**LECTURE NOTES**

For Health Science Students

# *First Aid and Accident Prevention*


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In collaboration with the Ethiopia Public Health Training Initiative, The Carter Center, the Ethiopia Ministry of Health, and the Ethiopia Ministry of Education

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# PREFACE

The need for first aid training is greater than ever because of population growth throughout the world due to the increased use of technological products, such as mechanical and electrical appliances in everyday use at home, working place and play areas. These make more and more people at risk of injury. Moreover, despite the limited amount of data available on injury epidemiology, it is becoming increasingly apparent that injuries will become an important contributor to morbidity and mortality in Ethiopia.

This is the reason why a need-based training program, which is target oriented and task based, was established to tackle major problems of the nation.

However, majority of Universities and Colleges who are training health science students in the country are in critical shortage of teaching learning materials, including first aid and accident prevention training materials.

In order to minimize these problems, the Ethiopian public Health Training Initiative, which is supported and sponsored by The Carter Center and USAID, recognized the problem. The problem was discussed among the Health center team training Universities and colleges (Jimma University, University of Gondar, Addis Ababa University, Hawassa University, College of Health Sciences and

Haramaya University). Finally agreement was reached among the Universities to develop lecture notes on different subjects.

This first aid and accident prevention lecture note series is set up to be simply utilized as a study and reference material by nurses and other category of health science students as well as teachers.

Each chapter in this material contains the following components.

(a). Objectives at the beginning of each chapter to guide students in their study,

(b). Bold face terms for students use.

(c). Study questions related to each chapter.

(d). Bibliography suitable for beginning students are listed at the end of material.

It is believed that this lecture note fills the gap created due to shortage of teaching learning materials and brings the Universities close together in terms of institutional teaching and learning strategies to minimize variations. Hopefully, this manual would be utilized effectively to minimize the shortage of material, prevent and alleviate morbidity, disability and mortality caused as a result of accidents and disasters in all human environment nationwide.

Initially, this teaching material was published in 2003 for diploma nurses. Currently due to the national change of educational policy, diploma programs are phased out from Universities. Therefore, this teaching material should be standardized to the degree level; that is why this lecture note series is needed to be revised for the second time.

# ACKNOWLEDGEMENT

First and foremost I would like to forward my gratitude to EPHTI (The Carter Center) and USAID for the initiative and all assistance to develop this lecture note series.

I would like to address my appreciation to Haramaya University, particularly to Professor Belay Kassa, president of the University and Ato Melake Demena, dean of faculty of health sciences for the continuous support and facilitation for the development of this material, as well as for the effort made to give value for the first publication. I would like to extend my appreciation to the faculty staff for their valuable support in the development of the draft. Furthermore I extend my deep appreciation to inter institutional reviewers from all sister institutions of all EPHTI members (Addis Ababa, Gonder, Jimma, Hawassa Universities and Defense University College).

I extend my gratitude to Professor Dr. Joyce Murrey, Nell Hodgson Woodruff School of Nursing, Atlanta Georgia and Ato Berhane Gebrekidan for their intensive and meticulous revision to finalize this lecture note, without it, it would have been impossible to finalize the material.

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## LIST OF ABBREVIATIONS

1. ***AIDS*** *– Acquired Immuno- deficiency Syndrome*
2. ***CO*** *– Carbon monoxide*
3. ***CPR -*** *Cardiopulmonary resuscitation*
4. ***HIV*** *– Human immunodeficiency virus*
5. ***NPO -*** *Nothing per os (nothing by mouth)*

# CHAPTER ONE

# INTRODUCTION

## 1.1. Learning Objectives

After studying the material in this chapter, the student will be able to:

1. Define first aid
2. Recognize the reasons why first aid is given
3. Appreciate values of first aid
4. Identify general directions for giving first aid

## 1.2. Definition

First aid is the immediate care given to a person who has been injured or suddenly taken ill. It includes home care if medical assistance is not available or delayed. It also includes well selected words of encouragement, evidence of willingness to help, and promotion of confidence by demonstration of competence (American red cross, 1998).

## 1.3. Reasons for First Aid giving

- To sustain (preserve) life.
  E.g. mouth to mouth respiration when breathing has stopped.
- To prevent worsening of the problem (complication).
  E.g. Immobilizing the fractured bone.
- To promote healing and recovery.

e.g., reassure the patient, relief pain, protect from cold and arrange patient transfer

**Values of First Aid Training**

The need for first aid training is greater than ever because of population growth through out the world and due to the increased use of technological products; such as mechanical and electrical appliances in everyday use at home, working place and play areas which make more people at risk of injury. Thus, there is an ever growing demand for first aid training for personal use and from the demand for certified first- aiders as part of industrial and commercial establishments. In general first aid is aimed to help for others, preparation for knowing what to do during disaster as well as to help self.

## 1.4. General directions to give first aid

Responsibility of a first -aider in the management of casualty:

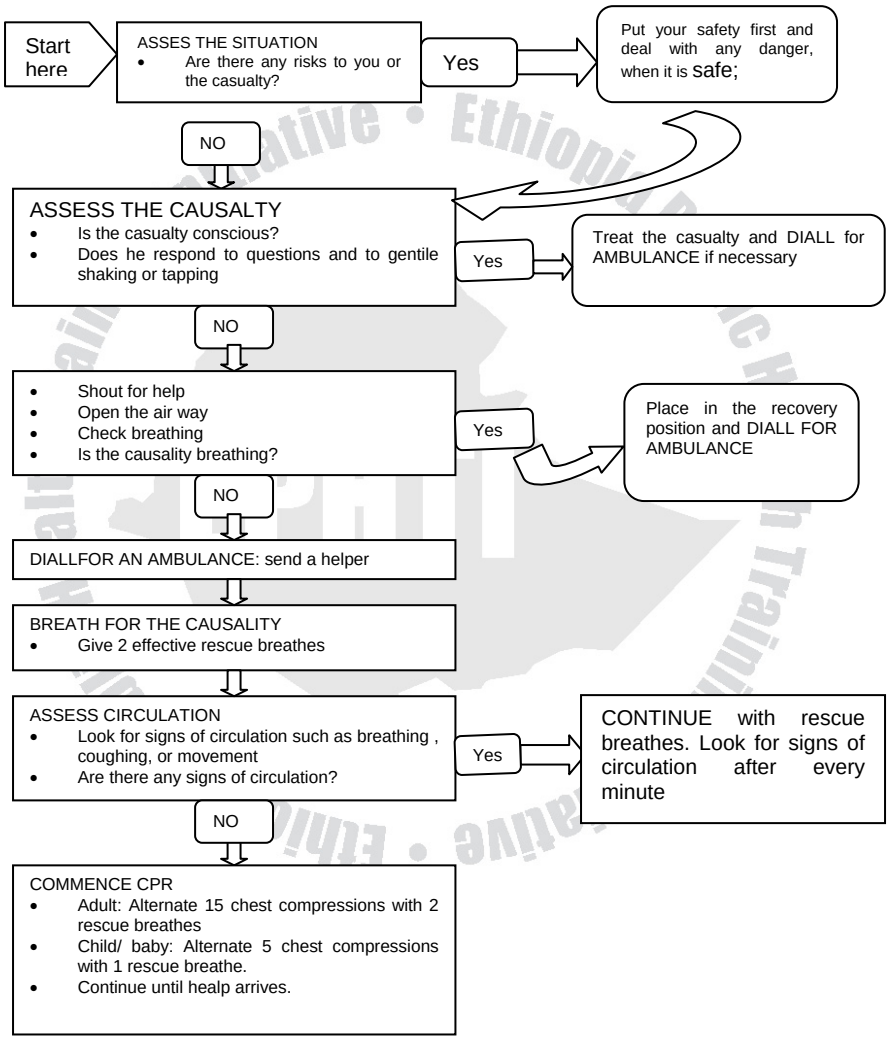
- Assessment of the situation
- Identify the problem
- Giving immediate and adequate treatment, bearing in mind that a casualty may have more than one injury and that some casualties will require more urgent attention than others (to give priority).
- Arrangement for the transport of casualty according to the seriousness of his/her condition with out delay accompanied with brief written report.
- Prevent cross infection

### 1.4.1. Assessment

- Be calm, take charge and be confident
- Talk, listen and reassure the conscious casualty
- Check safety of casualty and of yourself and check for breathing, bleeding and level of consciousness.
- Get others to help.

