food pieces, coins, nuts or dry food material may stick to the food passage resulting in an uncomfortable feeling. Sometimes a sharp object might have passed down but scratched the food passage and foreignbody sensation (as if something is sticking) is felt while swallowing.

Symptoms and signs :

(i) Feeling of obstruction during swallowing.
(ii) Pain and burning sensation may be felt.
(iii) Foreignbody sensation in the throat.

Management :

1. Ask the victim to swallow some dry food (biscuit, bread etc.) and give a glass of water to drink.
2. If the object is sharp in nature, plain X'Ray of the abdomen may be advised to locate the foreignbody.

❑❑❑

12

ACHES AND PAINS

An **ache** is a continuous dull pain felt at a particular part of the body but not pointing to an exact location.

The pain may be due to any local condition or referred from some other part of the body.

Sometimes people suffer from sudden pain over certain parts of the body (chest, abdomen, neck, back, ear etc.) due to some infection, injury or chronic disease. Yet these should be relieved at least temporarily by the first-aider to make the victim comfortable before taking care of the root cause. It may so happen that a person suffering from certain chronic disease may carry some medicine for relief during acute emergency and the first-aider may assist the patient to use it at the appropriate time. Some common conditions are described below :

HEADACHE :

Cause :

Headache may be caused due to many conditions : Sinusitis, common cold, eye strain, high blood pressure, inhalation of gases and fumes, mental tension, psychosocial stress, lack of sleep, fever, head injury, spinal injury, food poisoning etc.

Symptoms and signs :

(i) Continuous or intermittent throbbing pain felt at any part of the head.
(ii) Pain is relieved slightly by applying pressure over the temporal region (side of the ears).

Management :

1. Apply hot water bottle or warm compress over the forehead and temporal region.
2. Give one tablet of aspirin or paracetamol along with a cup of hot tea or coffee.
3. Pain relieving balm may be applied gently over the forehead
4. Advise the victim to consult a doctor if the headache is not relieved after 30 minutes.

MIGRAINE :

Cause :

This is a severe and unbearable headache coming all on a sudden but at irregular intervals and not caused due any specific disease. Fasting, noise, heat, travelling and emotional disturbances may cause or increase the severity.

Symptoms and signs :

(i) Throbbing headache affecting one side of head.
(ii) Severe pain may be felt.
(iii) Nausea and vomiting mostly associated with headache.
(iv) Visual disturbances may be there.
(v) The casualty is irritable and does not like light or noise.
(vi) The casualty feels miserable without any apparent reason.
(vii) Such attacks are repeated at frequent intervals.

Management :

1. Let the casualty rest in a dark and quite room.
2. Apply some pain-relieving balm and hot water bottle over the forehead.
3. The casualty may take pain relieving medicine prescribed by the doctor earlier.
4. Send the casualty to the doctor or hospital for detailed tests and treatment.

EARACHE :

Causes :

Earache may occur all on a sudden due to wax in ear, infection, boil or furuncle in external ear injury to ear canal, bursting of ear drum suddenly due to high noise or entry of any insect in the ear.

Referred ear pain may be caused due to infection of nearby tissue (tonsillitis, mostoiditis or tooth abscess) or generalised infection (measles, influenza, mumps etc).

Head injury may cause ear pain too.

Symptoms and signs :

(i) Throbbing pain in the ear.
(ii) Affected ear is tender to touch.
(iii) There may be discharge from ear.
(iv) There may be ringing in the ear.
(v) Fever.

Management :

1. Look for the local causes of pain - infection, injury, foreignbody.
2. If sudden change in pressure inside the ear is suspected, ask the casualty to hold the nose, close the mouth and blow out. The pain may be relieved.
3. Put one or two drops of ear drop solution to relieve pain.
4. One pain-relieving tablet (aspirin or paracetamol) may be given.

SINUS PAIN :

Causes :

When the sinuses (air spaces) in the forehead bones are infected, sever headache is caused.

Symptoms and signs :

(i) Severe headache felt over the fore head.
(ii) Pain and tenderness is felt over the sinus area (over the inner part of eye brows).
(iii) Blockage and running from the nose.
(iv) Sneezing and fever may be present.

Management :

1. Apply pain relieving balm over the forehead.
2. Steam inhalation may be given.
3. Pain relieving tablets may be given to relieve headache.
4. Send the casualty to the doctor.

NECK PAIN :

Causes -

Pain over the neck, particularly nape of the neck may be caused due to stiffness of neck muscles (rye neck), change in neck vertebrae (spondilytis),fracture of spine at the neck region or referred pain due to fracture of jaw bone.

Symptoms and signs :

(i) Pricking pain over the neck (any area).
(ii) Loss of free movement of neck.
(iii) Neck is tender to touch.
(iv) Swelling, nausea and vomiting may be associated.
(v) Pain may be referred or directed towards the hand.
(vi) Pain increases on lying down.

Management :

1. Make the victim sit or lie down in supine position.
2. Do not put any pillow under the head or neck.
3. Apply hot water bottle over the affected area.
4. Give one or two pain-relieving tablet to remove discomfort.
5. Consult a doctor for definite cause and specific treatment.

CHEST PAIN :

Severe chest pain is a serious condition particularly if it is felt in the middle or left side of chest and should never be neglected.

Causes :

The chest pain may be caused due to infection, injury, lungs conditions, heart conditions or gas formation in the stomach. The victim need medical treatment immediately in most cases.

Symptoms and signs :

(i)	Pain during breathing with breathing difficulties	Relate to lung disorders.
(ii)	Severe pain on the meddle or left side of chest spreading towards the left shoulder and the hand	Related to heart conditions.
(iii)	Dull pain over lower part of chest	Related to stomach disorder.
(iv)	Pain over right side of chest	Related to liver or gall bladder diseases.

Management :

1. Study the nature of pain, other signs and symptoms and identify the cause.
2. Send the casualty to the hospital quickly.

ABDOMINAL PAIN :

Pain abdomen is a tricky situation and should be diagnosed by a first-aider from history, signs and symptoms, nature and location of the pain. The casualty may give some clues for diagnosis.

Cause :

Indigestion, constipation, peptic ulcer, food poisoning, infection, appendicitis, hernia, worms, stones, injury and menstruation etc. may give rise to sudden pain in abdomen whose location and nature vary widely.

Symptoms and signs :

(i)	Location —	Right upper, right lower, left upper, left lower, above naval, below naval, lower abdomen areas.
(ii)	Nature —	Dull or sharp, continuous or intermittent, Localised or general, colicy pain, gripping or pricking pain.
(iii)	Associated signs —	Fever, vomiting, burning sensation, constipation, bile vomiting, black stool, bowel movement etc.
(iv)	How the pain is relieved ?	After food, after vomiting, applying pressure, by moving about or changing position etc.

Management :

1. Keep the victim in a comfortable (prop-up, prone, semiprone, supine or knee-chest) position depending on the condition.
2. Apply a hot water bag over the affected area.

3. Give sips of ice-cold water, if vomiting occurs.
4. If pain continues for more then 30 minutes, send for medical help.

BACKACHE :

Causes :

Back pain may occur due to bad posture, lifting weight while bending down, displaced inter-vertebral disc (slipped-disc), back muscle strain or referred pain from kidneys.

Symptoms and signs :

(i) Acute pain and stiffness on the back.
(ii) Unable to move or bend or stand erect.
(iii) There may be loss of sensation in the legs.
(iv) Difficulty in passing urine and urine may be blood strained.

Management :

1. Apply a hot water bag.
2. Give pain relieving tablets.
3. Send the casualty to the hospital.

JOINT PAIN (ARTHRITIS)

Joint pain of different joint may be felt by some people, particularly when they try to move the joints. One or more than one joint may be affected at the same time.

Causes :

Injury inflamnation of the joint (arthritis), gout, frozen shoulder in Diabets patient, rheumatism and bone changes due to old age may cause joint pain.

Symptoms and sings :

(i) Continuous or intermittent pain over one or more joint.
(ii) Only large joints may be affected or only small joints may be affected.
(iii) Pain may be related to movement.
(iv) There may be swelling and sliffres of joint.
(v) Skin may feel warm over the joint.

Management :

1. Give rest to the joint.
2. Place the victim in a comfortable position.
3. Apply pain relieving balm or give a pain reducing tablet.
4. Consult a doctor.

❐❐❐

13

SOME MEDICAL EMERGENCIES

HEART ATTACK :

Heart attack is an emergency condition arising due to certain heart diseases, which a first-aider may come across. Normal functions of the heart may be affected suddenly due to :

- Blockage of the coronary artery by a clot or constriction;
- Death of some portion of the heart muscle;
- Disturbances of electrical stimulation of the heart leading to temporary stoppage of heart.
- Congestive heart failure due to chronic heart disease, high blood pressure or kidney disease.

The signs and symptoms and management of heart attack vary accruing to the cause or disease process.

Symptoms and signs :

(i) Sudden pressing type pain felt in the centre of chest which spreads towards shoulder, back and left arm.
(ii) This pain is confused as referred pain due to gas in stomach or indigestion (be cautious).
(iii) Feeling of sudden dizziness or giddiness.
(iv) Profuse sweating takes place and most marked on the forehead.
(v) Skin looks pale and feels cold and clammy (moist).
(vi) Casualty may be breathless.
(vii) Pulse is rapid, weak and irregular.
(viii) Heart beat and breathing may stop suddenly making the victim unconscious.

Management :

1. If the person is conscious, keep him in a comfortable position (sitting or prop-up) as he chooses.
2. Do not allow the casualty to move about.
3. Loosen tight clothings arround neck, chest, waist.
4. Check breathing pulse and heart beat quickly.
5. If unconscious and heart has stopped, start Cardio-Pulmonary Resuscitation (CPR) immediately.
6. Transfer the casualty to hospital quickly.
7. The casualty may be taking some pain relieving medicine for his heart disease. Help him to take it quickly if possible.
8. In case of chronic heart failure, the casualty should be hospitalised immediately.

REMEMBER - Do not give CPR in cease of conscious person. Give Oxygen of E.A.R. Only

STROKE :

It is a condition of sudden unconsciousness in which sufficient blood is not supplied to a part of the brain. It is also called cerebrovascular accident (C.V.A.) which is followed by paralysis in most cases.

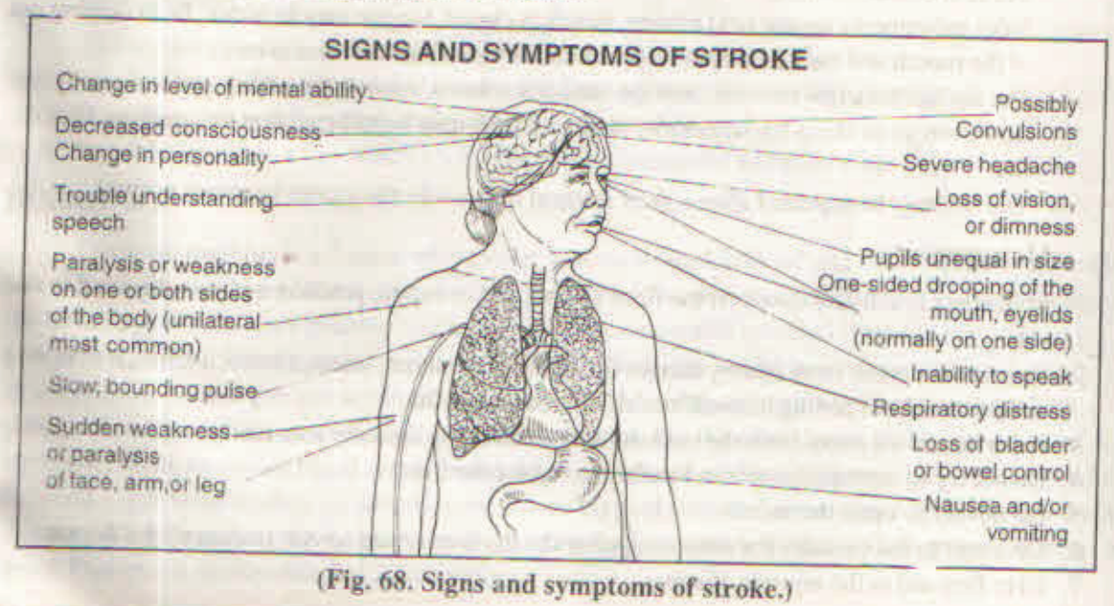
Causes :

Stroke occurs due to a blood clot, blockage of an artery, rupture of an artery causing bleeding into the brain tissue, high blood pressure, severe dehydration or rupture of a small brain tumour. Stroke is serious condition in old people.

Symptoms and signs :

The signs and symptoms very according to the part of the brain affected.

(i) The casualty may be confused, delirious of feel emotionally disturbed.
(ii) Difficulty in speech.
(iii) Unconscious fully (Coma) of partially.
(iv) Weakness or paralysis of one or both sides of the body - both legs and hands may be paralysed.
(v) Mouth drawn to one side and saliva dribbling from mouth.
(vi) Eyes may not be closed properly.
(vii) Lack of control over passing urine and stool.



(Fig. 68. Signs and symptoms of stroke.)

Management :

1. Keep the casualty in a comfortable position (semiprone or supine).
2. Loosen tight clothings.
3. Look for the level of consciousness, breathing and circulation. In most cases, breathing and circulation are not affected first but may deteriorate fast (watch out).
4. Transport the casualty to hospital in an ambulance.

EPILEPSY :

It is a disease of the brain which may occur at irregular intervals and manifested as violent jerky movements for a short time. It is mostly common in children but may occur among adults. It may be minor or major type.

Causes :

Disturbances in electrical activity of the brain causes epileptic fits (convulsions).

Symptoms and signs :

(i) The fits come all on a sudden. But some epileptics get warning signals such as giddiness dizziness and blurring of vision.

(ii) Some victims may manage to sit or lie down before the attack; but most of them fall flat and become unconscious suddenly.

(iii) The body becomes motionless for a while, muscles become rigid, limbs stiffen, breathing stops and skin colour changes.

(iv) Jerky movements appear next minute, mouth is closed, tongue may be bitten, froth coming out of the mouth and the casualty soils the clothes by passing stool and urine.

(v) The fits last for a few seconds, then the victim is relaxed, resumes breathing and lies quietly and may even go to sleep for sometime. A few victims may become violent and restless after the fits.

(vi) The fits may be repeated after a short interval but mostly the victim becomes normal.

Management :

1. Make the casualty lie down on the floor or on a bed in supine position and turn the head to one side.
2. Protect the person from nearby danger (machinery, furniture, water, electricity, fire, traffic etc) and prevent from getting himself/herself injured during fits.
3. Keep the crowd away from the casualty and observe the casualty constantly.
4. Do not try to restrain the victim forcibly to reduce the fits.
5. Do not try to open the mouth.
6. Give rest to the casualty for sometime after the fits is over and advise to consult the doctor.
7. Give first-aid to the injuries, if any.

Fits (convulsions) may also be caused particularly among the children due to : high fever, cerebral malaria, meningitis, encephalitis, tetanus, brain tumor or head injury. The first-aider should distinguish these conditions from epileptic fits.

REMEMBER : A person suffering from epilepsy should not be allowed to work near fire, water, electricity or machines without proper supervision. Most epileptics die due to accident.

HYSTERIA :

Hysteria is a symptom-complex manifested by unusual reaction to emotional disturbances or psychological stress and likely to be aggravated when the people are around.

Symptoms and signs :

(i) The victim is mostly a female adolescent but it can occur in any age group in both sexes.
(ii) The signs and symptoms vary widely; but headache, fainting attacks, unconsciousness and fits are the most common symptoms.
(iii) Crying, screaming, rolling, tearing hairs and clothes may be there.
(iv) The victim is not able to describe the condition exactly to the relatives and hence needs medical consultation.
(v) The symptoms aggravate when the people are around or there is a change of place.

Management :

1. The victim should be treated with sympathy and reassurance.
2. The history of the case should be collected from a close friend or by a doctor.
3. Keep the person isolated but under constant observation.
4. Send the victim to a psychiatrist for consultation, treatment and follow up.