Assessing a casualty

Primary survey algorithm



Source: *First aid manual, Emergency procedures for everyone, at home, at work, at leisure, 8th edition(P.29)*

**1.4.2. Problem identification (Diagnosis)**

The history of the incident must be taken in to consideration and an examination made to determine the signs and symptoms and level of consciousness.

***History:-***The story of how the accident happened or the illness began can be obtained from:-

- The causality ( e.g. I slipped and fall down)
- A witness or a bystander(s) whether he/she saw the happenings

Points to be considered during history taking:

Any history of illness: Eg. Epilepsy, Diabetes mellitus,

For history of ingested material E.g. Drug, Alcohol, type of food or fluid

***Symptoms:-*** Sensations and feelings that are described by the casualty

E.g.

- I feel pain
- I feel cold
- my arm is numb

***Signs:-*** variations from normal ascertained by the first- aider.

E.g. Pallor of the inner surface of the eyelids or nail beds; blueness (cyanosis) of face, lips, fingers and toes. There may be evidence of poisoning e.g. medications, alcoholic smell, bottles and other containers beside the victims.

**Level of consciousness:-**

Recognition of any change of level of consciousness is important.

- Full consciousness- the casualty is able to speak and answer questions normally
- Drowsiness- the casualty is easily aroused but lapses in to unconscious state
- Stupor –the casualty can be roused with difficulty, aware of painful stimuli.

E.g. pin prick, but not of other external elements like being spoken to.

- Coma - cannot be roused by any stimuli.

In general make full use of your senses to obtain maximum information (Look, smell, listen and touch).

***Action:*** **-** If the cause of the condition is still active, remove the cause.

E.g. -a lodging of wood on the causalities leg, contaminated clothing or remove the causality from the cause, such as traffic, fire, water, poisonous fumes. etc.

***Table 1.*** **Essential Points to be considered while giving first aid treatment**

| To sustain (preserve) life. | To prevent worsening of the problem (complication). | To promote healing and recovery. | Finally |
|---|---|---|---|
| • Emergency resuscitation | • Prevent the condition from becoming worse (complication)<br>• Cover wounds | • Place the casualty in correct and comfortable position | • Convey the causality with out delay to home or to hospital<br>• Transport the victim<br>• In a serious case summon(inform) a health personal |
| • Control bleeding and shock | • Immobilize fractures, large wounds and any injured par<br>• Handle gently and carefully at all times<br>• Move as little as possible Protect from cold. | • Reassure<br>• Give any other treatment needed<br>• Relieve pain | • A brief written report should accompany the causality<br>• A tactful message should be sent to the family if necessary to tell the family4 what was happened and where he has been taken, unless it has been done by the police or other authority. |

## 1.5. Study Questions

1. Define first aid
2. Describe reasons why first aid is given
3. What are the values of first aid?
4. What are the general directions to be followed while giving first aid?
5. In the case of occurrence of an injury to a victim if the condition is still active, remove the cause or the victim from the cause.

   True False

# CHAPTER TWO

# RESPIRATORY EMERGENCIES AND ARTIFICIAL RESPIRATION

## 2.1. Learning Objectives

After studying the material in this chapter, the student will be able to:-

1. Define respiratory emergencies and artificial respiration.
2. Explain the breathing process.
3. Identify causes of respiratory failure
4. Prevent respiratory accident, give artificial respiration and manage respiratory accident.

## 2.2. Definition

Respiratory emergency is one in which normal breathing stops or in which breathing is reduced so that oxygen intake is insufficient to support life.

Artificial respiration is a procedure for making air to flow into and out of a person's lungs when his natural breathing is inadequate or ceases.

## 2.3. The breathing process

Natural breathing is accomplished by increasing and decreasing the capacity of the chest and the lung. Atmospheric air being under

pressure, rushes in and out with the increase and decrease of chest space.

During the inhalation phase of breathing (inspiration), the muscles of the chest lift the ribs, expanding the chest. At the same time the diaphragm contracts and descends toward the abdomen. In this way, the chest cavities increased in size and air flows in. When all muscles relax, the ribs and diaphragm resume their normal position, the chest cavity becomes smaller, and air flows outward. In all manual methods of artificial respiration, the objective is to cause an alternate decrease and increase in size of the chest cavity. When this is done, air flows in and out if there is no obstruction.

### 2.3.1. Causes of Respiratory Failure

***A. Anatomical Obstruction***

The most common cause of respiratory emergency is interference with breathing caused by the drooping of the tongue back and obstructing the throat. Other causes of obstruction that constrict the air passages are:

- Asthma
- Croup
- Diphtheria
- Laryngeal spasm
- Swelling after burns of the face
- Swallowing of corrosive poisons
- Direct injury caused by a blow

***B. Mechanical Obstruction***

- Solid foreign objects lodging in the respiratory passage e.g. choking of food
- Accumulation of fluids in the back of the throat (mucous ,blood or saliva)
- Aspiration (Inhalation of any solid or liquid substance)

***C. Air Depleted of Oxygen or Containing Toxic Gases***

- ***Asphyxia*** – Is a condition in which there is a lack of oxygen in the blood and the tissue do not receive an adequate supply of oxygen. It may occur due to decreased oxygen in the air or increased carbon monoxide (CO) or other toxic gases e.g., mining area, sewer etc.
- ***Explosion hazard*** -Combustible gases that accumulate in confined spaces where natural or manufactured gases are free in the air, and are explosive in certain concentrations. The explosion may result if a flame is introduced, if static electricity is discharged or if an electric switch doorbell, telephone or other device is used.

***D. Additional Causes of Respiratory Failure are:-***

- Drowning
- Circulatory collapse (shock)
- Heart disease

- Strangulation
- Lung disease e.g. pneumonia
- Poisoning by alcohol, barbiturate, codeine etc.
- Electrical shock
- Compression of the chest e.g. accident

## 2.4. Artificial Respiration and Management of Respiratory Accidents

**A. Objectives:-**

1. To maintain an open air way through the mouth and nose (or through the stoma)
2. To restore breathing by maintaining an alternating increase and decrease in the expansion of the chest.

***B. General Information***

- The average person may die with in 4- 6 minutes if his/her oxygen supply is cut off.
- Recovery is usually rapid except in case of carbon monoxide poisoning, over dosage of drugs or electrical shock. In such cases, it is often necessary to continue artificial respiration for a long time.
- When a victim revives he/she should be treated for shock.
- A physician's care is necessary during the recovery period.
- Artificial respiration should always be continued until :
  - The victim begins to breath by himself

- He/she is pronounced dead by a doctor or he/she is dead beyond any doubt

**C. Mouth- to- mouth (mouth- to- nose) method or" kiss of life"**

**Steps in mouth- to- mouth or mouth- to- nose respiration**

- Determine consciousness by tapping the victim on shoulder and asking loudly "Are you OK"?
- Tilt the victim's head back so that his/her chin is pointing upward. In this case the two procedures can be applied, i.e. head tilt- neck lift and head tilt and chin lift. (fig.1).
- Place your cheek and ear close to the victim's mouth and nose. Look at the victim's chest to see if it rises and falls; listen and feel for air to be exhaled for about 5 seconds.
- If there is no breathing, pinch the victim's nostrils shut with the thumb and index finger of your hand i.e. pressing on the victim's forehead.
- Blow air in to the victim's mouth.

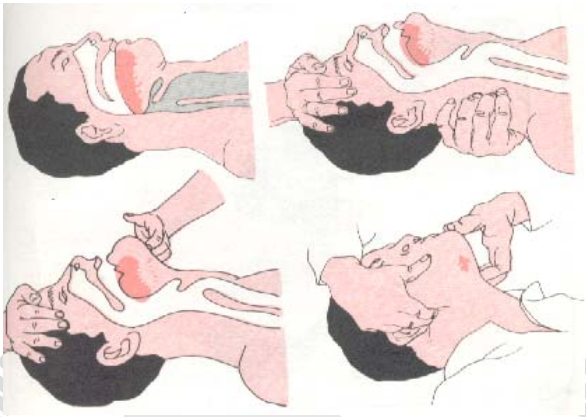


Figure 1 Steps of mouth to mouth respiration (steps of opening air way)

*Steps for mouth to mouth respiration:*

- Open your mouth wide.
- Take a deep breath.
- Seal your mouth tightly around the victim's mouth and with your mouth forming a wide open circle and blow into the victim's mouth (fig.2).
- Initially give four quick full breaths without allowing the lungs to fully deflate (empty) between each breath.
- Maintain the head tilt and again look, listen, and feel for exhalation of air and check the pulse for at least 5 seconds but not more than 10 seconds. If no pulse and breath do cardiopulmonary resuscitation (CPR).
- If there is pulse and no breath, provide at least one breath every 5 seconds or 12 per minute for adults and this provides sufficient air.
- If the airway is clear only moderate resistance to blowing will be felt.