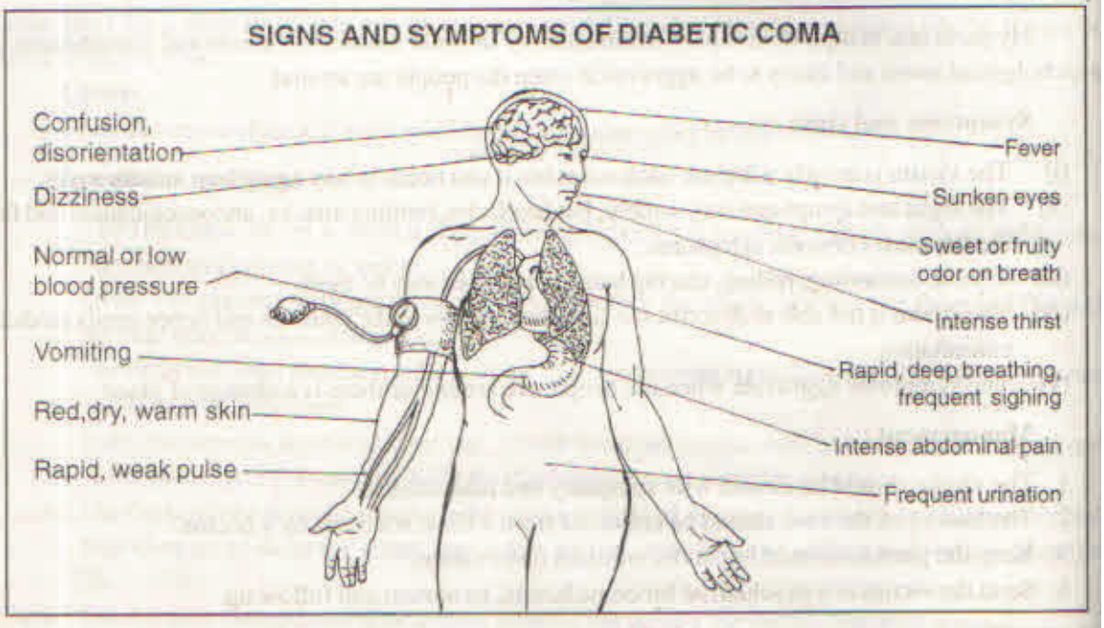
DIABETES :

Diabetes mellilus is a disease where sugar is accumulated in blood and excess sugar is passed in urine. Normally when any starch (carbohydrate) is taken, it is converted into glucose and absorbed into the blood circulation. This glucose reacts with a hormone **insulin** secreted from the pancreas to g energy to the body. When glucose is not utilised by the body due to any reason (mostly due to inac or insufficient insulin) glucose accumulates in the body. When blood sugar level becomes very high person may become unconscious called **Diabetic Coma**. On the other hand, if the patient is takin tablets or insulin to control blood sugar, excess dose of medicine or skipping a meal may cause rapid fall in blood sugar level leading to unconsciousness or **Hypoglycemic Coma**. Since Diabetes is a silent disease, the first-aider may not anticipate the cause of unconsciousness unless proper history is given.Diabetes is mostly detected accidentally.

Symptoms and signs :

Diabetic Coma :

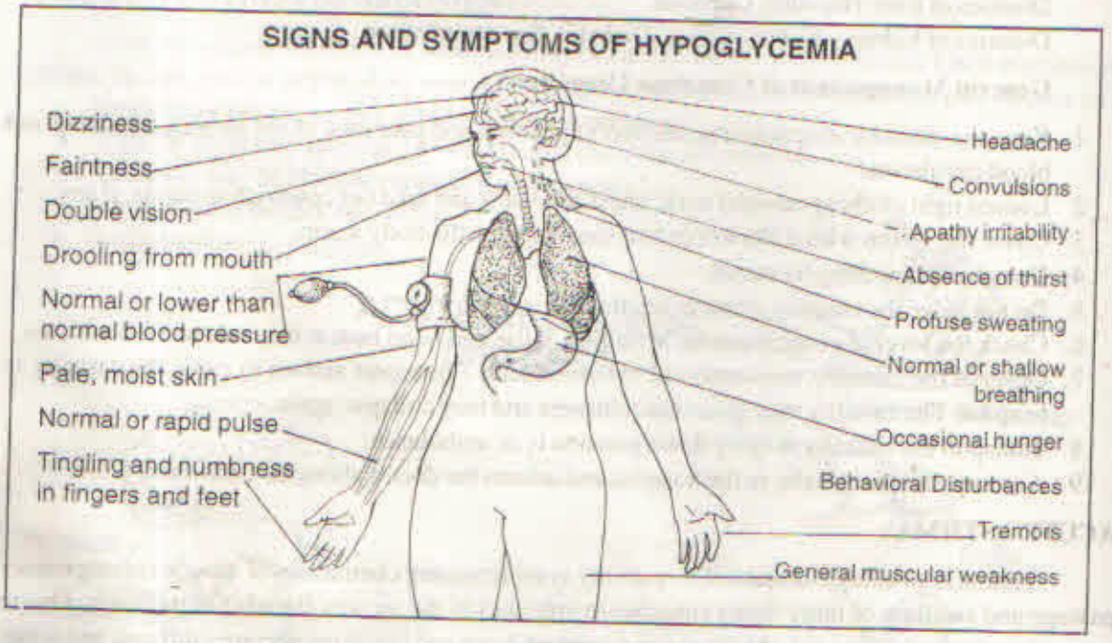
(i) The casualty feels tired, weak and confused.
(ii) Dryness of mouth, nausea and vomiting.
(iii) Complains of sever thirst, giddiness and abdominal pain.
(iv) Passes large volumes of urine frequently.
(v) Not taken usual dose of medicine or insulin.
(vi) Unconsciousness is gradual.



(Fig. 69. Signs and symptoms of Diabetic coma.)

Hypoglycemic Coma :

(i) The casualty complains of increased hunger, weakness and thirst.
(ii) There is profuse sweating, trembling, restlessness, headache and tingling sensation over the body.
(iii) Unsteady gait.
(iv) Feels light headedness, confused or may be aggressive.
(v) Missed food but not medicine or insulin. May be fasting for longer period or performed strenuous work without food.
(vi) Unconsciousness is sudden.



(Fig. 70. Signs and Symptoms of Hypoglycemia Coma)

Management :

1. In both the cases the casualty should be sent to the hospital as quickly as possible.
2. If the victim is not unconscious give some glucose / sugar solution to drink and transfer to hospital immediately.
3. Infact every case of Diabetes should be advised to carry a 50gm packet of Glucose powder for emergency use.

OTHER CAUSES OF COMA :

A person suffering from different diseases of brain, liver, kidneys or certain infections may become unconscious completely (coma) all on a sudden and may remain in that state for hours and days. Although role of first-aider is very limited in such cases, yet he should have the knowledge of such cases. Cases of coma resulting due to sudden illness may have to be given special attention while transporting the casualty to the hospital.

Causes :

Diseases of brain - Encephalitis, Meningitis, Cerebral Malaria, Cerebro-vascular-accident,brain tumour, Rabies, Tetanus etc.

Diseases of liver-Hepatitis, Cirrhosis.
Diseases of kidney - Kidney failure, Diabetes, Severe infection.

General Management of Comatose Casualty :

1. Keep the casualty in semiprone (recovery) position and take care of the airway, breathing and blood circulation.
2. Loosen tight clothings around neck, chest and waist and take out constrictive bands, if any.
3. Cover the victim with a blanket or bed sheet to keep the body warm.
4. Do not give anything by mouth.
5. Do not leave the casualty alone or unattended.
6. Check the level of consciousness, breathing, pulse and heart beat at intervals of 5-10 minutes.
7. Observe the casualty constantly till the ambulance / transport arrives to carry the casualty to hospital. The casualty may gain consciousness and may collapse again.
8. Ttansport the casualty in lying down position is an ambulance.
9. Accompany the casualty to the hospital and inform the doctor about the condition.

ACUTE ASTHMA :

Asthma is an allergic disease of respiratory system causing contraction of muscles of respiratory passage and swelling of inner lining (mucous membrane) of the air way (brochi) of the lungs. Due to excessive secretion of mucous, the air way is narrowed down and breathing becomes difficult and noisy. This condition becomes acute due to tension, weather change, exertion or hard work.

Symptoms and signs :

(i) The casualty becomes breathless and finds difficulty in breathing.
(ii) Feeling of air hunger.
(iii) Wheezing sound is produced during breathing.
(iv) The casualty is unable to talk and feels restless.
(v) Condition worsens when the victim tries to lie down but gets relieved in sitting position.
(vi) Anxiety and weakness may be present.
(vii) Usual medicines do not give quick relief.

Management :

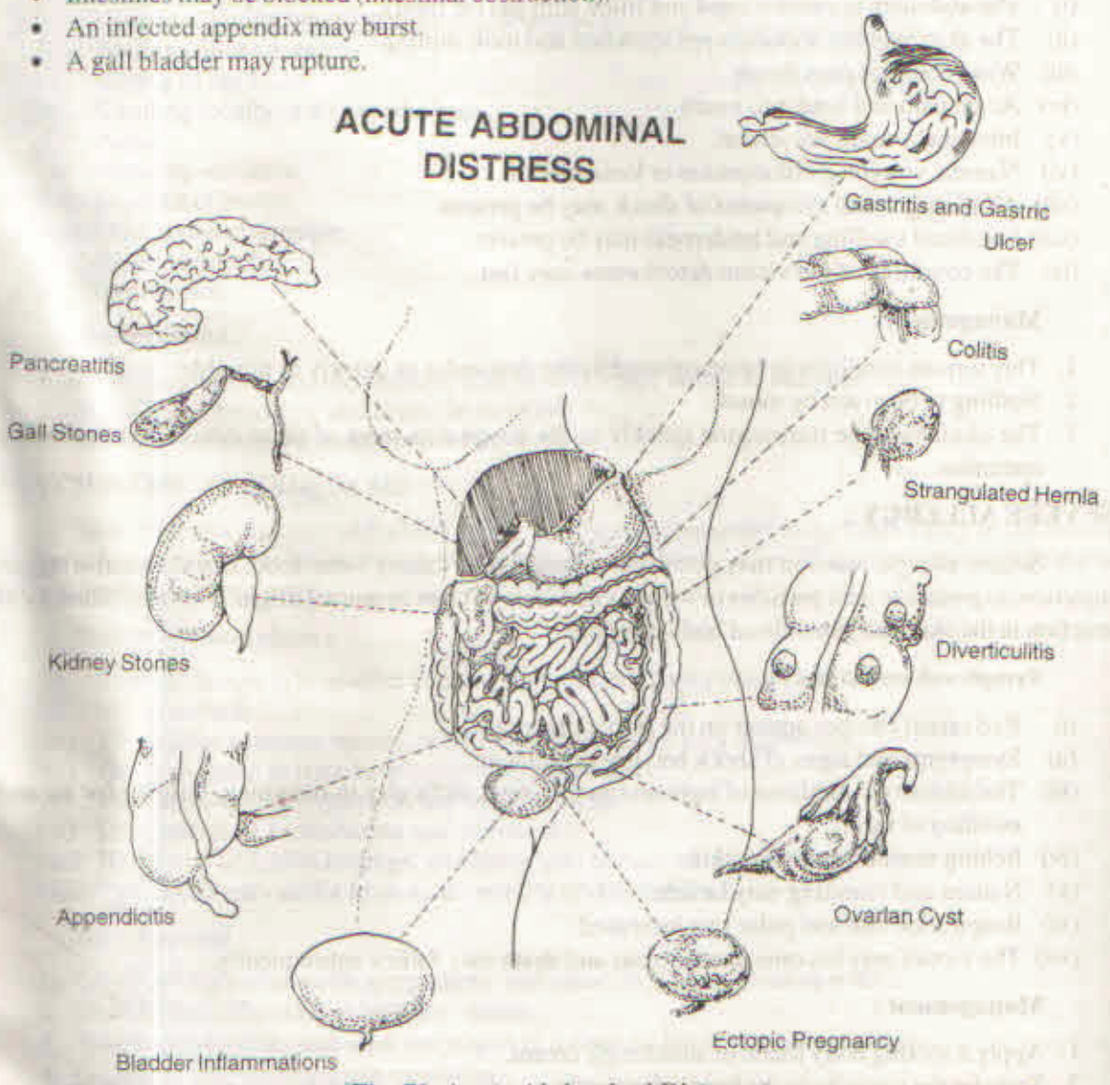
1. Advise the casualty to adopt a definite sitting position resting on a support in front so that the chest is upright, back straight and limbs and neck fully relaxed.
2. Avoid hot and stuffy environment and improve ventilation by opening the windows.
3. Loosen the tight clothings; but keep the casualty warm.
4. Continue prescribed medical treatment. Do not give over doses of medicine to get quick relief.
5. The casualty may use the inhaler if prescribed.
6. Seek further medical advice from the treating doctor or hospital.

ACUTE CONDITIONS OF ABDOMEN :

Acute or serious condition of abdomen may be caused due to changes taking place in an existing chronic disease such as peptic ulcer, appendicitis, harnia, enlarged prostate, stone in gall bladder etc.

Emergency situations may arise due to various causes :

- A peptic ulcer may open into the abdominal cavity (performation).
- Intestines may be blocked (intestinal obstruction).
- An infected appendix may burst.
- A gall bladder may rupture.



(Fig. 71. Acute Abdominal Distress.)

- A hernia comes out of the opening and does not go in (strangulated hernia)
- An oldman is unable to pass urine. (Retention of urine).

Symptoms and signs :

Although the signs and symptoms vary according to the disease and their severity, some of them may be looked for.

(i) The abdomen is swollen rigid and filled with gas (or fluid).
(ii) The skin over the abdomen are stretched and look shining.
(iii) Wind does not pass down.
(iv) Acute pain and tender to touch.
(v) Intestinal sounds are absent.
(vi) Nausea, vomiting, constipation or loose motion
(vii) All the signs and symptoms of shock may be present.
(viii) Localised swelling and tenderness may be present.
(ix) The condition of the victim detoriorates very fast.

Management :

1. This serious condition to be recognised by the first-aider as quickly as possible.
2. Nothing to be given by mouth.
3. The casualty to be transported quickly to the hospital as most of these cases need immediate operation.

SEVERE ALLERGY :

Severe allergic reaction may occur immediately after taking some food, due to insect sting, an injection, exposure to dust particles or irritant chemicals of plant or animal origin. This may cause local reaction in the skin and generalised body reaction.

Symptoms and signs :

(i) Red raised patches appear on the skin. (Uticaria)
(ii) Symptoms and signs of shock become prominent.
(iii) The casualty complains of tightness in the chest, difficulty in breathing, gasping for air and swelling of face.
(iv) Itching sensation over the skin.
(v) Nausea and vomiting may be felt.
(vi) Respiration rate and pulse rate increased.
(vii) The victim may become unconscious and death may follow subsequently.

Management :

1. Apply a sooting body lotion or antiallergic cream.
2. Transfer the casualty to the hospital urgently.

DRUG REACTION :

Sudden reaciton and collapse of the vital systems may take place after taking some medicines or injection. This type of reaction is called. *'Anaphylactic reaction'* which may lead to death if not attended quickly.

Symptoms and signs :

(i) History of taking injection or medicine recently.
(ii) Feeling of uneasiness.
(iii) Itching of the body.
(iv) Swelling locally or all over the body.
(v) Pallor.
(vi) Vomiting sensation.
(vii) Dryness of mouth.
(viii) Cold and clammy skin.
(ix) Breathlessness.
(x) Heart arrest.

Management :

1. Keep the victim in supine position with head low and turned to one side.
2. Start CPR if breathing and heart has stopped.
3. Send the victim immediately to the hospital.

PSYCHIATRIC EMERGENCIES :

Severe mental disorder with abnormal behaviour and emotional disturbances may occur among apparently normal or persons sufffering from psychiatric problem earlier. The acute onset of psychiatric illness needs quick treatment.

Symptoms and signs :

(i) Sudden change in behaviour and abnormality/peculiarity observed.
(ii) Irrelevant talk.
(iii) The patient becomes moody, irritable and sometimes very aggressive.
(iv) Does not listen to friends, relatives and co-workers.
(v) May not respond to question and remains silent.
(vi) Does not allow examination and treatment.
(vii) History of addiction to drugs, alcohol or past history of mental illness.
(viii) The victim may suffer from acute anxiety or depression.

Management :

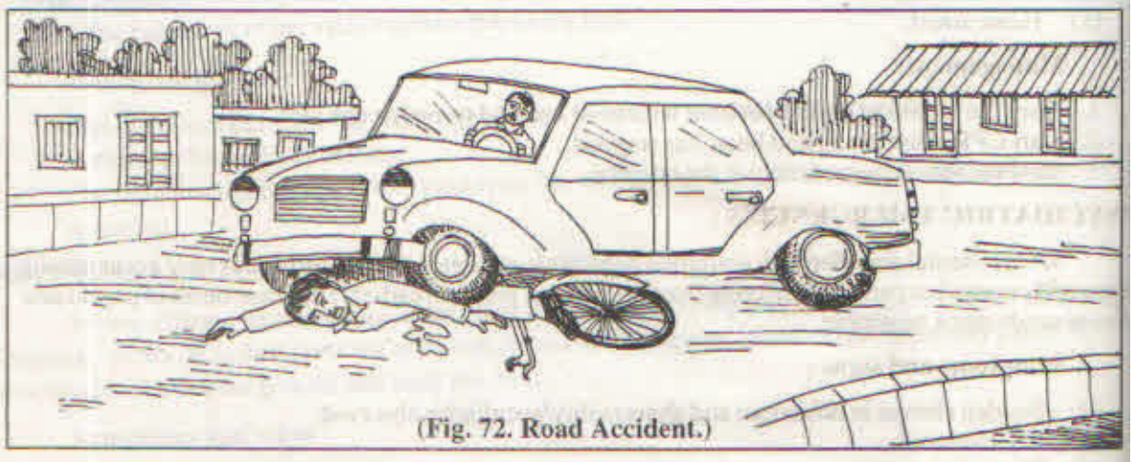
1. Convince the patient with sympathetic and consoling words to co-operate.
2. Do not abuse, threaten or beat the victim.
3. Take help of others and send the victim to a doctor. Do not try to use force.
4. Guard the victim during transptarotion.

❑❑❑

14

HIGHWAY ACCIDENTS

Road traffic has increased manyfold in our country particularly on national and state highways. Increase in number of vehicles, varieties of vehicles (cars, buses, trucks, mini-trucks, jeep, matador,tempo, vans, autorickshaw, motorcycles, scooters and mopeds) moving in different speed, slow moving carriages



(Fig. 72. Road Accident.)

(bullock cart, cycle rickshaw, cycles, trolleys, handcarts, horse driven carriages) occupy many highways and even pedestrians add to the risk of accidents. In addition to this, damaged roads, rash driving, overloading, tendency to overtake vehicles, not following traffic rules, following shortcuts without sticking to driving rules are some of the causes which result in serious road accidents leading to multiple injuries and mass casualties. In fact, thousands of people die every year in road accidents. Sometimes collison of vehicles result in fire and explosion particularly when one of the involved vehicle carries dangerous goods (explosives, petroleum, chemicals, LPG). Devastating consequences occur on the highway when such vehicles meet with an accident on the road. Particularly during rainy season or during long distance travel such accidents may be encountered frequently. Many a times, two-wheeler drivers and car passengers are affected in such road accidents and many valuable lives are lost untimely. Therefore, getting help or giving help to the accident victims on the highway becomes a natural phenomenon and one should know precisely what to do in such occasions.

ASSESS THE SITUATION - Whenever any highway accident occurs one has to assess the situation very quickly.

i) ***Look for the victims.*** They may be scattered on the road or still inside the vehicles.
ii) ***Examine each victim's. condition.*** Some of them may need life saving action, rescue from awkward position and may be facing imminent danger of fire, explosion etc.
iii) ***Prevent further accident***. Attend to the damaged vehicle and take to road side if possible.
iv) ***Switch of car ignition and lights***. Keep it stationary by applying brakes, wooden blocks or stones at the wheels after cutting off power.
v) ***Cordon the accident spot*** carefully, so that other vehicle could see from a distance.
vi) ***Call for assistance.*** take help of other drivers, villagers or pedstrians.
vii) ***Look inside the vehicles*** for small children and ensure that all passengers are out of the vehicle.

LOOK FOR THE CASUALTIES

i) There may be many casualties. Some of them may be unconscious and still inside the vehicle. The driver may be trapped or escaped.
ii) While moving any casualty, make sure that there is no serious injury or fracture; pull out the casualty gently.
iii) If a casualty has been trapped under a vehicle, move the vehicle carefully and gently to rescue the casualty.
iv) Observe or note the position of the vehicles and casualties for giving information to the police later on.
v) Give first aid to the casualties using a first-aid kit. (It may be available in the vehicle.)
vi) Inform the police or ask someone to telephone to the nearly police station.

IF VEHICLES CARRYING DANGEROUS SUBSTANCES ARE INVOLVED :

i) Look for the Hazard label on the vehicle and find out the exact nature of the substance carried.
ii) If dangerous liquids, toxic fumes or inflammable substances are likely to leak out, warn the people gethering nearby to keep away.
iii) Take precautions while rescuing the casualties.
iv) Adopt safety measures as indicated in the hazard warning label.

LIFE OF THE CASUALTIES IS FIRST CONCERN :

i) Avoid road blocks, cautic situation and jamming of road by vehicles or public.
ii) Send the casualties for medical aid to the hospital or to a near by doctor.
iii) Organise the persons available on the spot for rescue operation.
iv) Discourage and avoid violence.
v) Put a signal to make the accident known.

❑❑❑

15

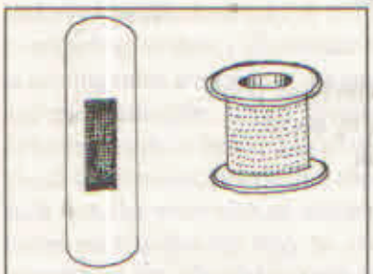
DRESSINGS, BANDAGES AND FIRST AID KIT

A first aider should learn to identify and use various materials used in first aid and upkeep of the first aid boxes on the shop floor.

DRESSING :

A dressing is a covering applied to a wound or injured part to help control bleeding, prevent infection, absorb any discharge and assist in quick healing.

* Dressing should be large enough to cover the area of the wound and beyond.
* It should be sterile or clear to avoid infection.
* It should help clotting of blood when applied over bleeding wounds.
* It should not stick to the wound. If it sticks, its removal becomes difficult.
* Some dressings have a perforated surface and a absorbent pad to help free flow of discharge from the wound.
* Dressing should be easily removed from the wound.
* Tulle -gras dressings covered with petroleum jelly and antiseptic cream are used to dress the wounds and burns.
* Antiseptic solutions and sprays are used for dressing.
* Dressing may be dry or wet.



(Fig. 73. Readymade Dressing)

Types of dressings :

Gauze dressing -Thin loosely-woven pieces of white cloth cut into small and large pads kept in container for use after sterilization. Sterilized gauze pads are also available in the fist-aid box.

Medicated adhesive dressing - These dressings consist of an absorbent gauze pad soaked in antiseptic solution and help in position by an adhesive strip, which may be waterproof. It is covered in a sterile wrapping and available in different shapes and sizes. This dressing is applied to the wound after removing the outer wrapping and keeping the gauze side down.

Sterile ready made dressing- This consists of a sterilized cotton pad with two layers of gauze on both sides and a roller bandage stitched to it. This is always enclosed and sealed in a protective wrapping of paper or plastic.

Cotton wool - Clean and sterilized cotton rolled into small or large bundles are used to clean, dress and swab the wound. It is also used to prepare swab sticks (buds), as pads, to give hot and cold compress and to apply medicines.

Adhesive plaster (Leucoplast)- It is a sticky strip of plaster used to keep the dressings and ends of bandages in position. These are available in different width and sizes.

Spray dressing - Spray dressing kits are available for application to wound, burn and sprain directly. After spraying, the medicine, it forms a coating over the wound and dries up quickly. No bandage is necessary after application of the spray dressing.

Tulle- gras or Paraffin gauze - Gauze pieces coated with a thin layer of liquid paraffin/ petroleum gel and antiseptic cream are available in packets for application over the burns and scalds. This should be used after cooling and drying the burn/scald.

Water gel compound - Small dressing packets containing water gel compound are available for application over the burn surface. When applied, it produces the cooling effect, relieves the pain and reduces the severity of the burn. This material should be kept in the first-aid box where chances of burn/scald are frequent.

Antiseptic lotions - Many medicines are used in form of lotions over the wound to prevent infection. Dettol, Betadine solution and Mercurochrome lotion only should be kept in first-aid box for use. Tincture iodine and Tincture Benzoin are not used now-a-days.

Antibiotic cream or ointment - Certain creams/ointments containing germ-killing medicines may be used to prevent wound infection particularly in case of minor wounds. Neosporin, Terramycin, Sofradex etc. come under this group.

How to Apply a Dressing ?

1. Clean the hands with soap and water quickly and dry them.
2. Control the bleeding from the wound by applying direct pressure with the help of a gauze pad.
3. Clean the wound gently and dry it. Clean the surroundings of the wound also.
4. Select the proper dressing material– medicated adhesive dressing, spray dressing, ready-made dressing or a prepared dressing.
5. Place the dressing directly on to the wound surface to cover it completely. When using spray dressing apply it over the entire surface of the wound and a little beyond to give a full coating.
6. Keep the dressed part well supported.
7. Never use concentrated antiseptic solution on a wound. It irritates the wound and skin.
8. Avoid using any ointment or lotion over a major wound. Apply a sterilized dry dressing only.
9. In case of burns, sprain and contusions wet dressing may be applied.

BANDAGES.

Definition - Bandages are strips of clothes, elastic material, paper or similar material used to hold the dressings and splints in position, control bleeding, prevent swelling, provide support for a limb or joint and sometimes used as slings.

Types - Roller bandage, Triangular bandage, Elastic bandage and Pressure bandages are used in first-aid.

ROLLER BANDAGES

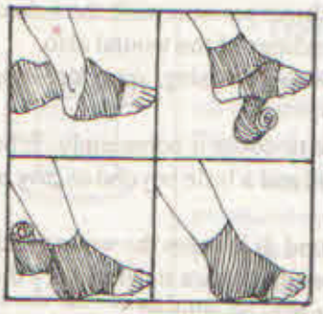
Roller bandages are made out of parallel strips of cloth or synthetic fibre of different breadth and length and are rolled up tightly and evenly into cylindrical shape. Different sizes of roller bandages are available for use in different parts of the body.

Finger bandages	-2 to 3cms wide.
Hand and Arm bandages	-5 to 7cms wide.
Leg bandages	-8 to 10cms wide.
Trunk bandages	-10 to 15cms wide.

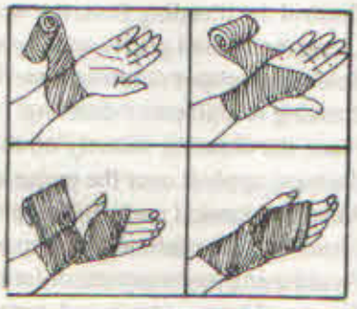
Elastic roller bandages and special types of roller bandages to be used as pressure bandages are also available.

How to Apply a Roller Bandage ?

1. Make the casualty lie down or sit comfortably.
2. Face the casualty and hold the free end (tail) of the bandage over the dressing and give one turn firmly. See that the rolled part (head) of the bandage is kept outwards.
3. Bandage firmly (not very tightly) from below upwards and from within outwards so that half of the previous layer is covered.
4. Cover the edges of the dressing completely.
5. When the bandaging is over, fix the end with adhesive plaster or give a knot after splitting the end into two.
6. When another bandage has to be applied in continuation, cover the end of the first bandage with the loose end of the second bandage and continue bandaging. Do not apply a knot to join the bandages.



(Fig. 74. Foot Bandage)



(Fig. 75. Hand Bandage)

Different Methords of Bandaging :

Simple spiral- The type of bandage is applied to the body part of uniform thickness-fingers, wrist, lower part of forearm and leg. The bandage is applied in one direction like a spiral.

Reverse spiral - This is applied to the body part which are not of uniform thickness - legs, forearm, arm etc. The bandage is applied first in one direction like a spiral and the second turn is applied at an angle and then another turn is applied.

Figure of 8 - This type of bandage is applied to bandage the joints-elbow, knee, ankle etc. The bandage is applied obliquely around the joint giving and upward an downward turn alternatively so that it looks like figure of 8. This bandage is commonly applied in case of fracture of collar bone (clavicle).

Spica - It is a modified figure of 8-bandage applied over the shoulder, groin or thumb.

TRIANGULAR BANDAGE

It is a triangular piece of cloth prepared by cutting a piece of one-meter-square cloth diagonally into two pieces. The longest side of the triangular bandage is called **base**, equal sides measuring 1 meter each are called **sides**, the point opposite to the base is called **apex** or **point** and two other points are called **ends** or **corners**. The application of triangular bandage for dressing the injured body part was first done by Dr. Mayor of Switzerland in 1831 but it was popularised by German Surgeon Esmarch (1823-1908). Use of triangular bandage although limited in modern first-aid, it has got specific uses.

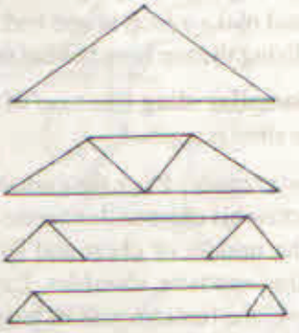
USES

The triangular bandage can be used in various ways.

i) ***Broad bandage*** - Spread the triangular bandage and bring the point to the middle of the base. Fold again neatly in the same direction. The bandage thus prepared is called a broad bandage. This bandage is used to dress large wounds of chest, abdomen, thigh and leg.

ii) ***Narrow bandage*** - Fold the broad bandage once again to make a narrow bandage. The narrow bandage can be used as a sling or to dress the wounds of hand, wrist, forehead or jaw.

iii) ***Sling*** - It can be used as sling to support the injured part particularly the hands.



(Fig. 76. Triangular Bandage)

iv) ***Ring pad*** - To dress the wound with a projecting foreignbody, a ring pad maybe prepared from triangular bandage.

v) ***Torniquet or ligature*** - To check bleeding and to prevent entry of poison through blood stream a narrow bandage can be used as a torniquet or ligature.

Different Methords of Bandaging :

Simple spiral- The type of bandage is applied to the body part of uniform thickness-fingers, wrist, lower part of forearm and leg. The bandage is applied in one direction like a spiral.

Reverse spiral - This is applied to the body part which are not of uniform thickness - legs, forearm, arm etc. The bandage is applied first in one direction like a spiral and the second turn is applied at an angle and then another turn is applied.

Figure of 8 - This type of bandage is applied to bandage the joints-elbow, knee, ankle etc. The bandage is applied obliquely around the joint giving and upward an downward turn alternatively so that it looks like figure of 8. This bandage is commonly applied in case of fracture of collar bone (clavicle).

Spica - It is a modified figure of 8-bandage applied over the shoulder, groin or thumb.

TRIANGULAR BANDAGE

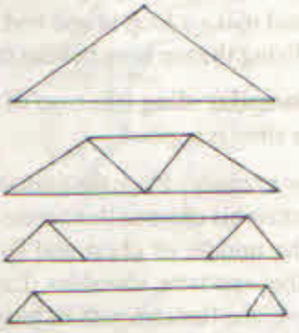
It is a triangular piece of cloth prepared by cutting a piece of one-meter-square cloth diagonally into two pieces. The longest side of the triangular bandage is called **base**, equal sides measuring 1 meter each are called **sides**, the point opposite to the base is called **apex** or **point** and two other points are called **ends** or **corners**. The application of triangular bandage for dressing the injured body part was first done by Dr. Mayor of Switzerland in 1831 but it was popularised by German Surgeon Esmarch (1823-1908). Use of triangular bandage although limited in modern first-aid, it has got specific uses.

USES

The triangular bandage can be used in various ways.

i) ***Broad bandage -*** Spread the triangular bandage and bring the point to the middle of the base. Fold again neatly in the same direction. The bandage thus prepared is called a broad bandage. This bandage is used to dress large wounds of chest, abdomen, thigh and leg.

ii) ***Narrow bandage -*** Fold the broad bandage once again to make a narrow bandage. The narrow bandage can be used as a sling or to dress the wounds of hand, wrist, forehead or jaw.



(Fig. 76. Triangular Bandage)

iii) ***Sling -*** It can be used as sling to support the injured part particularly the hands.

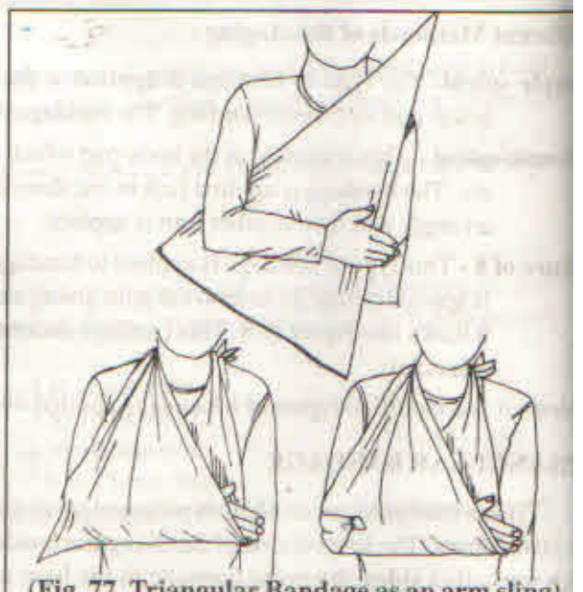
iv) ***Ring pad -*** To dress the wound with a projecting foreignbody, a ring pad maybe prepared from triangular bandage.

v) ***Torniquet or ligature-*** To check bleeding and to prevent entry of poison through blood stream a narrow bandage can be used as a torniquet or ligature.