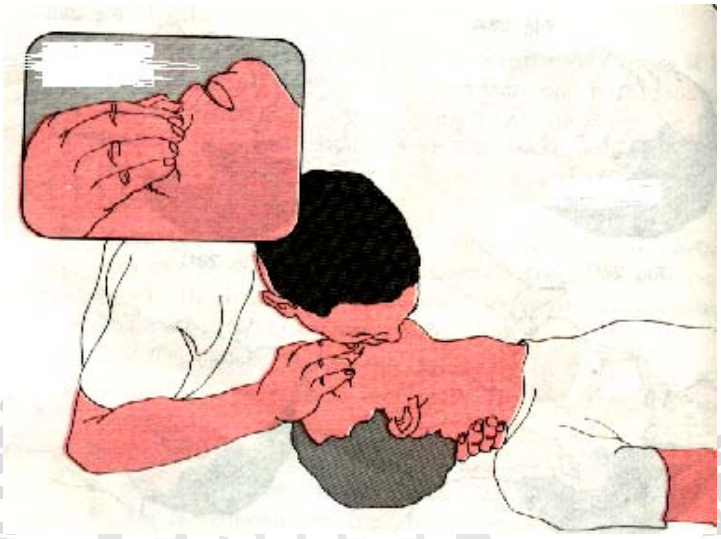


Figure 2 Mouth- to- mouth respiration

- Watch the victim's chest to see when it rises.
- Stop blowing when the victim's chest is expanded and check for exhalation
- Watch the chest to see that it falls.
- Repeat the blowing cycle.
- For the mouth -to -nose method maintain the backward head -tilt position with the hand on the victim's forehead and use your other hand to close the victims mouth. (fig.3).

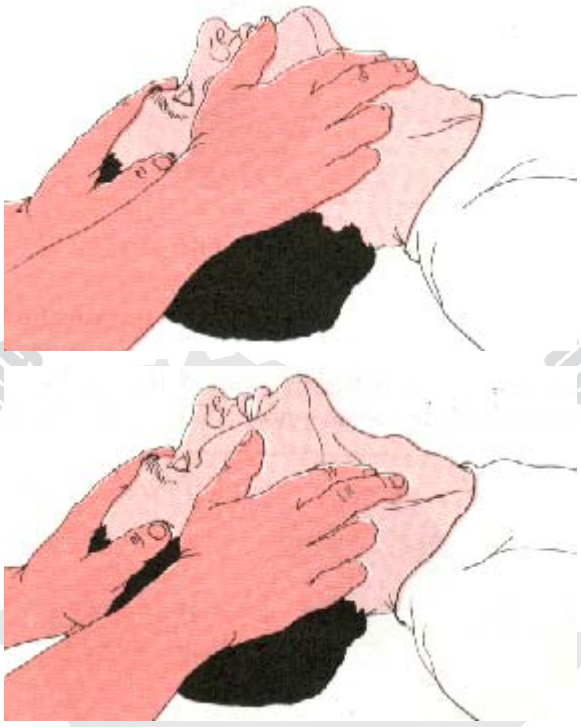


Figure 3 Steps in mouth -to -nose respiration

**Note:** Mouth- to- mouth and -nose resuscitation are administered for infants and children as described above except that the backward head tilt should not be as extensive as that of adult. Both the mouth and nose of the infant or child should be sealed off by your mouth. Blow in to the infant's mouth and nose once every 3 seconds (about 20 times per minutes). But in the case of children blow once every 4 seconds (about 15 times per minute). The amount of air is determined by the size of the victim.

**NB: -** Nowadays this practice is questioned by many people as to the possibility of transmission of HIV/ AIDS and needs maximum care or needs alternative procedure to save life in both cases (the victim and the first aider). Therefore this needs recent information for better practice.

***D. Obstructed airway - unconscious victim***

- If you are not getting air exchange, reposition the head and again attempt to ventilate.
- If you still do not get an air exchange immediately turn the victim on his side towards you, resting his chest against your knees and administer four sharp blows between the shoulder blades (fig.4).
- Place the victim on his back (supine) and spread legs wide apart, straddle his hips or one thigh. This position gives comfort for the first -aider.

Figure 4 First aid measure for obstructed air way

- Open the victim's airway and sweep with the fingers.
- If the procedures are ineffective, you must repeat the sequence.
  - Attempt to ventilate.
  - Perform four rapid back blows
  - Perform four thrusts (push on the chest )
  - Do finger sweep

  - If the stomach is building gastric distention, turn the adult victim to one side and clear the mouth after pressing your hand briefly and firmly over the upper abdomen between the rib margin and the navel. This procedure will force air out of the stomach. But it may also cause regurgitation.

***E. Obstructed Air Way - Conscious Victim:*** The urgency of this situation can not be over emphasized. Immediate recognition and proper action are essential if the victim has good air

exchange with only partial obstruction and is still able to speak or cough effectively. Do not interfere with his attempts to expel a foreign body. If the victim can not speak or cough, shows a distress signal, appears cyanotic or reveals an exaggerated effort to breathe, you must intervene appropriately.

***F. Ingested and Inhaled Objects (Choking)***

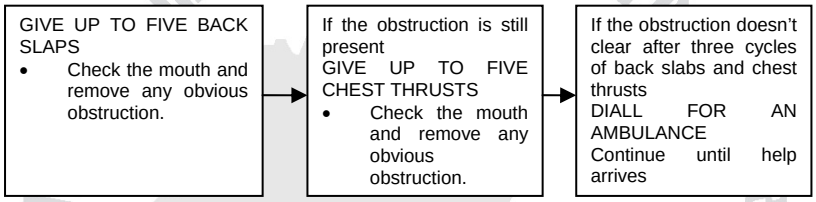
A small piece of food or a bone (foreign body), may be inhaled in to the wind pipe when eating. Most people on such occasions are able to cough it up at once. Some times, however, this may not be possible and help is needed.

Do not try to hook the foreign body out with your fingers; this is likely to push it further down. Do the following at once.

Figure 5 First aid measure during choking for adults and children's

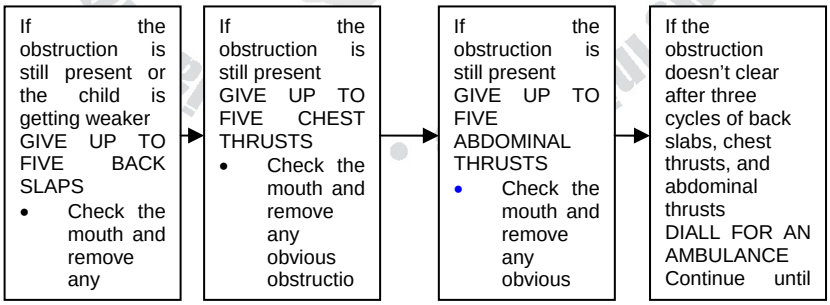
**For babies and small children (under one year)**

- Hold the baby up side down by the feet and smack him firmly between his shoulder blades three to four sharp slaps (fig.5).




***For Children (1-7 years)***

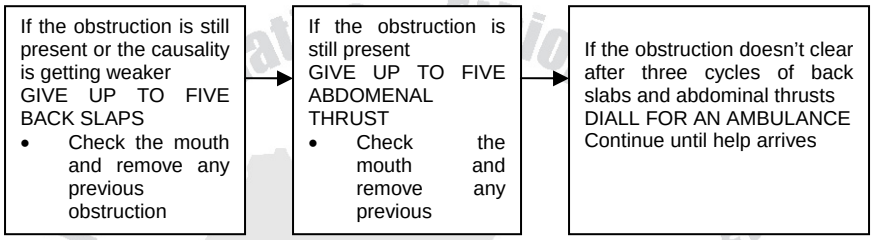
- Lie the child face down over your knee or arm and smack them sharply between their shoulder blades three to four sharp slaps.