APPLICATION OF TRIANGUALR BANDAGE :

The Arm Sling - The arm sling is used to support the forearm particularly in case of forearm bone fracture.

How to apply - Face the casualty. Keep the triangular bandage in front of the chest with base parallel to the body and the point towards the injured side. Place one end of the triangular bandage over the shoulder on the healthy side and pass it round the neck, so that it comes over the other shoulder on the injured side. Bring the point behind the elbow of the injured hand. Place the forearm on the bandage at right angles to the upper arm, i.e, the lower end with the upper end just above the collar bone. Tuck the bandage into the back of elbow and fix the point.



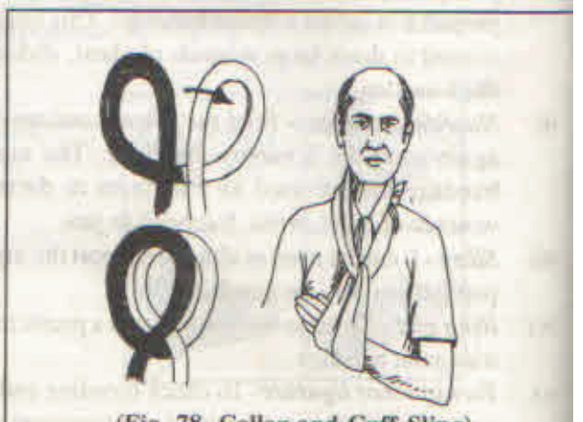
(Fig. 77. Triangular Bandage as an arm sling)

Collar -and-Cuff sling - It is applied to support the wrist if there is any fracture or wound in the hand.

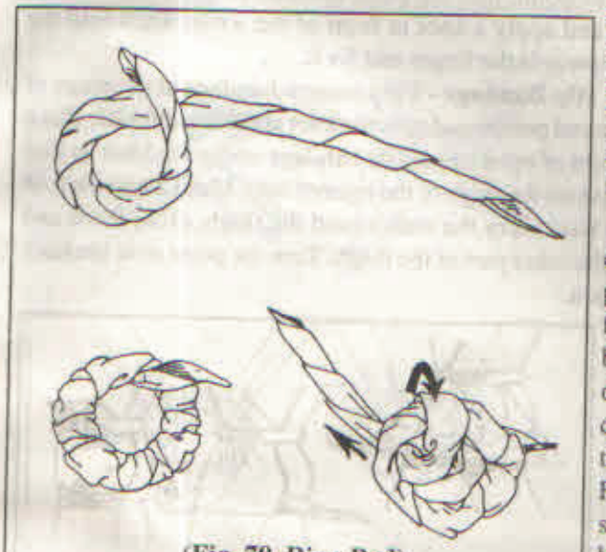
How to apply : Bend the casualty's elbow so that the forearm rests over the chest and the finger touching the opposite shoulder. Prepare a clove hitch and pass the loop round the wrist and tie the tw ends around the neck, keeping the knot just above the collar bone. To make a clove hitch, take a narrow bandage and make a loop at one end. Make a second loop on the other end and lay it on the top of th first one. Bring the top loop behind the first one without turning it.

Triangular sling - In case of collar bone fracture or when it is required to keep the arm wel raised, this sling is applied.

How to apply : Place the casualty's injured forearm across his chest so that centre of his palm rests on the middle of chest and fingers point towards the opposite shoulder. Lay an open bandage over the forearm with its base parallel to the forearm and covering the hand. Fix the hand, tuck the base of the bandage well under the hand and forearm and bring the lower end under the elbow. Turn the lower end across the back towards the injured shoulder and tie the two ends above the collar bone. Tuck and fix the loose ends.



(Fig. 78. Collar-and-Cuff Sling)



(Fig. 79. Ring Pad)

Ring pad - A ring pad is used to check bleeding of the scalp or to dress a wound with a projecting foreignbody.To make a ring pad take a narrow bandage and make a loop at one end. Then bring the other end through and through and tuck at the end till a circular pad is made fix the end with leucaplast.

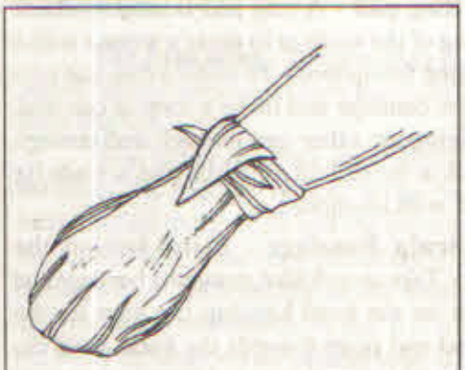
Scalp Bandage - Stand behind the casualty. Take an unfolded triangular bandage and place it on the head keeping the base on the forehead and point towards the back. Fold the base inwards as necessary and pass the two ends over the ear towards the back of the head and cross at the nape of the neck. Bring the ends to the front again and tie them in front of the head. Fix the head with left head and pull the point down so that the bandage is tight over the top of the head. Turn the point upwards and fix to the bandage.

Chest Bandage - Face the casualty and place the centre of the triangular bandage over the chest so that the point is over the shoulder on the same side and two ends are at two sides of the chest. Make a narrow fold (about 5 cms) at the base and carry the ends round the waist. Tie them at the back leaving one end longer than the other. Draw the point over the shoulder and tie it to the longer ends at the back.

Shoulder Bandage - Place the center of an unfolded triangular bandage on the top of the shoulder with point upwards and the base around the arm, cross them and give a knot on the outer side of arm. Apply an arm sling, draw the point of the bandage under the sling, fold it and fix it.

Hand Bandage - Spread the triangular bandage and place the palm on the bandage so that back of the palm points upwards and fingers pointing towards the point. Fold the bandage by bringing the point beyond the wrist. Cross the ends

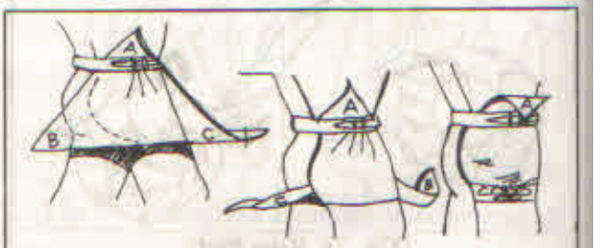
(Fig. 80. Scalp Bandage)



(Fig.81. Hand Bandage)

over the point, fold the point towards finger, turn the ends again and apply a knot in front of the wrist. Then fold the point towards the finger and fix it.

Hip Bandage - Tie a narrow bandage at the waist of the injured person and give the knot at the injured side. Place the point of open triangular bandage under the knot so that the base on the thigh of the injured side. Make a narrow fold at the base carry the ends round the thigh, cross them and tie at the other part of the thigh. Turn the point over the knot and fix it.



(Fig. 82. Hip Bandage)

Knee Bandage - Bend the knee and keep the leg supported. Face the casualty and place the triangular bandage on the knee with the point upwards and middle of the base below the knee. Make a narrow inward fold at the base. Cross the ends be hind the knee and then in front of the thigh and tie in front. Turn the point over the knot and fix it.

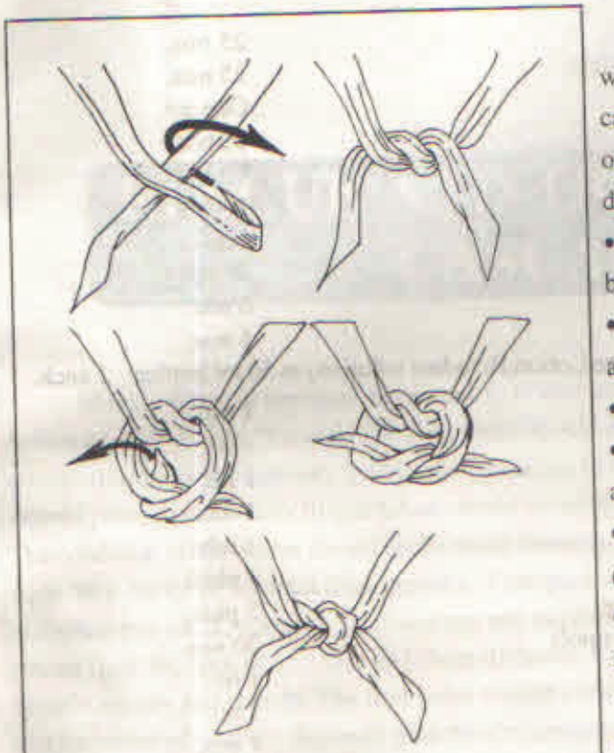
(Fig. 83. Foot Bandage)

Foot Bandage - Keep the sole of the foot on the centre of an unfolded triangular bandage with the toes pointing towards the point. Turn the point to over the toes. Bring down both the ends over the point and cross them. Poll the point to tighten the bandage. Carry the ends round the ankle and cross them behind covering the base, bring the ends forward again and give a knot at the dorsum of foot.

(Fig. 84. Knee Bandage)

Bandage for a stump - Fold a narrow hem inwards along the base of the triangular bandage. Place the bandage behind the stump with the folded base on the top and point hanging downwards. Draw the point upwards so that it covers the stump. Cross the ends behind, cross them again and bring forward. Apply the knot in front. Cover it by folding the point down and fix it.

For easy availability and convenience of application, roller bandage are frequently used. But triangular bandages are to be kept in the first-aid box for use.



(Fig. 85. Tying a Knot)

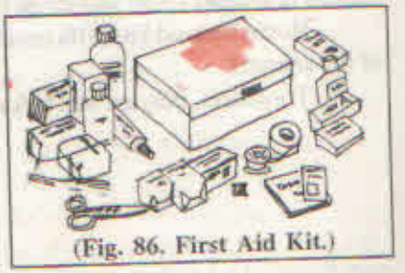
SPLINTS :

These are made of polished pieces of wood, wire frame, metal, plastic or compressed card board and used to keep the fractured bones or injured limb in steady position, particularly during transportation.

- Splints are available in different sizes and may be straight or angular.
- Wooden, metalic, plastic or wier splints are available.
- The padded splints should always be used.
- The splint should cover atleast two joints below and above the injured part.
- Special splints are available to immobilise different types of fractures.
- Splints can be inprovised (prepared out of available material) during emergency situations.
- Bandages are used to keep the splints fixed.
- Air splints made by two layers of leather or canvas like a bag are used to immobilise injured limb.

A MODEL FIRST-AID KIT :

A well-equipped first-aid box is very useful during emergency to render first-aid. The purpose and the contents of a first-aid box have been prescribed for factories, mines, rescue stations and workshops. Many contents prescribed earlier under various Acts and Rules have to be replaced with better ones. It is always better to keep the contents in a first aid box depending on the need and it should be replenished when finished.



(Fig. 86. First Aid Kit.)

A model first-aid kit should contain :

- ⌘ Sterilized dressings of different sizes — 25 nos.
- ⌘ Medical adhesive dressing of different sizes — 25 nos.
- ⌘ Spray dressing Kit — One set.
- ⌘ Sterilized cotton wool (15 gm Pkt) — 10 nos.
- ⌘ Sterilized gauze pieces — 10 Pkts.
- ⌘ Sterilized eye pad — 10 nos.
- ⌘ Adhesive Plaster (10 cm wide) — 1 roll.
- ⌘ Roller bandage of different width — 25 nos.
- ⌘ Triangular Bandage — 6 nos.
- ⌘ Elastic Bandage — 5 nos.

Antiseptic solutions (Dettol, Mercurochrome Lotion,Betadine solution) in 50 ml bottles 1 each.

- ⌘ Surgical scissors — 1 no.
- ⌘ Small tailoring scissors — 1 no.
- ⌘ Clinical Thermometer — 1 no.
- ⌘ Ointment for minor Burn (colourless) — 1 tube.
- ⌘ Antibiotic ointment for skin — 1 tube.
- ⌘ Eye drop, Eardrop, Pain relieving Balm — 1 phial.
- ⌘ Paraffin gauze or Water-gel mini dressing — 2 pkts.
- ⌘ Pain relieving tablets (Aspirin or Paracetamol) — 20 nos.
- ⌘ One note book and a dot pen or pencil. — 1 no.
- ⌘ Multipurpose folding kni — 1 no.
- ⌘ Troch light with Battery — 1 nos.
- ⌘ A Resuscitator or face mask with adoptor to be kept along with the first-aid kit where there is chances of Respiratory emergency more frequently.

The first-aid kit should be checked at regular internals and exhausted contents should be refilled.

As per the factories act and Rules and Mines Act and Rules contents of First-aid box have been prescribed depending on the size of the factory/mines. These boxes have to be kept under the charge of trained first-aiders who should be made responsible for handling and maintaining the first-aid boxes.

Home first aid kits with necessary contents are available in many houses and also in the sick room of the schools.

Travellers, players and trekkers carry their personal first-aid kit for use at the time of need.

❑❑❑

16

RESCUE AND TRANSPORT OF CASUALTY

Many a times, it becomes necessary to rescue and transfer a casualty to a safe place or hospital before or after giving first-aid. The first-aider should ensure careful rescue, safe handling and quick transportation of the casualty giving due attention to his comfort and safety. Ordinarilly a severely injured person or seriously ill individual should never be moved unless there is immediate danger to life. The condition of the victim should not be made worse due to careless handling or unnecessary movement done in a hurry or by unskilled persons. Transporting the casualty with the help of a stretcher or ambulance is ideal, but such facilities are not available everywhere. However, different methods of rescue from the spot of accident and short-distance- transfer of the casualty are adopted which should be safe, steady and speedy. The first-aider should consider the following points while planning rescue and transport of casualty depending on the circumstances.

(a) Condition of the casualty.

(b) Nature, extent and severity of the injury.

(c) Number of persons affected.

(d) Danger in the surrounding.

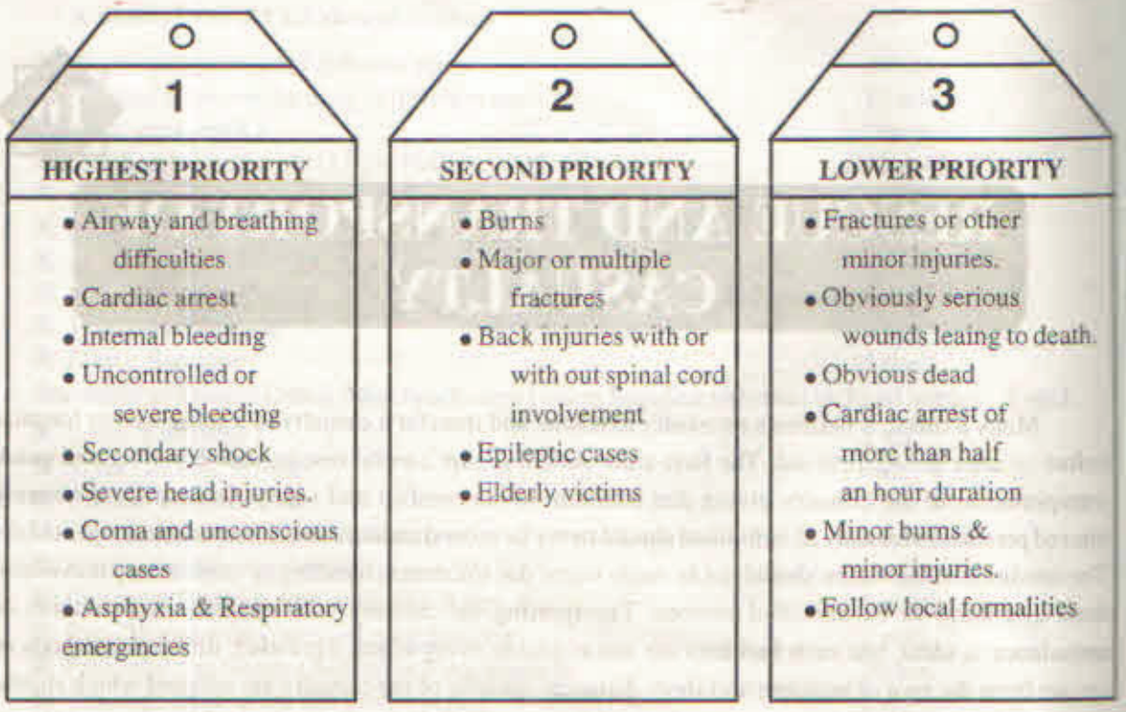
(e) Assistance available.