**For Adults**

***Method - A***

Stand behind the patient and grasp them around the chest just under the chest bone (sternum). Give a sharp bear hug (fig.6).




***Method - B***

Tell the patient to lean over the back of the chair holding on to the seat and then bang him sharply three or four times between his shoulder blades.

Whichever method you use, the foreign body should be coughed out. When a very soft food, drink, blood or vomitus has been breathed in, place the patient in the recovery position and clear his mouth off any food or vomitus with your finger (wrapped in a soft clean cloth). If the breathing has stopped begin mouth-to -mouth respiration.

Figure 6. First aid measure during choking for adults

## 2.5. Drowning

It is the fourth leading cause of accidental death in the active age groups. Major drowning ranks second in fatality only to motor vehicle accidents; the majority occurs in the recreational play or leisure time activities in developed countries.

The aim of giving first aid for drowning is:

To restore adequate breathing

To keep the casualty warm

To arrange urgent removal to hospital

**First aid measure.**

1. If you are rescuing the casualty from the water to safety, keep the head lower than the rest of the body to reduce their risk of inhaling water.

2. Lay the casualty

Prevention of accidental drowning involves:-

- Supervision during swimming.
- Protection of the swimming area and the swimmer.
- Training of the swimming person and life savers.

## 2.6. Mechanical suffocation (Strangulation)

If pressure is exerted on the outside of the neck, the air way is squeezed and the flow of air to the lung is cut off. The main causes of such pressure are:

- Hanging- suspension of the body by rope around the neck or throat.
- Strangulation- constriction or squeezing around the neck or throat.

Sometimes, hanging or strangulation may occur accidentally- for example, by ties or clothing becoming caught in machinery. Hanging may cause a broken neck; for this reason, a casualty in this situation must be handled extremely carefully.

**Recognition (signs)**

- A constricting article around the neck
- Marks around the casualty's neck
- Rapid, difficult breathing; impaired consciousness; grey-blue skin (cynosis).

- Congestion of the face, with prominent veins and, possibly, tiny red spots on the face or on the whites of the eyes.

**Caution**

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

**First aid aim and interventions:**

**The aims are:**

- To restore adequate breathing.
- To arrange urgent removal to the hospital

**First aid measures are:**

1. Quickly remove any constriction from around the casualty's neck. Support the body while you do so if it is still hanging. Be aware that the body may be very heavy.
2. Lay the casualty on the ground. Open the airway and check breathing. If he/she is not breathing, be prepared to give rescue breaths and chest compressions if necessary. If he/she is breathing, place her in the recovery position.

Never give an infant plastic material to play with and be certain that mattress covers securely anchored to the bed.

## 2.7. Inhalation of fumes

The inhalation of smoke, gases (such as carbon monoxide), or toxic vapors can be lethal. A casualty who has inhaled fumes is likely to have low levels of oxygen in his/her body tissues and therefore needs urgent medical attention. Do not attempt to carry out a rescue if it is likely to put your own life at risk; fumes that have built up in a confined space may quickly overcome anyone who is not wearing protective equipment.

**Smoke inhalation**

Any person who has been enclosed in confined space during a fire should be assumed to have inhaled smoke. Smoke from burning plastics, foam padding, and synthetic wall coverings is likely to contain poisonous fumes. Casualties should also be examined for other injuries due to the fire.

**Inhalation of carbon monoxide**

Carbon monoxide is a poisonous gas that is produced by burning. It acts directly on red blood cells, preventing them from carrying oxygen to the body tissues. If the gas is inhaled in to the body in large quantities- for example, from smoke or vehicle exhaust fumes in a confined space- it can very quickly proves fatal. However, lengthy exposure to even a small amount of carbon monoxide- fore example, due to a leakage of fumes from defective heater or flue- may also result in sever, or possibly fatal, poisoning.

Carbon monoxide has no test or smell, so take care if you suspect a leak.

**Table 2: Effects of fumes Inhalation**

| Gas | Source | Effects |
|---|---|---|
| Carbon monoxide | Exhaust fumes of motor vehicles.<br>• Smoke from most fires<br>• Back-draughts from blocked chimney fumes<br>Emission from effective gas or paraffin hits | *Prolonged exposure from low levels:* Head ache<br>• Confusion, Aggression, Nausea and vomiting<br>• Incontinency<br>*Brief exposure to high level:*<br>• Grey-blue skin coloration with a faint red tinge<br>• Rapid difficult breathing, Impaired consciousness, leading to unconsciousness. |
| Smoke | Fires: Smoke is a bigger killer than fire it self. Smoke is low in oxygen (which is used up by the burning of the fire) and may contain toxic fumes from burning materials | Rapid, noisy, difficult breathing<br>• Coughing and wheezing, Burning in the nose or mouth, Soot around the mouth and nose, Unconsciousness |
| Carbon dioxide | Tends to accumulate and become dangerously concentrated in deep enclosed spaces, such as coal pits, wells, and underground tanks | Breathlessness<br>• Headache<br>• Confusion<br>• Unconsciousness |
| Solvent and fuels | Glues, Cleaning fluids, Lighter fuels, camping gas and propane-fuelled stoves. Solvent abusers may use a plastic bag to concentrate the vapour | Headache and vomiting, impaired consciousness, airway obstruction, from using plastic bags or from on vomit may result in death. Cardiac arrest is |

| | | |
|---|---|---|
| | (especially with glues) | potential cause of death, and this may occur following inhalation of the very cold gasses that are released from pressured containers. |

**The aim of first aid is:**

To restore adequate breathing and,

To obtain urgent medical attention and call the emergency services,

**Caution**

If entering a garage filled with vehicle exhaust fumes, open the doors wide and let the gas escape before entering.

**First aid measures**

1. HELP: Ask for both fire and ambulance services. If the causality's clothing is still burning, try to extinguish the flames.
2. CASUALITY HANDLING: If it is necessary to escape from the source of the fumes, move the causality in to the fresh air.
3. Support the casualty and encourage him/ her to breathe normally. Treat any obvious burns or other injuries.
4. Stay with the causality until help arrives. Monitor and record vital signs – level of response, pulse, and breathing.

Furtherly:

- Conditions that allow carbon monoxide to accumulate in closed spaces should be eliminated.
- Never forget to turn of gases cylinder

- Get casualty out door if it so happens
- Open doors and windows and obtain full supply of fresh air
- Resuscitate the casualty if needed
- Do not enter into carbon monoxide suffocated room.
- Be careful of open electrical devices.

**Warning**

If the causality is unconscious, open the air way and check breathing; be prepared to give rescue breathes and chest compressions if necessary. If he/ she is breathing, place him in the recovery position.

## 2.8. Electric current shock

When a person is electrocuted, the passage of electrical current through the body may shock him causing his breathing and even his heartbeat to stop. The electrical current may cause burns both where it enters the body and where it exits the body to go to “earth”. In some cases, the current causes muscular spasms that may prevent a casualty from breaking contact with it, so the person may still electrically charged (“live”) when you come on the sight. Electrical injuries usually occur in the home or workplace, due to contact with sources of low voltage current (opposite). They may also result from contact with sources of high voltage current (below), such as fallen power lines. People who are electrocuted by a high-voltage current rarely survive.

## 2.9. Lightning

A natural burst of electric city discharged from the atmosphere, lightening forms an intense trial of light and heat. The lightening seeks contact with the ground through the nearest tall feature in the landscape and, possibly, through any one standing nearby. A lightning strike may set clothing on fire, knock the causality down, and even cause instant death. Clear everyone from the site of lightening strike as soon as possible.

**First aid measures**

- Break the contact between the casualty and the electrical supply by switching off the current at the mains or meter point if it can be reached easily. Otherwise, remove the plug or wrench the cable free.

If you cannot reach the cable, socket, or mains do the following:

- To protect your self, stand on some dry insulating material such as a wooden box, a plastic mat, or a telephone directory.
- Using something made of wooden (such as a broom) push the causality's limbs away from the electrical sources or push the source away from the security.
- If it is not possible to break the contact with a wooden object, loop a length of rope around the causality's ankles or under the arms, taking great care not to touch him/her, and pull him/her away from the source of the electrical current.

- If absolutely necessary, pull the casualty free by puling at any articles of loss, dry clothing. Do this only as a last resort because the causality may still be “live”.