(f) Distance to be covered and time required.

(g) Nature of the route.

TRIAGE

Triage means sorting out multiple casualties into priorities for emergency care or for transportation to hospital. Priorities are usually given at three levels as follows.



METHOD OF TRANSPORT -

A casualty may be transported by different means :

i) Manual carriage- Cradle, Human crutch, Pick-a-Back, Fireman's lift & carry, Rescue crawl, Fore & aft carry and Hand seats.
ii) Stretcher - Standard, folding, metal, special stretchers improrised.
iii) Trolley or wheel-chair - To carry through a short distance or inside a building.
iv) Ambulance - For transport by road.
v) To take the casualty from critical areas.
vi) To carry the victim through water surface.
vii) Helicopter or Motor boats
viii) Relief van or Train - During disastans

In our country, use of stretcher and ambulance are common means and undue emphasis should not be given on other methods, which are not of practical significance today.

Since trained first-aiders and ambulances are available in most of the factories and mines correct procedure of rescue & transport should be followed whenever someone is injured or becomes sick.

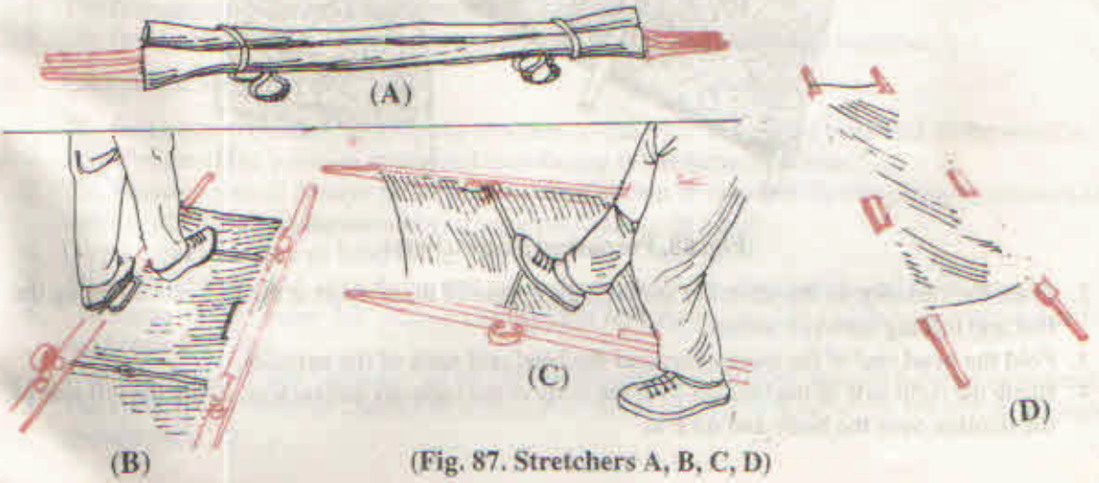
However a first-aider should be conversant with loading the casualty on to a stretcher, carrying a stretcher, loading on an ambulance, unloading the casualty from the ambulance and placing the casualty in a comfortable position during transportation.

STRETCHER -

- Different types of stretchers are used to carry the casualties, Canvas stretcher (flat & folding type), metal stretcher, wheeled stretcher and special types are available. Usually four persons are necessary to carry a stretcher but even two persons can carry it during emergency.
- The standard (Furley) Stretcher consists of poles, handles, traverses, runners and a canvas bed.
- The traverses are jointed so that the stretcher can be opened for use and kept closed when not used.
- The stretcher should be tested to bear the load before each use.
- A hard or metal stretcher should be used to carry the casualty with back injury or spine fracture.
- When a standard stretcher is not available, other types of stretcher or improvised one may be used.
- Most of the ambulances are provided with a trolley stretcher for convenience of loading and unloading.
- Other types of stretchers used during special situations are ultrafolding stretcher, scoop stretcher, Neil-Robertson stretcher, Paraguard stretcher, Pole & Canvas stretcher and Improvised stretcher.

Opening the stretcher :

1. Place the Stretcher on its side with its runner towards the inner side and buckles of the straps uppermost. Unfasten the straps.
2. Open the traverses fully by pushing with your heel and place the stretcher flat on its runners.



(Fig. 87. Stretchers A, B, C, D)

Loading into the ambulance :

1. The stretcher may be loaded into the ambulance along with the casualty or the casualty may be transferred gently from the stretcher to the trolley stretcher of the ambulance.
2. If the stretcher has to be loaded, all the bearers keep the stretcher at the loading level of ambulance placing the runners on the groove and push gently inwards.
3. If the casualty is to be transferred to the trolley bed, then the stretcher is kept parallel to the trolley bed and the casualty is gently lowered down with head forward.

Unloading the casualty :

1. Two bearers hold the handles of the stretcher at the leg end and gently poll the stretcher outwards.
2. Two other bearers hold the handles at the head end and lower the stretcher with support of head end and bearing the weight of the casualty.

Finally all the bearers carry the stretcher out of the ambulance and place it on the ground.

AMBULANCE

Ambulances are special types of vehicles used to transport the casualties by road. It is white in colour in a prominent redcross sign. It is provided with audiovisual signal (red light and a siren) to make way through the crowd. Modern ambulances may be provided with breathing apparatus, oxygen cylinder and other sophisticated emergency equipment to support recovery of the casualty during transportation.

POSITIONING THE CASUALTY

Certain positions are recommended to provide comfort to the casualty and assist recovery during transportation and rest.

Supine position - This is the usual lying down or sleeping position adopted by most of the people. The person lies on the back with face upward or turned to one side. This position is adopted while giving mouth-to-mouth breathing (EAR) or CPR. The victim's head may rest on a pillow except in case of head injury.

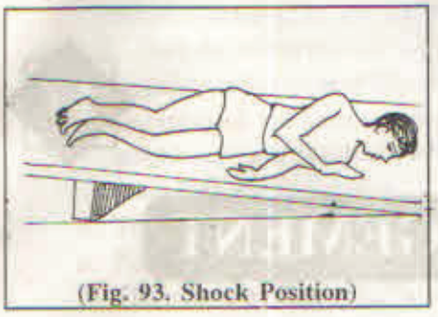
(Fig. 90. Supine Position)

Prone or recovery position - The person is made to lie down in face downward position, face turned to one side, elbows bent and placed under the head, legs may be resting on the ground or one leg may be vent at the knee and fully relaxed. Most of the injury cases and unconscious victims are placed in this position.

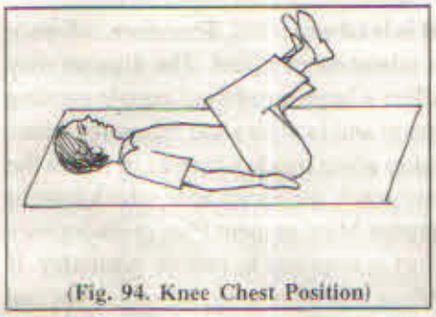
(Fig. 91. Semiprone position)

Semiprone (or lateral) position - The person lies on one side with the face turned to the same side, hands may be bent at the elbow or kept on the side of the body, legs may bent and resting on the ground. The casualty is kept in this position if there is vomiting or excess secretion from mouth or nose.

(Fig. 92. recovery position)



(Fig. 93. Shock Position)



(Fig. 94. Knee Chest Position)

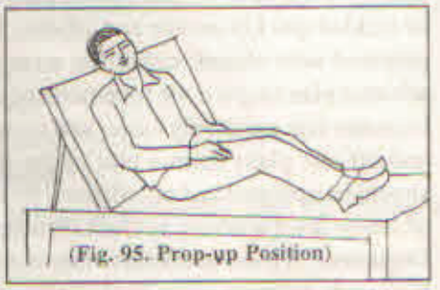
Shock position - The casualty is made to lie down on the bed in supine or semiprone position with head turned to one side. The foot end of the bed is raised about 25 cms by placing wooden blocks or bricks. This position is adopted when the casualty suffers from shock and it helps to improve blood circulation to the vital organs.

Knee-chest position - In case of open abdominal injury the victim is made to lie down on the back with both legs bent at the knees and placed over the abdomen. This position helps to relax the abdominal muscles and pressure is reduced in abdomen so that the contents do not bulge out. Abdominal injury cases are sent to the hospital in this position.

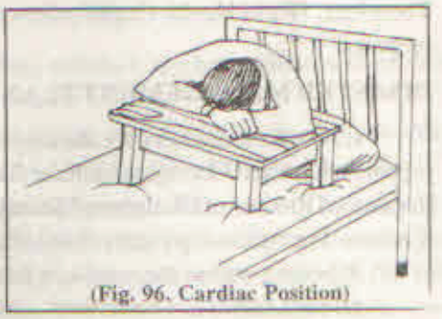
Prop-up-position - This is partial sitting position when the person feels comfortable if pillows or a back rest is provided on the bed. Persons suffering from respiratory or heart diseases prefer this position rather then lying down or sitting.

Cardiac position - In case of severe asthma or breathlessness due to chest injury or heart disease, the casualty likes to sit on the beding forward and resting on pillows, a raised surface or packing box kept on bed or lap. The casualty feels better when the body remains bent. Sitting straight or lying flat on the bed makes the condition of the victim miserable.

While handling the injured or sick persons, these positions may be adopted considering their comfort and safety.



(Fig. 95. Prop-up Position)



(Fig. 96. Cardiac Position)

17

DISASTER MANAGEMENT

Disasters strike all on a sudden, unwarranted and when it is least expected. Therefore, advance planning to anticipate and manage any disaster is necessary to minimise its effect. The disaster may occur due to natural calamities or accidental causes that may affect a large number of people causing loss of many lives, serious injuries, extensive damage to the property and facilities and bringing serious disruption of activities in the area. Particularly when a disaster takes place inside a factory or mines the entire work area or several sections are seriously affected and emergency situations arise which have to be tackled quickly on-site and off-site. In absence of a proper Disaster Management Plan or emergency prepared ness chaotic condition arise and a lot of time and effort is required to restore normalcy. If advance planning is done for emergency preparedness and meticulous microplanning, subsequent action becomes comparatively easier and more systematic. To render medical assistance to the victims on-site and off-site plans form a part of the total Disaster Management Plan. The entire medical activities should be operated and coordinated by the "Controller of Medical and Health Services", who is a doctor of senior level working in Govt./Private organisation and designated in the Disaster Management Plan Document. A team of doctors, nurses, other paramedical staff and first-aiders work under his/her control to provide emergency medical services on-site and off-site which may continue for a few days or weeks. Therefore, World Health Organisation has given a call to member Nations - "Should disaster strike, be prepared".

DISASTER MANAGEMENT PLAN

It becomes statutory for the employer of every industrial organisation and agents of the mines to prepare a Disaster Management Plan documents and get it approved by the competent authorities-Chief Inspector/Director of Factories of State in case of factories and Director General of Mines Safety in case if mines. The following points should be considered while preparing these documents.

i) Whether, within the works, is there the potential for a major emergency e.g. fire, explosion, gas release, release of hazardous, chemical etc. ?
ii) What are the possible consequences in terms of risk to the people and spread of damage ?
iii) How adequate are existing resources and arrangement to handle the most serious emergency situation ?
iv) What further provision or action needed if any emergency situation arises ?

While assessing the risk, the following points should also be considered and provision should be made to control/contain the risk during emergency preparedness.

a. Population densities in the area likely to be affected due to spread of the hazard.
b. Location of the factory where the incident may occur and other sources of hazard in the neighbouring area (other Factories, Storage tanks, Power house, Dam, etc.)
c. Prevailing winds dierction.
d. The possibility of contaminating drains, crops and water sources.
e. Presence of nearby radio-active sources.
f. The possible effect of collapse of massive structures as a consequence.

The major emergency procedure should be documented to ensure maximum use of the combined resources of the works and the outside services to :

1. Provide effective rescue transport and treatment of the casualties.
2. Safeguard the people.
3. Minimise damage to the equipment, property and environment.
4. Contain and control the consequences.
5. Identify the dead bodies and dispose them properly.
6. Establish communication with family members and relatives.
7. Provide authoritative information to the news media.
8. Ensure rehabilitation of the affected persons (survivors).
9. Preserve and protect the environment in the affected area.
10. Provide alternate services till regular facilities are restored.
11. Preserve relevant records and equipment for the subsequent enquiry into the causes and circumstances of the emergency.
12. Establish liaison with the external authorities.

WHEN A DISASTER STRIKES.....

1. ***Raising the alarm to make the emergency known-*** Who will do it and how will it be done should be mentioned in the Disaster Management Plan Document.
2. ***Declaring the major emergency*** - Once the alarm is raised, the works emergency procedures will be activated through the 'Works Incident Controller' and the 'Works Main Controller'.
3. ***Making the Emergency Known*** - Inside the works it is important for everyone to know that a major emergency exists and action has to be taken immediately according to the emergency preparedness document. This will be done by the Works Incident Controller through the Works Main Controller and his deputies and other key personnel. The emergency should be made known.
   - to the outside emergency services;
   - to the key personnel outside normal working hours;
   - to neighboring firms; and
   - to the administrative authorities;

CONCLUSION

It is made absolutely clear that first-aid is a stop-gap arrangement in any case- be it minor or major. But the time interval between the incident and the availability of medical aid may be crucial and life threatening. First aid becomes essential during this time. Discussions on various emergency situations which may arise at the workplace or in the home have been discussed in this book to create an awareness and clear understanding among the general public. The modern concept of first-aid, international practices and practical solutions to suit the Indian environment have been amalgamated and put in easily understandable language. Although the main objective of the book is to impart training to the industrial workers, miners and social volunteers in techniques of first-aid, yet it can be used by others to enrich their knowledge and apply in life. Various topics have been covered widely to make the subject broad based. Considering the training imparted by various voluntary organisations and non-governmental professional associations working in this field, the book has been designed to meet their requirements too to a greater extent.

As discussed earlier, the importance of first aid is increasing in every walk of life and at every crowded place be it schools, play ground, fairs, festivals or other leisure time activities in addition to the statutory groups -factories, mines, rescue crops, ambulance brigade, home guards, NCC cadets etc. To equip the trainees with up-to-date knowledge effort has been made through this book. This can also be used as a need based modular training manual.

Suggestions for further improvement or modification of the book is most welcome.

❐❐❐

APPENDIX

CASE STUDIES

CASE – 1

While doing some gas welding job, the clothing of the welder caught fire, who was wearing a loose dress, throwing the welding torch in lighted condition, he started running on the shop floor and felldown after sometime. His coworkers reached the spot and applied Burnol on his body surface which were burnt and sent him to the factory clinic immediately. He had more than 30% Body Surface Burnt.

1. What mistake were committed by the welder ?
2. Did his co-workers gave right first-aid ? Justify.
3. What first-aid should be given to such a victim ?

CASE – 2

While doing maintenance work in a factory, inside of a 5 meter X 5m X 5m tank was to be painted. It was a hot day in sumer season in second shift (at about 2pm) the contractor left the painter, helper and the supervisor and instructed them to finish the job quickly. A ladder was available to go down the tank. The supervisor explained the job to the painter and the helper and handed over the epoxy paint (a strong chemical paint) and thinner and left the spot. The mixing of the paint and thinner was done at the floor of the tank. The supervisor returned after about 1½ hour and saw that work has been half done and the fumes coming out of the tank. The painter and the helper were not responding to his call. He called two other strong persons working in his other job nearby and asked them to go down immediately and pull out the painter and the helper who were already unconscious. These two persons also did not return, leter on it was found that all the four persons were dead.

1. What may be the cause of such fatal accident ?
2. What precaution should have been taken before starting the job ?
3. What special precautions are necessary to rescue the casualties ?
4. What first aid should be given if the victims are alive after rescue ?

CASE – 3

While crossing the railway line inside a factory, a worker fell down on the railway track and the locomotive ran over his right leg. His right leg was completely cut at the ankle and the cut end was bleeding profusely. The person complained of severe pain, difficulty in breathing and sweating appeared on the forehead ?

1. What type of injury the person suffered from ?
2. What first aid to be given in such a case ?
3. What should be done to the completely cut part ?
4. What will happen if the first aid and medical aid is delayed.

CASE – 4

While doing some job in the factory, the hammer struck the thumb of a worker very heavily. The left thumb was badly damaged, bleeding heavily and extremely painful. His co-workers applied some machine oil immediately to the wound and applied a bandage from the first aid box. After all it is a temporary measure. The first aid box did not have any thing except cotton, bandage and gaugze pieces. The case was sent to the factory clinic immediately by making him sit on the back seat of a scooter.