**Warning**

- Do not touch the causality if he/ she is contact with the electrical current; he will be “live” and your electrocution.
- Do not use any thing metallic to break the electrical contact. Stand on insulting material and use a wooden object.
- If the causality stops breathing, be prepared to give rescue breathes and chest compression until emergency help arrives.

## 2.10. External Cardiac Massage (Cardiopulmonary Resuscitation)

External cardiac message is a combination of artificial respiration and manual artificial circulation. The aim of heart message is to press the heart between the breast bone (sternum) and the backbone (spine) thus literally squeezing blood out of it.

Cardio pulmonary resuscitation involves the following steps

A- Air way opening

B- Breathing restored

C- Circulation restored

D- Definitive therapy

- Lay the patient on a firm flat surface.
- Kneel close to his side, at right angles to him and alongside his chest.
- Press the lower third of his breast bone sharply with the heels of your hands, using pressure from your shoulders. Do not bend your arms at the elbows.
- Check the carotid pulse every few minutes to see if the heart beat has re started. If you are succeeding the pupils of the patient's eyes will begin to get smaller. As soon as the patient revives, his neck (carotid artery) and heart recover, pulsate continuously; his/her enlarged pupils shrinks to the normal size.

*For adults, apply pressure at least 60 times per minute by using the heels of two hands placed one over the other. In children enough pressure is obtained by using the heel of only one hand at the rate of 80 to 90 per minute and for babies, use only two fingers at the rate of 100 per minute (fig.7).*The ratio of lung inflation and heart compression varies when there is one first aider (2:15) and two first aiders (1:5).

Figure 7 Cardiopulmonary resuscitation

## 2.11. Study Questions

1. Describe briefly, respiratory emergencies and demonstrate artificial respiration.
2. Discuss different causes of respiratory failure.
3. List steps of administration of artificial respiration.
4. Describe first aid measures for obstructed air way in unconscious and conscious victim.
5. Demonstrate the procedure of external cardiac massage.
6. External cardiac message is a combination of artificial respiration and manual artificial circulation.

A). True. B). False

# CHAPTER THREE

# WOUNDS AND BLEEDING

## 3.1. Learning Objectives

After studying this chapter, the student will be able to:-

1. Define wound and bleeding
2. Classify different types of wound
3. Identify common causes of wound
4. Give first aid measures for different types of wounds.
5. Apply first aid measures to stop severe bleeding.
6. Explain the preventive measures of contamination and infection of wounds.
7. Recognize different types of bite.

## 3.2. Definition of wound

A wound is a break in the continuity of the tissue of the body either internal or external.

**3.3. Common Causes of Wounds:** Wounds usually result from external physical forces. The most common accidents resulting in open wounds are accidental falls and handling of sharp objects, tools, machinery and weapons.

## 3.4. Classification of Wounds

1. Open wound: an open wound is a break in the skin or the mucus membrane.
2. Closed wound: a closed wound involves injury to underlying tissues with out a break in the skin or mucous membrane.

### *3.3. Types of Open Wounds*

- Abrasions
- Incisions
- Lacerations
- Punctures
- Avulsions

#### *3.3.1. Abrased Wound (fig.8)*

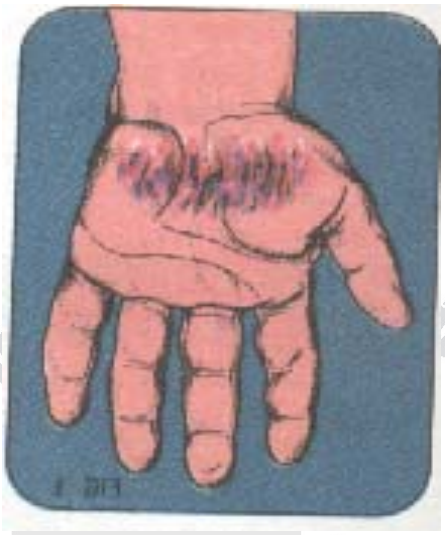


Figure 8. Abrased Wounds

- The outer layers of the protective skin are damaged. It usually results when the skin is scraped against a hard surface.
- Bleeding is limited.
- Danger of contamination and infection is high.

### 3.3.2. *Incised Wounds* (fig.9)

Figure 9 Incised Wound

- It frequently occurs when body tissue is cut on knives, rough edges of metal, broken glass or other sharp objects.
- Bleeding may be rapid and heavy.
- Deep cuts may damage muscles, tendons and nerves.

### *3.3.3 Lacerations (fig10)*

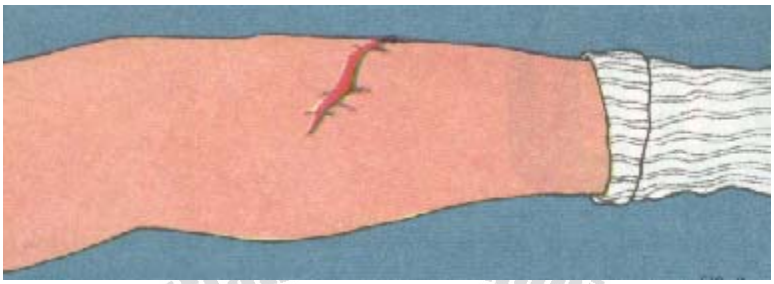


Figure 10 Laceration

- It is jagged, irregular or blunt breaking or tearing of the soft tissues and is usually caused when great force is exerted against the body
- Bleeding may be rapid and extensive.
- Destruction of tissue is greater in a lacerated wound than in a cut.
- Deep contamination of the wound increases the chance for later infection.

### *3.3.4. Puncture (fig.11)*

Figure 11 Puncture

- It is produced by an object piercing skin layers, creating a small hole in the tissue. It is produced by objects such as bullet and pointed objects like pins, nails and splinters.
- External bleeding is usually quite limited.
- Internal damage may have resulted to the organs causing internal bleeding.
- The hazard of infection is increased because of the limited flushing action of external bleeding
- Tetanus may develop.

### *3.3.5. Avulsions (fig.12)*

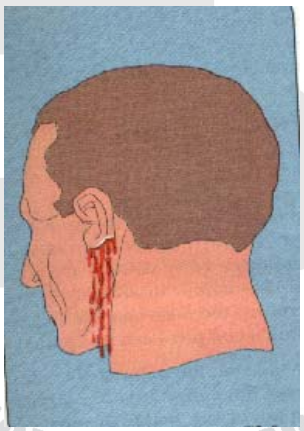


Figure 12 Avulsions

- It results when tissue is forcibly separated or torn off from the victim's body.
- An incised wound, a lacerated wound, or both will usually occur when a body part is avulsed.
- There will be heavy and rapid bleeding.

- An avulsed body part may be reattached to a victim's body by a surgeon. Send the body part along with victim to the hospital.
- Avulsed wound occurs in accidents such as motor vehicle, wrecks, gunshots, explosions, animal bites and other crushing injuries.

Bleeding: is loss of blood, usually through disease, injury, or other physical conditions.

Internal bleeding:

Bleeding inside body cavity may follow an injury, such as a fracture or a penetrating wounds, but can also occur spontaneously for example, bleeding from a stomach ulcer.

The main risk from internal bleeding is shock. In addition, blood can build up around organs such as the lungs or brain and exert damaging pressure on them.

You should suspect internal bleeding if a casualty develops signs of shock without obvious blood loss. Check for any bleeding from body openings (orifices) such as the ear, mouth, urethra, or anus.

**How to recognize internal bleeding**

- Initially, pale, cold, clammy skin. If bleeding continues, skin may turn blue- grey (cyanosis).
- Rapid, weak pulse
- Thirst
- Rapid , shallow breathing
- Confusion, restlessness, and irritability.
- Possible collapse and unconsciousness
- Bleeding from body openings (orifices)

- In case of violent injury, “pattern bruising” an area of discolored skin with a shape that matches the pattern of clothes, crushing objects, or restricting objects (such as seat belt).
- Pain
- Information from the causality that indicates recent injury or illness; previous similar episodes of internal bleeding; or use of drugs to control a medical condition such as thrombosis.(in which unwanted clots form in blood vessels).