1. What type of injury the worker suffered from ?
2. Was the person given right first aid ? Why ?
3. What first aid should be given ideally ?
4. What may happen if transport of the casualty is delayed ?

CASE – 5

A lady wearing a synthetic saree was cooking food with the help of a double gas stove keeping it on the floor of the kitchen. For taking out the open pan from the stove she used the loose end of her saree which caught fire all on a sudden. She shouted for help and ran here and there in the kitchen and food container was also spilled over her hand and body. When her husband came to rescue her the burn saree was sticking to her body partially and she had burn of right hand, abdomen, right thigh and part of back.

1. What mistakes were committed by the lady ?
2. What should you do if you happen to be her husband ?
3. What precautions to be taken to avoid repeatition of such accident in the kitchen ?

CASE – 6

An old man aged about 65yrs was coming down through the stair case when his leg slipped in the last step and he fell down on the floor. He has severe pain near the wrist on the right side, he could not raise his right leg and right leg looked as if twisted. When somebody came to help him He complained of severe pain and could not walk.

1. What may be the condition the oldman was suffering from ?
2. What are the signs and symptoms to support your diagnosis ?
3. What first-aid to be given to the victim ?
4. What special precautions the family members should take if there is an elderly person in the home ?

CASE – 7

On a hot summer day, a lady was reading a magazine while sitting in her drawing room. She wanted to adjust the pedestral fan kept in the room by moving it while the fan was on. While doing so, she gave a loud cry, fell on the floor and fainted. Her neighbour came running after hearing her cry and found that the fan was on her body.

1. What should do first if you are the negihbour ?
2. What had happened to the lady ?
3. What is the first-aid management of the case ?

CASE – 8

A girl aged bout 15yrs fell down from her cycle in front of the school gate. Her right hand struck against the ground. A friend lifted her and her cycle and found that right wrist was swollen and deformed. She pulled the hand gently to make it alright when the girl cried with pain. The hospital was very close to school and the girl walked to the hospital keeping her hand hanging on one side. A well-equipped First- Aid box was available in the sick room of the school.

1. What may be the condition the girl was suffering from ?
2. What mistake was made by her friend ?
3. What should have been done first ?
4. What first aid to be given to such a victim ideally ?

CASE – 9

During holiday time some ladies were talking while sitting in the lawn of the house and small children were playing around. A boy aged about 8 years was sitting on the gate and fell down from there. His head struck on a hard surface and a swelling appeared on the right side of head. There was no bleeding seen out side. The skin over the swelling was looking bluish.

1. What is the condition the boy suffered from ?
2. Is it a serious condition ? Why ?
3. What first aid to be given to such a case ?

CASE – 10

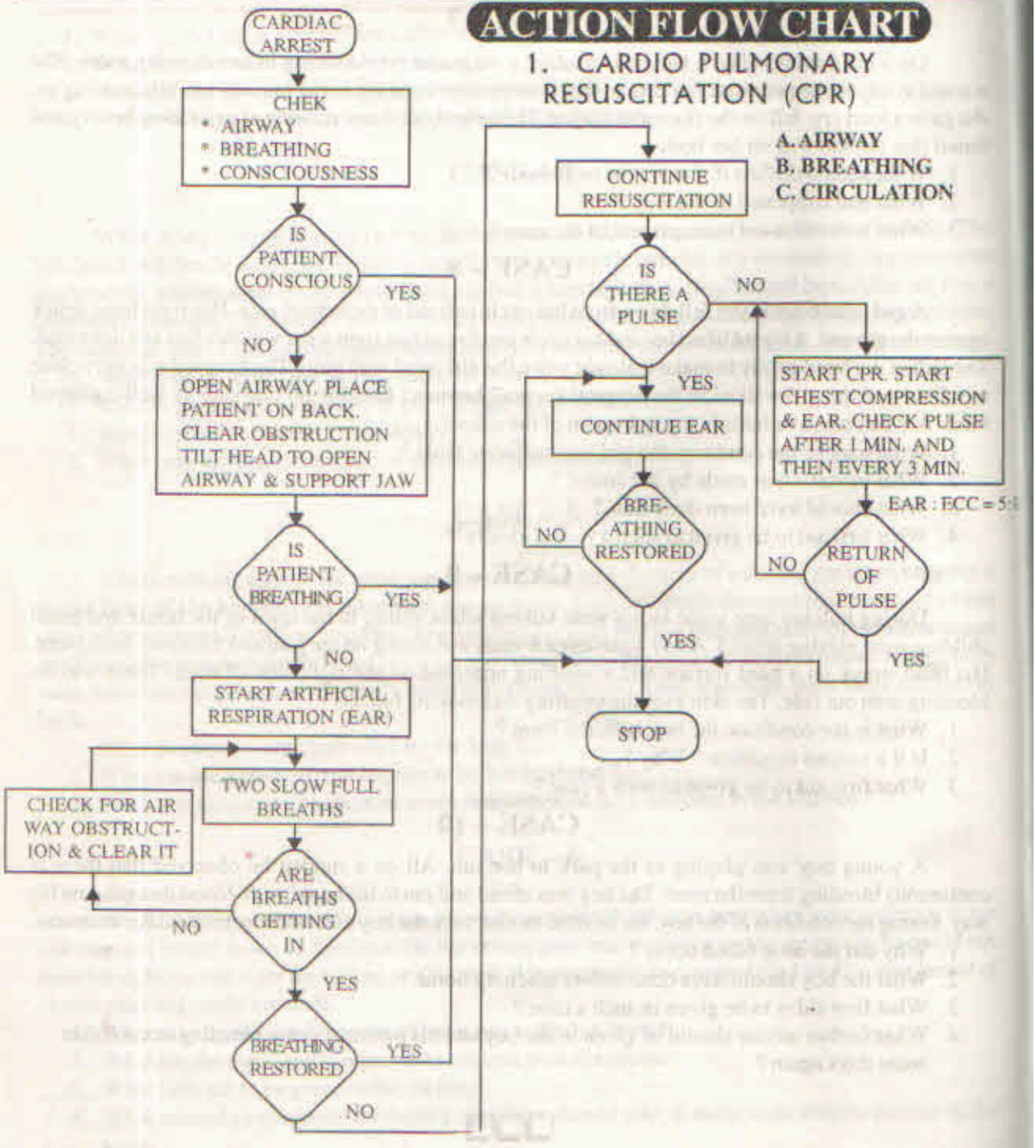
A young boy was playing in the park in hot sun. All on a sudden he observed that there is continuous bleeding from the nose. The boy was afraid and ran to his home with blood dropping on his way. Seeing the condition of the boy, his worried mother took the boy to the nearby hospital for treatment.

1. Why did the nose bleed occur ?
2. What the boy should have done before reaching home ?
3. What first aid is to be given in such a case ?
4. What further advice should be given to the boy and his parents in case bleeding occurs after some days again ?

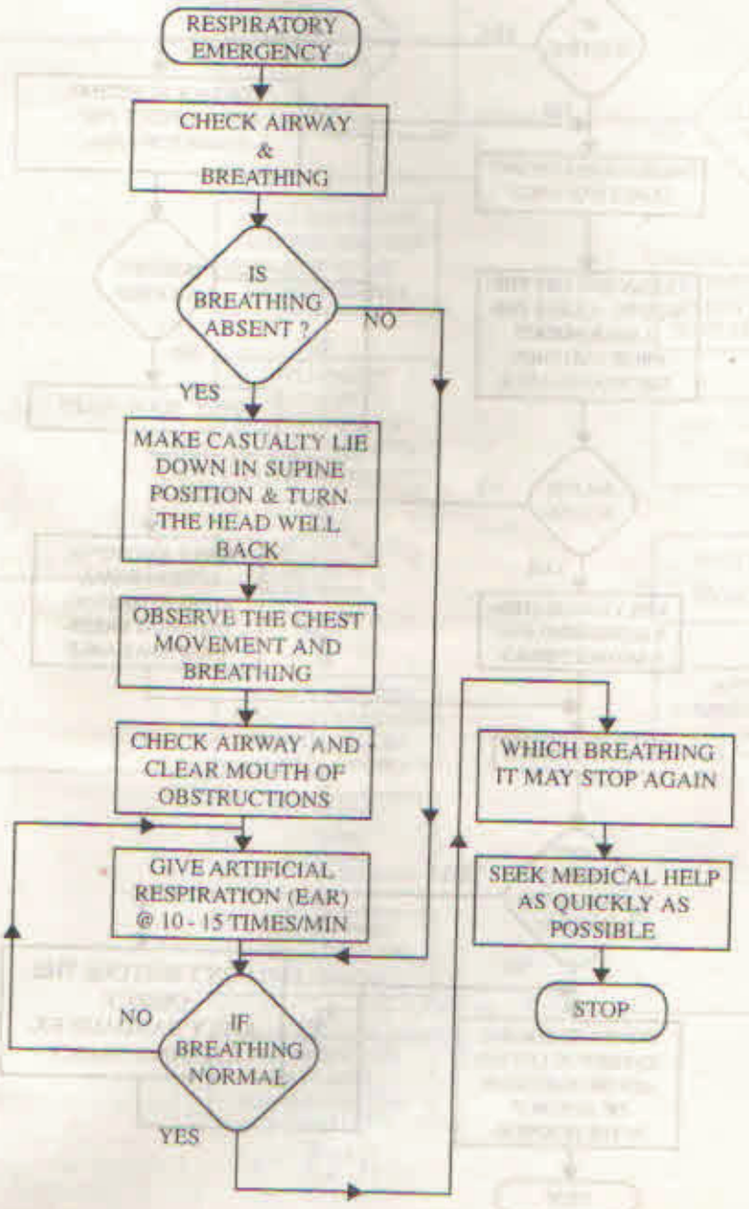
❑❑❑

ACTION FLOW CHART

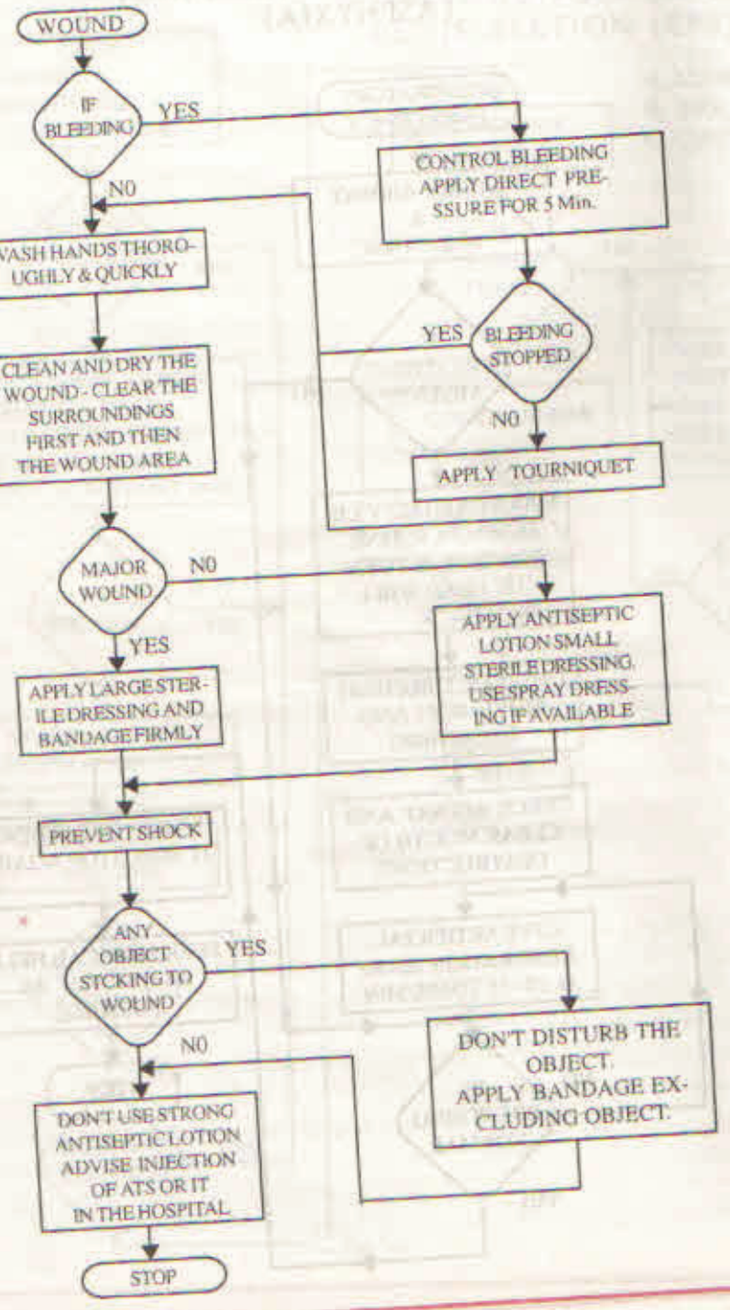
1. CARDIO PULMONARY RESUSCITATION (CPR)



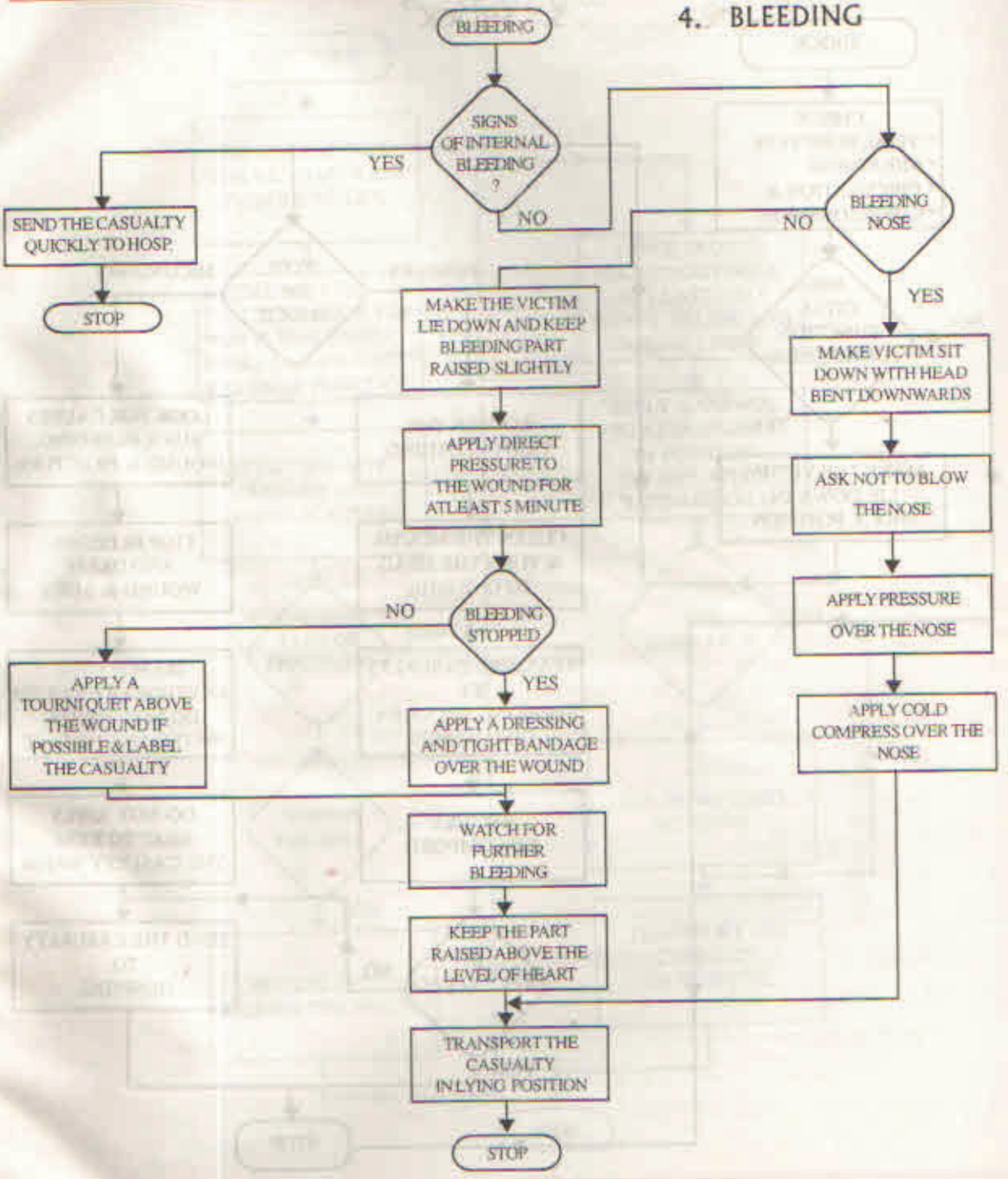
2. RESPIRATORY EMERGENCY (ASPHYXIA)



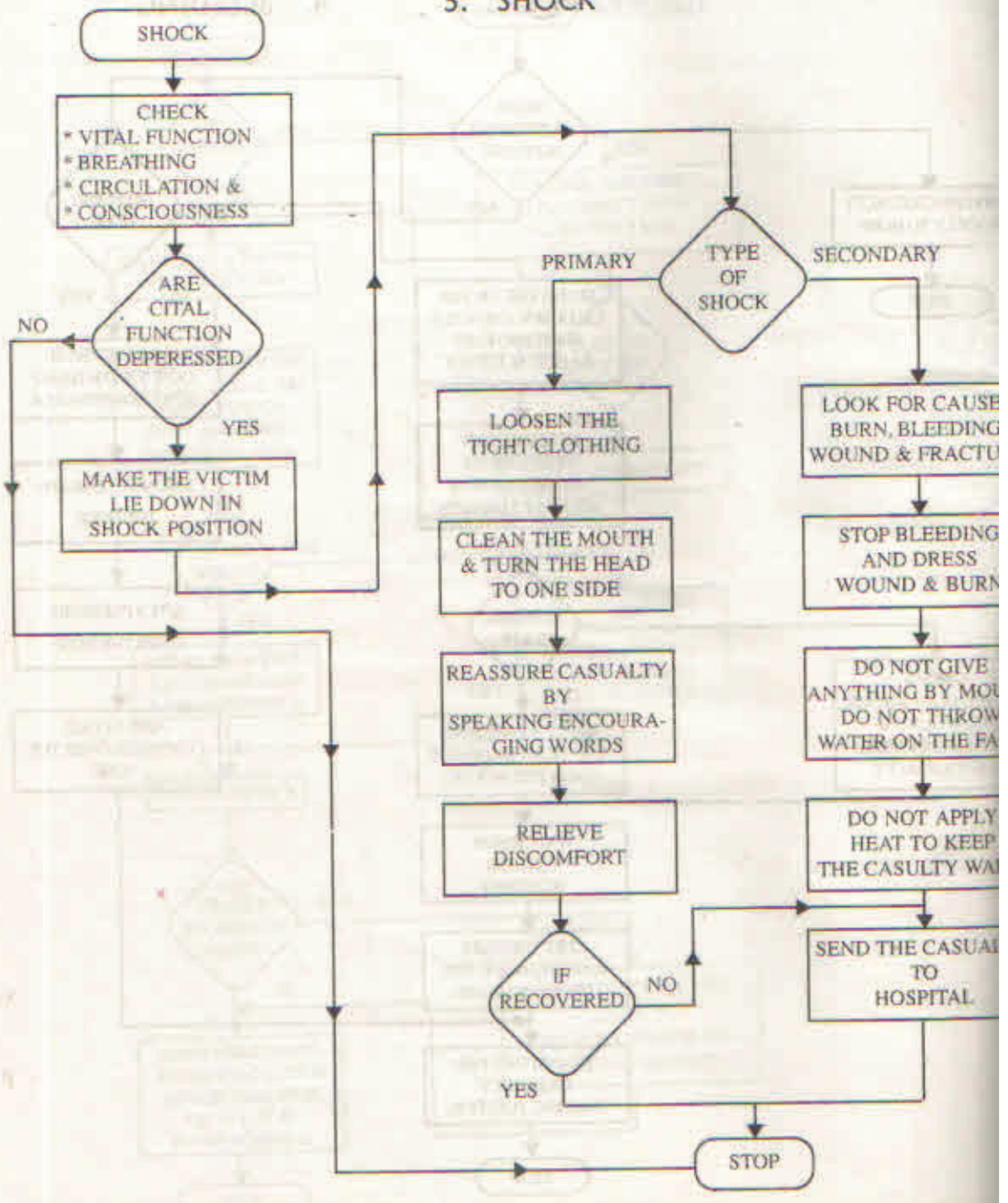
3. WOUND


WOUND
IF BLEEDING
YES
NO
CONTROL BLEEDING APPLY DIRECT PRESSURE FOR 5 Min.
BLEEDING STOPPED
YES
NO
APPLY TOURNIQUET
WASH HANDS THOROUGHLY & QUICKLY
CLEAN AND DRY THE WOUND - CLEAR THE SURROUNDINGS FIRST AND THEN THE WOUND AREA
MAJOR WOUND
NO
YES
APPLY ANTISEPTIC LOTION SMALL STERILE DRESSING. USE SPRAY DRESSING IF AVAILABLE
APPLY LARGE STERILE DRESSING AND BANDAGE FIRMLY
PREVENT SHOCK
ANY OBJECT STCKING TO WOUND
YES
NO
DON'T DISTURB THE OBJECT. APPLY BANDAGE EXCLUDING OBJECT.
DON'T USE STRONG ANTISEPTIC LOTION ADVISE INJECTION OF ATS OR IT IN THE HOSPITAL
STOP

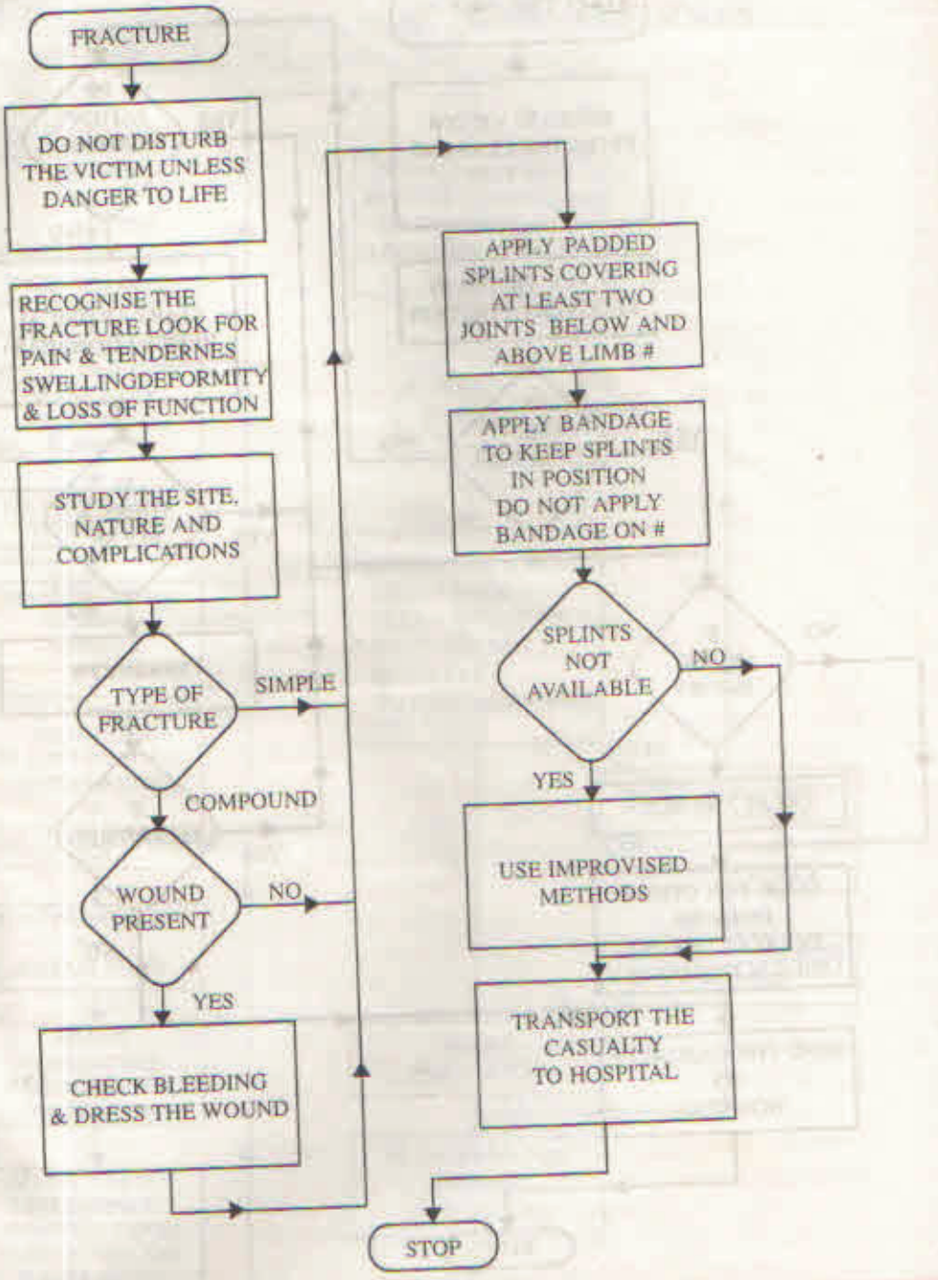
4. BLEEDING


BLEEDING
SIGNS OF INTERNAL BLEEDING ?
YES
NO
SEND THE CASUALTY QUICKLY TO HOSP.
STOP
BLEEDING NOSE
NO
YES
MAKE THE VICTIM LIE DOWN AND KEEP BLEEDING PART RAISED SLIGHTLY
APPLY DIRECT PRESSURE TO THE WOUND FOR ATLEAST 5 MINUTE
MAKE VICTIM SIT DOWN WITH HEAD BENT DOWNWARDS
ASK NOT TO BLOW THE NOSE
APPLY PRESSURE OVER THE NOSE
APPLY COLD COMPRESS OVER THE NOSE
BLEEDING STOPPED
NO
YES
APPLY A TOURNIQUET ABOVE THE WOUND IF POSSIBLE & LABEL THE CASUALTY
APPLY A DRESSING AND TIGHT BANDAGE OVER THE WOUND
WATCH FOR FURTHER BLEEDING
KEEP THE PART RAISED ABOVE THE LEVEL OF HEART
TRANSPORT THE CASUALTY IN LYING POSITION
STOP

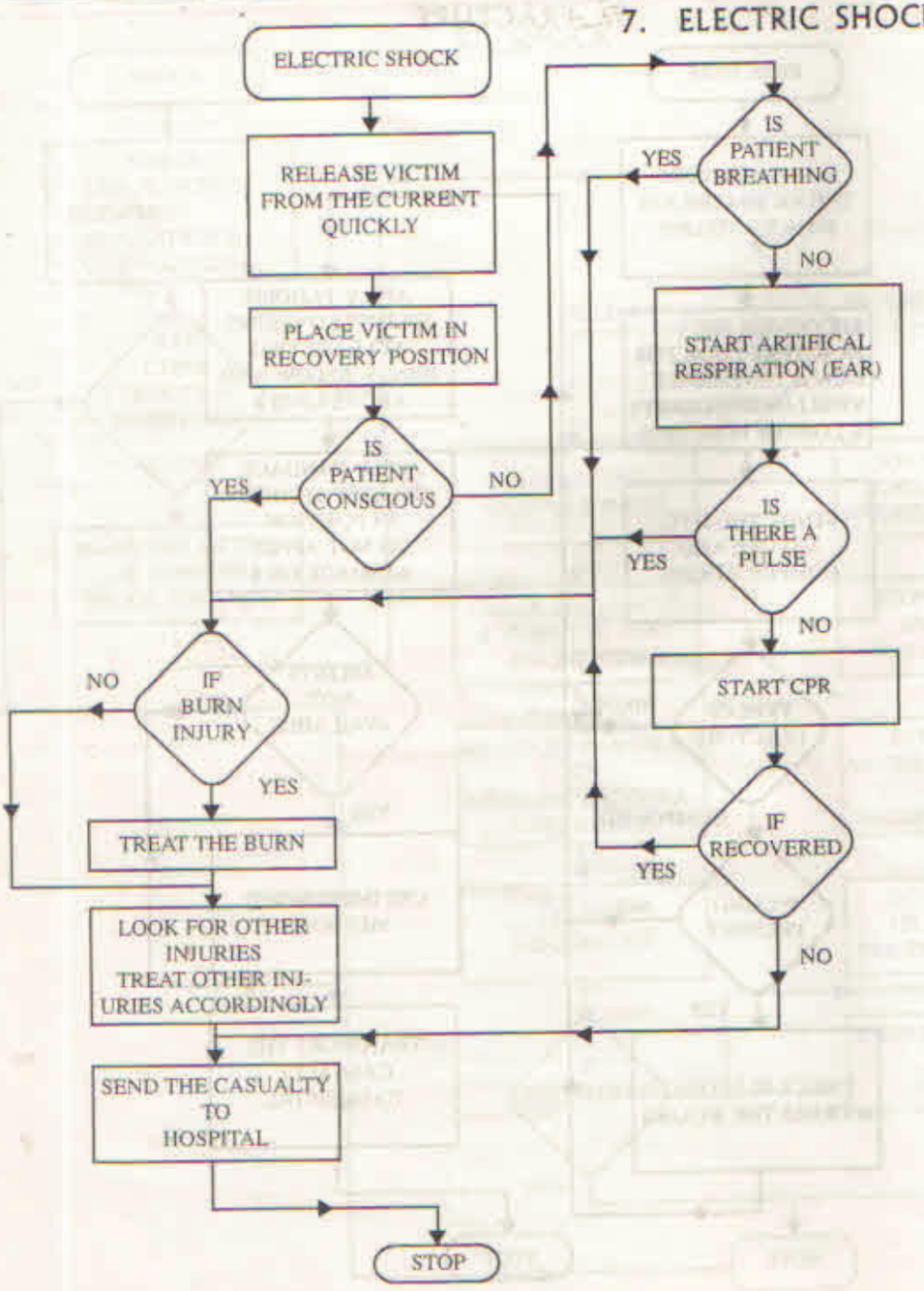
5. SHOCK


SHOCK
CHECK
* VITAL FUNCTION
* BREATHING
* CIRCULATION &
* CONSCIOUSNESS
ARE CITAL FUNCTION DEPERESSED
NO
YES
MAKE THE VICTIM LIE DOWN IN SHOCK POSITION
TYPE OF SHOCK
PRIMARY
SECONDARY
LOOSEN THE TIGHT CLOTHING
CLEAN THE MOUTH & TURN THE HEAD TO ONE SIDE
REASSURE CASUALTY BY SPEAKING ENCOURA-GING WORDS
RELIEVE DISCOMFORT
IF RECOVERED
NO
YES
LOOK FOR CAUSE
BURN, BLEEDING
WOUND & FRACTU
STOP BLEEDING
AND DRESS
WOUND & BURN
DO NOT GIVE
ANYTHING BY MOU
DO NOT THROW
WATER ON THE FA
DO NOT APPLY
HEAT TO KEEP
THE CASULTY WA
SEND THE CASUAL
TO
HOSPITAL
STOP