**Table 3: *Possible signs of internal bleeding***

| *Signs of bleeding vary depending on the site of blood loss, but the most obvious feature is a discharge of blood from a body opening (orifice). Blood lose from any orifice is significant and can lead to shock. In addition, bleeding from some orifices can indicate a serious underlying injury or illness.* | | |
|---|---|---|
| Site | Appearance of blood | Cause of blood lose |
| Mouth | Bright red, frothy, coughed - up blood | Bleeding in the lungs |
| | Vomited blood, red or dark reddish brown, resembling coffee grounds | Bleeding with in the digestive system |
| Ear | Fresh, bright red blood | Injury to the inner or outer<br>• perforated ear dram |
| | Thin, watery blood | Leakage of fluid from |

| | | |
|---|---|---|
| | | around brain due to head injury |
| Nose | Fresh, bright red blood | Ruptured blood vessels in the nostril |
| | Thin watery blood | Leakage of fluid from around brain due to head injury |
| Anus | Fresh, bright blood | Piles, Injury to the anus or lower intestine |
| | Black, tarry, offensive- smelling stool (melaena) | Disease or injury to the intestine |
| Urethra | Urine with a red or smoky appearance and occasionally containing clots. | Bleeding from the bladder, kidney, or urethra. |
| Vagina | Either fresh or dark blood | Menstruation , Miscarriage, pregnancy or recent child birth, Disease of , or injury to, the vagina or uterus |

## 3.4. First Aid for Severe Bleeding

***Need for Immediate Action:***-The reason why intervention of first aider needed is to stop any large rapid loss of blood and to treat for shock and prevent death.

**Techniques to stop severe bleeding (described in order below)**

***Direct Pressure (fig.13)***

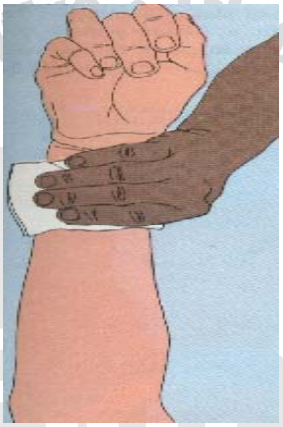


Figure 13 Direct Pressure

It is the preferred method for the control of severe bleeding since it prevents blood loss from the body with out interference with normal blood circulation.

- Apply direct pressure by placing the palm of the hand over a thick pad directly on the entire area of an open wound; protecting the hand from contact to the blood in order to prevent HIV/ AIDS transmission.

- In case of very severe bleeding, manual pressure over the main artery, nearest to the bleeding point, should be applied as well as direct pressure over the wound itself.
- Apply the pressure bandage, maintain a steady pull on the bandage, and then tie the bandage with the knot directly over the pad.
-

***Elevation (fig14)***

Figure 14 Elevation

- Unless there is evidence of a fracture, a severely bleeding open wound of the hand, neck, arm or leg should be elevated above the level of the victim's heart.
- Elevation uses the force of gravity to help reduce blood pressure in the injured area and slows down the loss of blood through the wound, however, it should be aided by direct pressure.

***Pressure on the Supplying Artery (Fig.15)***

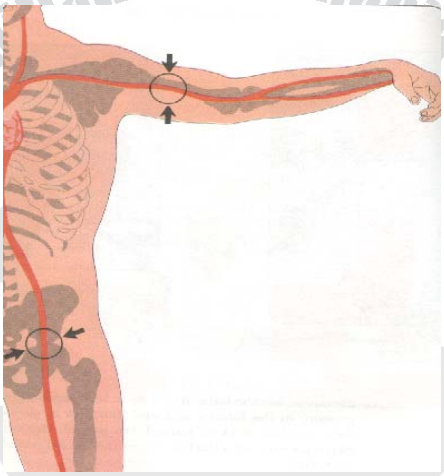


Figure 15 Pressure on supplying artery

- If severe bleeding from an open wound of the arm or leg does not stop after the application of direct pressure plus elevation, the pressure point technique may be required.
- Use the pressure point technique by temporarily compressing the main artery (which supplies blood to the affected limb) against the underling bone and nearby tissues the technique also stops circulation within the limb.
- Use it for short duration of time.

- Use the brachial artery for the control of severe bleeding from an open arm wound (it is situated in the inside of the arm between the biceps and triceps about mid way between the armpit and the elbow).

E.g. use femoral artery for the control of severe bleeding from an open leg wound.

***Tourniquet***

The use of a tourniquet is dangerous and the tourniquet should be used only for a severe life threatening hemorrhage that can not be controlled by other means.

*Precaution:* release the tourniquet every 15 minutes, and notify others as tourniquet is applied not to forget in its applied site.

## 3.5. Prevention of Contamination and Infection

Open wounds are subject to contamination and infection. This danger can be prevented or minimized by appropriate first aid measures, depending up on the severity of bleeding.

***A. Safeguards.***

Whenever a dressing is applied to control bleeding, whether bleeding is severe or not, safeguards must be taken

- Do not remove or disturb the cloth pad initially placed on the wound.
- Do not try to cleanse the wound, since the victim requires medical care.
- Watch for signs of shock before and during transportation.

- Immobilize the injured area.
- Adjust the victim in a lying position so that the affected limb can be elevated.

***B. Measures to be taken with wounds without severe bleeding***

To cleanse a wound, wash your hands thoroughly with soap and water.

- Wash in and around the wound to remove bacteria and other foreign materials (wash the wound from inside to outer side).
- Rinse the wound thoroughly by flushing with clean water.
- Blot the wound, dry with a sterile gauze pad or clean cloth.
- Apply a dry bandage or clean dressing and secure it firmly in place.
- Inform the victim to see a physician immediately if evidence of infection appears (see page 18 for signs and symptoms).

## 3.6. Removal of foreign objects

- In small open wounds, some foreign materials often remain in the skin, tissues or underlying surfaces. Such objects irritate the victim, and unless they are removed they can cause infection.
- Use tweezers, sterilized over a flame or in boiling water, to pull out any foreign matter from the surface tissue.
- Lift out those objects embedded just beneath the skin with a tip of a sterilized needle (with alcohol or flame).
- Deeply embedded foreign objects in the tissues, regardless of size should be left for removal by health personnel.

- The fishhook is probably one of the most common types of foreign objects that may penetrate the skin. If the fish hook goes deeper and the barb becomes embedded, it is advisable to be removed by pushing it through until the barb protrudes. Cut the hook either at the barb or at the shank and remove it. Clean the wound thoroughly and cover it with an adhesive compress. Consult physician for possibility of infection, especially tetanus.
- Some penetrating foreign objects such as sticks or pieces of metal may protrude loosely from the body. ***Under no circumstance should the victim be pulled loose from the fixed object.*** If the object is fixed or protrudes more than a few inches from the body, it should be left in place, be cut off at a distance from the skin, and be secured from being damaged.
- Immobilize the protruding end with massive dressing around the protruding part, and then transport the victim to a hospital without delay.

### *3.7. Dressing the Wound*

- Dressing a wound helps to protect it from additional injury and contamination, and to assist in the control of bleeding.

## 3.8. Infection

If bacteria get inside tissues of the body through breaks in the skin or mucous membranes, serious infection may develop within hours or days following an injury. These will result in delay of wound

healing. The first-aider should recognize this fact and combat against development of infection, e.g. Tetanus.

***Signs and Symptoms of Infection include the following*:**

- Swelling of the affected part
- Redness of the affected part.
- A sensation of heat
- Throbbing pain
- Fever
- Pus formation
- Swelling of lymph nodes depending on the affected sites.
- Red streaks leading from the wound (sign of spreading of infection through the lymphatic circulation).

***Emergency Care for Infection***

In case of delay of medical care the first-aider should do the following for infection.

- Keep the victim lying down and quiet, and immobilize the entire infected area.
- Elevate the affected body part if possible.
- Apply heat to the area with hot water bottle or placing warm, moist towels or clothes over the wound.
- Do not delay efforts to get medical care for the victim.

## 3.9. Bites and stings

Injuries produced by animal or human bites may cause punctures, lacerations or avulsions. Not only care for open wounds but also consideration must be given to the danger of infection, especially rabies.

***A. Human Bite***

Human bites that break the skin may become seriously infected because many bacteria exist in the mouth. Cleanse the wound thoroughly with clean water, dry, cover it and seek medical attention.

***B. Animal Bite***

The bite of any animal or a pet may result in an open wound. Dog and cat bites are common. A rabbi is a viral infection which can be transmitted from infected animals such as dogs and cats to human being. There is no known cure for rabies in human beings or animals once symptoms develop.