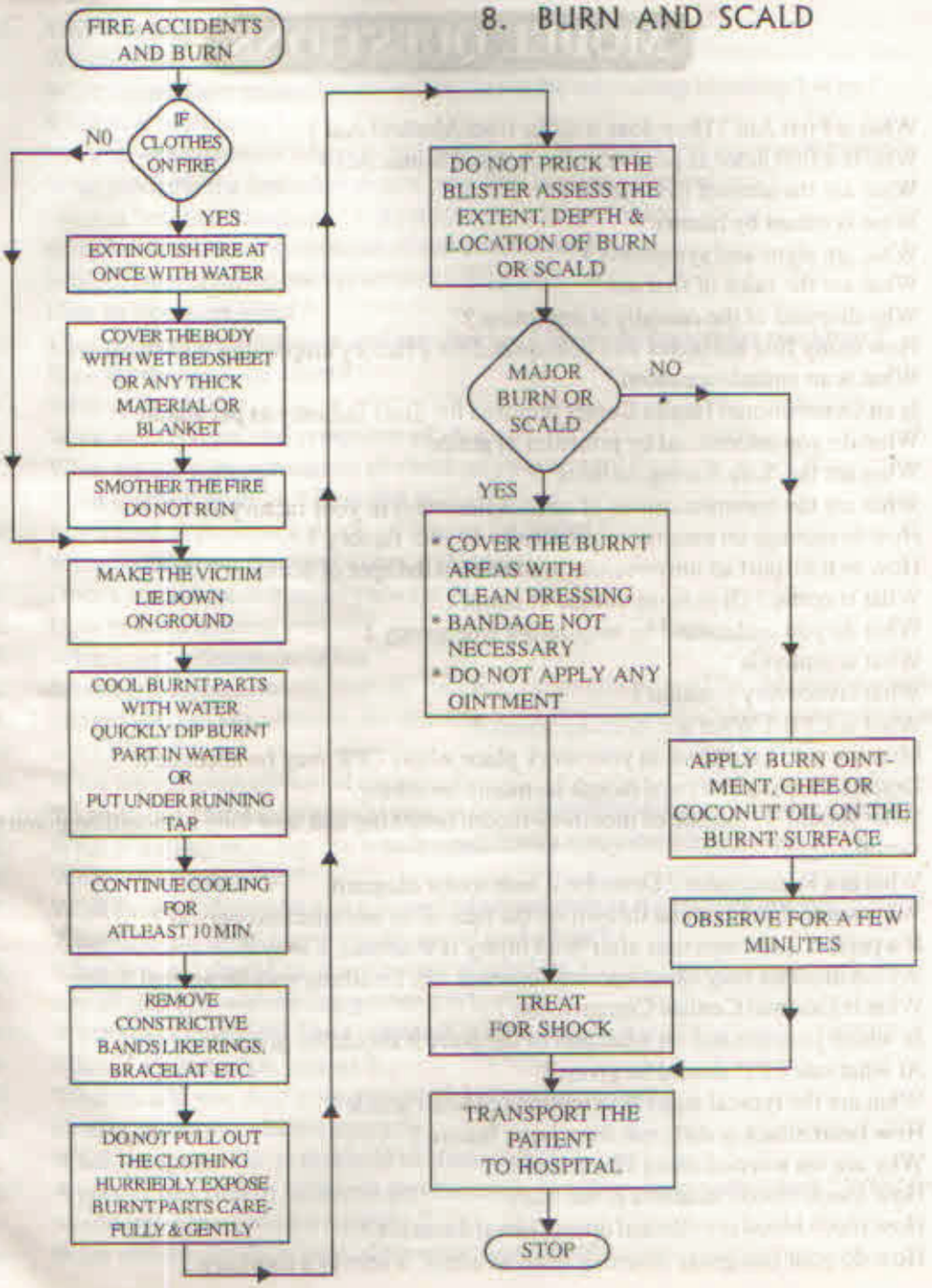
6. FRACTURE


FRACTURE
DO NOT DISTURB THE VICTIM UNLESS DANGER TO LIFE
RECOGNISE THE FRACTURE LOOK FOR PAIN & TENDERNES SWELLINGDEFORMITY & LOSS OF FUNCTION
STUDY THE SITE. NATURE AND COMPLICATIONS
TYPE OF FRACTURE
SIMPLE
COMPOUND
WOUND PRESENT
NO
YES
CHECK BLEEDING & DRESS THE WOUND
APPLY PADDED SPLINTS COVERING AT LEAST TWO JOINTS BELOW AND ABOVE LIMB #
APPLY BANDAGE TO KEEP SPLINTS IN POSITION DO NOT APPLY BANDAGE ON #
SPLINTS NOT AVAILABLE
NO
YES
USE IMPROVISED METHODS
TRANSPORT THE CASUALTY TO HOSPITAL
STOP

7. ELECTRIC SHOCK



8. BURN AND SCALD



MODEL QUESTIONS

1. What is First Aid ? How does it differ from Medical Aid ?
2. Who is a first aider as per Factories Act and Mines Act ?
3. What are the aims of first aid ?
4. What is meant by history ?
5. What are signs and symptoms ?
6. What are the rules of first aid ?
7. Why disposal of the casualty is important ?
8. How many first aid boxes will be required for a factory employing 2000 workers ?
9. What is an ambulance room ?
10. Is an Occupational Health Center required for Steel Industry as per statute ?
11. What do you understand by priorities of action ?
12. What are the 'Life Saving Actions' ?
13. What are the common causes of unconsciousness in your factory ?
14. How to manage an unconscious casualty in your factory ?
15. How to transport an unconscious victim from the spot of accident ?
16. What is coma ? Give some causes of coma ?
17. What do you understand by respiratory emergency ?
18. What is asphyxia ?
19. What is recovery position ?
20. What is CPR ? What are its components ?
21. Mention two conditions in your work place where CPR may be necessary.
22. Describe different steps of mouth-to-mouth breathing.
23. What should be the rate of mouth-to-mouth breathing and how long it should be given to a victim ?
24. What is a Resuscitator ? Describe it with a neat diagram.
25. Why water should not be thrown on the face of an unconscious person ?
26. If a person is unconscious after head injury is it serious ? Why ?
27. Which diseases may cause unconsciousness, but breathing may be normal ?
28. What is External Cardiac Compression ?
29. In which position and on what part of the body it should be given ?
30. At what rate ECC should be given ?
31. What are the typical signs & symptoms of heart attack ?
32. How heart attack is different from heart failure ?
33. Why are we worried about blood loss ?
34. How much blood circulates in out body ?
35. How much blood is collected during blood donation ?
36. How do your recognize bleeding from an artery, a vein or a capillary ?

37. Why bleeding should be controlled immediately ?
38. What is to be done first to stop bleeding ?
39. What are pressure points ? Are they important for controlling bleeding ? Why ?
40. What is a Tourniquet ?
41. Mention one condition where tourniquet should be applied without wasting time ?
42. What precaution a first adier should take after applying a tourniquet ?
43. What is 'internal bleeding' ? Is it a serious condition ? Why ?
44. What are the signs & symptoms of internal bleeding ?
45. Is bleeding from nose always serious ? Why ?
46. How to stop nose bleed ?
47. There is bleeding from nose and ear after head injury. Is it a serious condition ?
48. How to manage such cases ?
49. What is shock ?
50. What are the signs and symptoms of shock ?
51. What are the common causes of shock in your factory ?
52. What is shock position ? Describe it ?
53. In what other position a shock victim can be placed ?
54. What is difference between injury and wound ?
55. Does a wound cause bleeding always ?
56. How to dress a minor wound ?
57. What is an 'antiseptic solution'?
58. Which antiseptic solution from the first aid box should be used for cleaning a wound ?
59. Should you use any ointment for dressing a major wound which needs immediate medical aid ? Why ?
60. What are the steps of wound dressing ?
61. What advice a first aider should give to the victim after dressing a fresh wound?
62. What is a spray dressing ? In which conditions a spray dressing is used ?
63. What is an amputation ?
64. What first aid should be given in case of amputation at the level of ankle ?
65. What first-aid should be given in case of snake bite ?
66. What first-aid should be given in case of dog bite ?
67. Are ali dog bite wounds dangerous ? Why ?
68. What is a crush injury ? Is it serious ? Why ?
69. What is a penetration wound ?
70. What should you do if a weapon is sticking to the wound ?
71. How to recognise a bullet injury ?
72. What is a graze ? How it should be dressed ?
73. A person was shot by an arrow and the arrow is still sticking to the chest ? What first-aid would you give to such a casualty ?
74. What should you do in case of bleeding from mouth.

MODEL QUESTIONS

1. What is First Aid ? How does it differ from Medical Aid ?
2. Who is a first aider as per Factories Act and Mines Act ?
3. What are the aims of first aid ?
4. What is meant by history ?
5. What are signs and symptoms ?
6. What are the rules of first aid ?
7. Why disposal of the casualty is important ?
8. How many first aid boxes will be required for a factory employing 2000 workers ?
9. What is an ambulance room ?
10. Is an Occupational Health Center required for Steel Industry as per statute ?
11. What do you understand by priorities of action ?
12. What are the 'Life Saving Actions' ?
13. What are the common causes of unconsciousness in your factory ?
14. How to manage an unconscious casualty in your factory ?
15. How to transport an unconscious victim from the spot of accident ?
16. What is coma ? Give some causes of coma ?
17. What do you understand by respiratory emergency ?
18. What is asphyxia ?
19. What is recovery position ?
20. What is CPR ? What are its components ?
21. Mention two conditions in your work place where CPR may be necessary.
22. Describe different steps of mouth-to-mouth breathing.
23. What should be the rate of mouth-to-mouth breathing and how long it should be given to victim ?
24. What is a Resuscitator ? Describe it with a neat diagram.
25. Why water should not be thrown on the face of an unconscious person ?
26. If a person is unconscious after head injury is it serious ? Why ?
27. Which diseases may cause unconsciousness, but breathing may be normal ?
28. What is External Cardiac Compression ?
29. In which position and on what part of the body it should be given ?
30. At what rate ECC should be given ?
31. What are the typical signs & symptoms of heart attack ?
32. How heart attack is different from heart failure ?
33. Why are we worried about blood loss ?
34. How much blood circulates in out body ?
35. How much blood is collected during blood donation ?
36. How do your recognize bleeding from an artery, a vein or a capillary ?

37. Why bleeding should be controlled immediately ?
38. What is to be done first to stop bleeding ?
39. What are pressure points ? Are they important for controlling bleeding ? Why ?
40. What is a Tourniquet ?
41. Mention one condition where tourniquet should be applied without wasting time ?
42. What precaution a first adier should take after applying a tourniquet ?
43. What is 'internal bleeding' ? Is it a serious condition ? Why ?
44. What are the signs & symptoms of internal bleeding ?
45. Is bleeding from nose always serious ? Why ?
46. How to stop nose bleed ?
47. There is bleeding from nose and ear after head injury. Is it a serious condition ?
48. How to manage such cases ?
49. What is shock ?
50. What are the signs and symptoms of shock ?
51. What are the common causes of shock in your factory ?
52. What is shock position ? Describe it ?
53. In what other position a shock victim can be placed ?
54. What is difference between injury and wound ?
55. Does a wound cause bleeding always ?
56. How to dress a minor wound ?
57. What is an 'antiseptic solution'?
58. Which antiseptic solution from the first aid box should be used for cleaning a wound ?
59. Should you use any ointment for dressing a major wound which needs immediate medical aid ? Why ?
60. What are the steps of wound dressing ?
61. What advice a first aider should give to the victim after dressing a fresh wound?
62. What is a spray dressing ? In which conditions a spray dressing is used ?
63. What is an amputation ?
64. What first aid should be given in case of amputation at the level of ankle ?
65. What first-aid should be given in case of snake bite ?
66. What first-aid should be given in case of dog bite ?
67. Are ali dog bite wounds dangerous ? Why ?
68. What is a crush injury ? Is it serious ? Why ?
69. What is a penetration wound ?
70. What should you do if a weapon is sticking to the wound ?
71. How to recognise a bullet injury ?
72. What is a graze ? How it should be dressed ?
73. A person was shot by an arrow and the arrow is still sticking to the chest ? What first-aid would you give to such a casualty ?
74. What should you do in case of bleeding from mouth.

75. What first-aid should be given is case of vaginal bleeding ?
76. What is a fracture ? How does it differ from sprain and dislocation ?
77. What are the various types of fracture ?
78. What are the signs and symptoms of fracture ?
79. What are the principles of first-aid in case of fracture ?
80. What will happen if first-aid is delayed in case of a simple fracture ? In case of a complicated fracture ?
81. In which part of the body does the sprain occur commonly ?
82. What first-aid should be given in case of rib fracture, backbone fracture and skull fracture ?
83. How would you recognise a fracture of thigh bone ? What first-aid is to be given ?
84. A person fell without stretched hand and had a deformity at the wrist. What may be the injury ?
85. How to manage a compound fracture of right forearm ?
86. What is the difference between burn and scald ?
87. A person is burnt very badly. A blanket, a bucket of cold water and Burnol rubes are available. What should you use first ? Why ?
88. What is Rule of 9 ?
89. How do you calculate Body Surface Burnt ? What is its importance ?
90. Which cases of burn should be sent for medical aid immediately ?
91. What first-aid should be given to victim of acid burn of right hand ?
92. How does an electric burn look like ?
93. What first-aid would you give in case of a minor electric burn of hand ?
94. What are the complications of burn ?
95. What are the common causes of burn in your factory ?
96. What factors are to be considered while giving first-aid to a burn victim ?
97. What first-aid should be given for chemical burn in any part of body ?
98. What is sun burn ? How sun burn can be prevented ?
99. What type of burn may be caused due to high voltage current ?
100. What do you understand by 'foreignbody' in the eye ?
101. What should be done when a dust particle enters the eye ?
102. What happens when a flying particle penetrates the eye ? What are the signs & symptoms ?
103. What is 'black eye' ? What first-aid should be given in case of black eye ?
104. What injury may be caused due to exposure to welding rays ? What first-aid is to be given ?
105. What first-aid should be given if there is a bleeding in sclera (white portion) of eye ?
106. What is poison ?
107. How poisons enter the body ?
108. How do you detect oral poisoning ?
109. What should be done in case of suspected oral poisoning ?
110. What is an 'universal antidote ?'
111. What do you understand by gas poisoning ?

112. Which gases are responsible for gas poisoning in an integrated steel plant ?
113. What are the signs & symptoms of carbon monoxide poisoning ?
114. What first-aid should be given in case of Carbonmonoxide poisoning ?
115. How to manage pesticide poisoning ?
116. What do you understand by food poisoning ?
117. What are the signs & symptoms of food poisoning ?
118. What is the role of first-aider in case of food poisoning ?
119. What is a dressing ?
120. What materials are used for dressing ?
121. What is the meaning of antiseptic ? What is its importance in first-aid ?
122. What is antibiotic ? Why it is used ?
123. What dressing material should be used to dress a graze or alrasion ?
124. What material is used in case of dry dressing ?
125. What is a bandage ?
126. What are the types of bandage ?
127. How a roller bandage is applied ?
128. What are different parts of a triangular bandage ?
129. What are the uses of a triangular bandage ?
130. Why gauze pieces are used for dressing ?
131. What medicines should be kept in a first-aid box ?
132. Who should handle the first aid box in a factory ?
133. Are burnol, furacin ointment and dettol standard contents of first aid box ?
134. What better first aid material can be used for wound dressing & burn dressing ?
135. Why a casualty should be transported fast ?
136. In which different positions a casualty can be placed during transport to the hospital ?
137. How to transport a casualty with back injury ?
138. How to transport a case of severe abdominal injury ?
139. What are different types of stretcher used in first aid ?
140. What is the minimum and ideal number of persons required to carry a stretcher ?
141. Which stretcher bearer controls the movement of stretcher during transport ?
142. When a hard stretcher must be used ?
143. What should be the minimum equipment to be kept in an ambulance ?
144. What should be the colour of an ambulance ?
145. How an ambulance is differentiated from other vehicles on the road ?
146. What is a disaster ?
147. What is the role of first aider in case of disaster ?
148. What is to be done when disaster strikes ?
149. What preparations should be done in a factory to face a disaster ?
150. What is 'triage ?' Why it is necessary ?

❐❐❐

About the Author

Dr. J. K. Mahapatra, MBBS, MD, DIH, is an Occupational Physician of more than thirty years' experience. After passing MBBS (1965) and MD (1971) from S.C.B. Medical College, Cuttack, he was deputed by government to join Medical & Health Department of Rourkela Steel Plant. In 1973, he was sponsored for DIH training in All India Institute of Hygiene and Public Health and stood first in DIH Examination of Calcutta University in 1974. Thereafter, he was instrumental in developing Occupational Health Services in RSP and all the units of SAIL including mines. In 1988, he was deputed to the SAIL Safety Organisation at Ranchi to monitor the OHS Projects of SAIL at Corporate and Unit Level. At present OHS Centres have been established in all integrated steel plants, special steel plants and mines hospitals of SAIL. He is working as Joint Director (Medical & Health Services) JLN Hospitals and Research Centre, Bhilai and Incharge of the National Occupational Health Service Centre for Steel Industry, in Bhilai steel plant.

A widely-travelled person with varied experience in various capacities, Dr. Mahapatra has received training in Australia, Canada and Finland in the field of Occupational Health and Safety. He attended many National and International Conferences in the country and abroad and presented 120 papers. He is past General Secretary and past President of Indian Association of Occupational Health and Life/ Founder Member of many professional associations. He has authored three books on First Aid and published 32 Research Papers in medical journals. He has the credit of training more than eighteen thousand persons on First Aid belonging to industries, mines, police, nursing profession, NCC, school and college students and different voluntary organisations like Indian Red Cross, St. John's Ambulance Association and National Safety Council. Being a verstile writer, he has written many scientific articles in English and Oriya in different magazines and newspapers. He is Expert Member on Occupational Health in many regional and national committees. He is a faculty member in many Safety Training and Management Institutions.

He was Associate Editor of Indian Journal of Industrial Medicine and Editor of Safety, Health & Environment Scan published by SAIL Safety organisation.

He was awarded Sir Ardhesir Dalal Memorial Gold Medal instituted by the House of Tatas for delivering oration in IAOH Conference 1990 and received Britannia Award for presenting best scientific paper in Occupational Health during 1984.

● **Publisher**