- A bite on the face or neck should receive immediate medical attention, because of the proximity to brain.
- Keep the animal under observation if possible at least for 10 days.
- Do not kill the animal unless absolutely necessary. Injuries produced by animal or human bites may cause punctures.
- Tetanus is an added danger in an animal bite. Any animal bite carries a great risk of infection

**First Aid Measures**

First aid measure for animal bite is similar to other types of wounds but in the case of dog bite:

- Wash the wound thoroughly with soap and water, flush the bitten area. Animal bit wounds are not recommended to be sutured and dressed.
- Make sure that the victim avoids movement of the affected part until he/she receives the medical attention.
- Refer the victim to health institution for medical attention.

*Proposed Optional Structure and content of first aid management of surface skin wounds:*

**Etiologic factor**

*Blunt*

- Direct blow to skin (e.g., fist, rock, stick)
- Indirect blow to skin surface (e.g., blast wave from gunshot)

*Penetrating*

- Puncture or cutting of skin surface (e.g., knife, glass, nail, blade neddle)

**Assessment Findings**

- Contusion
- Laceration
- Avulsion
- Abrasion

- Bleeding
- Pain
- Neurovascular compromise

**First aid interventions**

*Initial*

- Insure airway, breathing, and circulation before management of surface injury
- Identify and treat other more serious injuries.
- Control bleeding with direct pressure or by elevating the affected part. Initial bleeding may help remove dirt and contaminants from the wound
- Assess for impaled object. Stabilize for removal under controlled environment.
- Clean the wound using running water as an irrigating solution and mild soap as a cleansing agent.
- After bleeding has subsided and the area has been cleansed, protect the wound with sterile or clean dressing. Small cuts may be left open to the air. Extensive wounds may require a bulky dressing applied with pressure to minimize movement.

*Ongoing Intervention*

- Monitor vital sign
- Check neurovascular status of injured extremity

## 3.10. Study Questions

1. Define wound.

2. Mention different types of wounds
3. What are the common causes of wound?
4. Enumerate the steps of arresting severe bleeding.
5. Explain first aid measures for open wounds.
6. Explain preventive methods of contamination and infection of wound.
7. State possible causes of bites.
8. The immediate concern after dog bite is the fear of developing rabies.

A) True B) False

9. There is no known cure for rabies in human beings or animals once symptoms of rabbis developed.

A) True B) False

10) Tourniquet should be used only for a severe life threatening hemorrhage that can not be controlled by other means.

A) True B) False

# CHAPTER FOUR

# DRESSINGS AND BANDAGES

## 4.1. Learning objectives

After studying the material in this chapter the student will be able to:

1. Define dressing and bandaging.
2. Recognize the purposes of dressing and bandaging.
3. Recognize the general principles of bandaging.
4. Perform different applications of bandages.
5. Recognize different kinds of first aid kits and supplies.

## 4.2. Dressing.

### 4.2.1. Definition of dressing:

A dressing is the immediate protective cover placed over a wound. Sterile dressings are those which are free from germs prior to use and are preferable to unsterile dressings.

### 4.2.2. Purpose of Dressings

- To assist in the control of bleeding
- To absorb blood and wound secretions
- To prevent additional contamination
- To relieve pain

### 4.2.3. Types of dressing

**There are two types of dressing**

1. Adhesive dressing, this type of dressings are used for dressing small cuts and grazes. They consist of a gauze or cellulose pad and an adhesive backing.
2. Non adhesive dressing is a type of dressing used to dress large size area wound unlike that of adhesive dressing.

### 4.2.4. Dressing procedure

To apply clean dressing materials at home, hand washing, boiling the dressing materials for 15 minutes, and then drying the dressing materials with out contamination is the primary necessity.

If available, ironed clothes or the inner surface of a folded cloth can be used for immediate use. Do not touch or breathe or cough on the surface of a dressing that is to be placed next to wound.

## 4.3. Bandages

A bandage is a strip of woven material used to hold a wound dressing or splint in place. It helps to immobilize, support and protect an injured part of the body.

### 4.3.1. Functions of bandages

A. To assist in the control of bleeding

B. To absorb blood and wound secretion

C. To prevent additional contamination

D. To ease pain

E. Control or reduce swelling

F. Lift and transport casualty

G. Secure dressing and splint in position

H. Assist in immobilization

### 4.3.2. Kinds of Bandages

The most useful commercially available bandages include:

1. Gauze bandages usually in roles of 1 meter long and 3, 5 or 8 cm wide.
2. Elastic bandage of woven material in various widths and lengths.
3. Triangular bandages.
4. A binder of muslin (many tailed bandage) to be applied to the chest or abdomen (a large towel or part of a sheet can substitute for a binder). It is rarely used to cover large area of abdomen and chest.
5. Other emergency bandages can be formed from handkerchiefs, household linen, belts, ties, socks or stockings.
6. Combinations of dressing and bandages.
7. Special pads.

***A. Elastic Bandages***

They are expensive but can be laundered and used repeatedly for a number of purposes. In using elastic bandages the first -aider must

take great care not to stretch the material too tightly. Putting an elastic bandage too tight will hinder or constrict blood flow.

***B. Gauze Bandages***

Skill is necessary in applying a gauze bandage to prevent its slipping and stretching. Gauze can be used as a bandage, almost on any part of the body. Never apply wet gauze it will shrink as it dries and become too tight.

**A gauze bandage can be used in different ways:-**

- Circular bandages
- Spiral bandages
- Figure of eight bandages (for joint areas )
- Finger tip bandages ( formerly called recurrent )

***C. Triangular Bandages***

Triangular bandages are useful as an emergency cover for the entire scalp, and foot or any large areas. Such a bandage also is used as a sling for fracture or other injury of the arm or hand.

The triangular bandage can be used as a circular, spiral or figure of eight bandage. It can also be used as a tie for a splint, as a constricting band or as a tourniquet.

***D. Adhesive -Strip Dressings***

It is used for small wounds following through cleaning.

**Application of Bandages**

***General Principles***

- A bandage should be snug (not too loose and not too tight).
- To ensure that circulation is not interfered with.
    - Leave the person's fingertips and toes exposed.
    - Watch for swelling, change of color and coldness of the tips of fingers or toes indicating interference with circulation.
    - Loosen bandages immediately if the victim complains of numbness or tingling sensation.
    - Never apply a tight circular bandaged about a person's neck. It may cause strangulation.

## 4.4. Methods of applying bandages on different locations.

***A. Arm Sling (fig.16)***

- Prepare a triangular bandage.
- Place one end of the bandage over the injured shoulder and let the other end hang down in front of the chest parallel to the side of the body.
- Carry the point behind the elbow of the injured arm.
- Carry the second end of the bandage up over the shoulder and tie the two ends together at the side of the neck not over the spine.
- Bring the point of the sling and tie it.
- Make sure the ends of the fingers extend just beyond the base so that you can observe whether or not the circulation is cut off.

- In all cases of fore arm or hand injury adjust the sling so that the hand is elevated 10 or 12 cm above the level of the elbow.

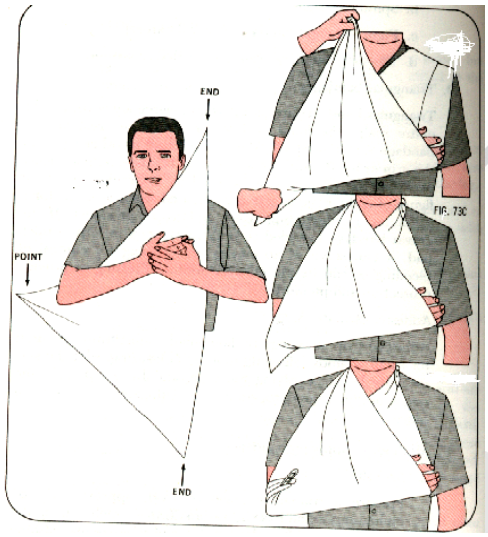



Figure 16 Application of arm slings

***B. Triangular Bandage Folded as a Cravat (Neck Tie)***

To make a cravat bandage bring the point of a triangular bandage to the middle of the base then fold length wise along the middle until you obtain the desired width.

***C. Triangular Bandage for the Scalp and Fore Head (fig.17)***

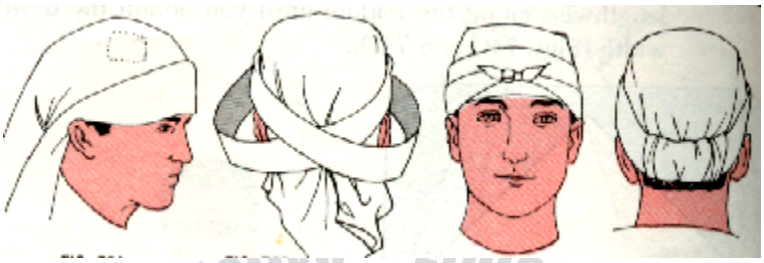


**Figure 17** Application of bandages for scalp and forehead

- Fold a hem about 5 cm wide along the base.
- Place, compress and put the dressing in place with the hem on the outside.
- Place the bandage on the head so that the middle of the base lies on the forehead close down to the eyebrows and the point hangs down the back.

***D. Cravat Bandage for Forehead, Ears or Eyes (fig.18)***

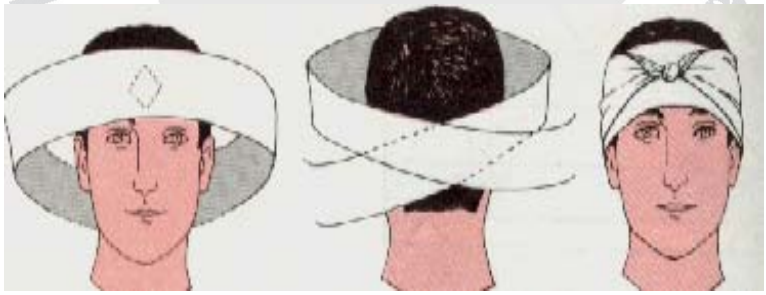


Figure 18 Application of Cravat Bandage for forehead, ears or eyes

- Place the center of the cravat over the compress that covers the wound.

- Carry the ends around to the opposite side of the head and cross them.
- Bring them back to the starting point and tie them.

***E. Cravat Bandage for Cheek or Ear (fig.19)***

Use a wide cravat, start with the middle of the cravat over the dressing that covers the cheek or ear.

- Carry one end over the top of the head and the other under the chin.
- Cross the ends at the opposite side, brining the short end back around the forehead and the long end around the back of the head.

**Figure 19.** Application of cravat bandage for cheek or ear

***Anchoring a bandage (fig.20)***

- Place the end of the bandage on a base at the starting point.
- Encircle the part allowing the corner of the bandage end to protrude.

- Turn down the protruding tip of the bandage and encircle the part again.

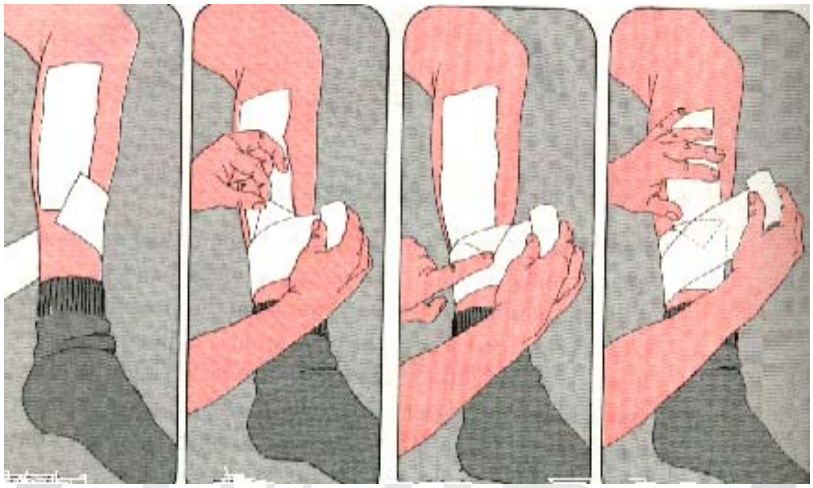


Figure 20 Anchoring a bandage

***Securing of a bandage***

There are several ways to secure a bandage in place (safety pin, applying adhesive tape, bandage clip, tucking in the end and tying).

***Methods of bandaging***

***Circular turn (fig.21)***

Simply encircle the part with each layer of bandage super imposed on the previous one. It is simplest of all bandage turns, however, its use is limited to covering parts of uniform width such as the toes and head.

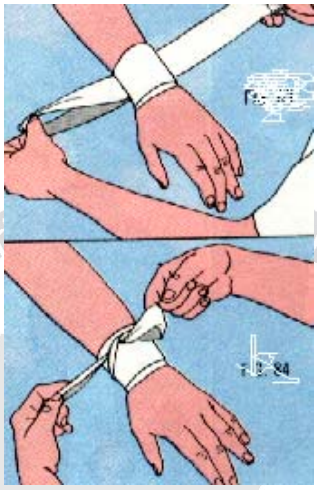


Figure 21 Circular turning of a bandage

**Open and closed spiral bandage of the limb**

It is a continuous encircling of the area to be covered with spiral turns spaced and closed. The bandage is completed by tying off. It is used temporary for splinting and holding a large burn dressing in place.

**Figure of eight bandage for hand and wrist (fig.22).**

- Anchor the bandage with one or two turns around the palm of the hand.
- Carry it diagonally across the front of the wrist and around the wrist.

- Again carry it diagonally across the front of the wrist and back to the palm. It is repeated as many times as necessary to fix the dressing properly.
- Complete it by tying off.

**Figure 22.** Figure of eight bandage for hand and wrist

**Finger tip bandage (fig.23)**

This is a series of back and forth runs called recurrent turn held in place by circle and spiral turns.

- It is normally used to bandage fingers; the bandage may be adapted to bandage the toes, scalp or stumps of limbs.
- This bandage is held in place with circular turns.
- From the finger or toe, take the end of the bandage diagonally across the back of the hand to the wrist, encircle one or more times from the opposite side of the wrist.
- Continue to the finger and loop.

- Repeat the figure of eight several times and tie off at the wrist.
- Secure by tying.

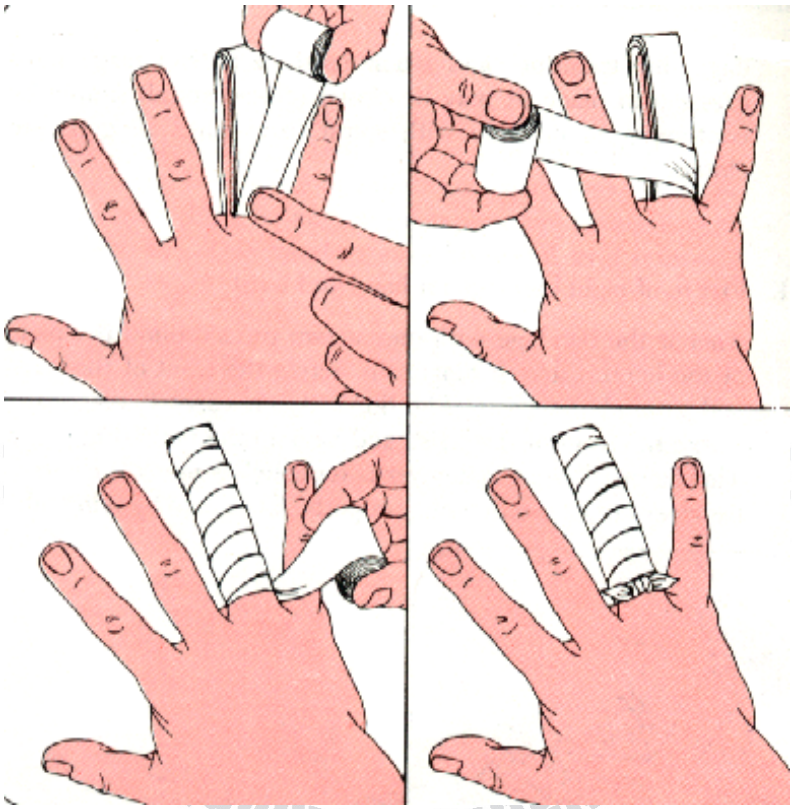


Figure 23 Finger tip bandage

**Figure of eight bandage for the ankle joint (fig.24)**

- Anchor the bandage on the instep and take two or three additional turns around the instep and foot.

- Carry the bandage diagonally upwards across the front of the foot then around the ankle and diagonally downwards.
- Occasionally use an extra turn around the ankle and complete by

  tying off

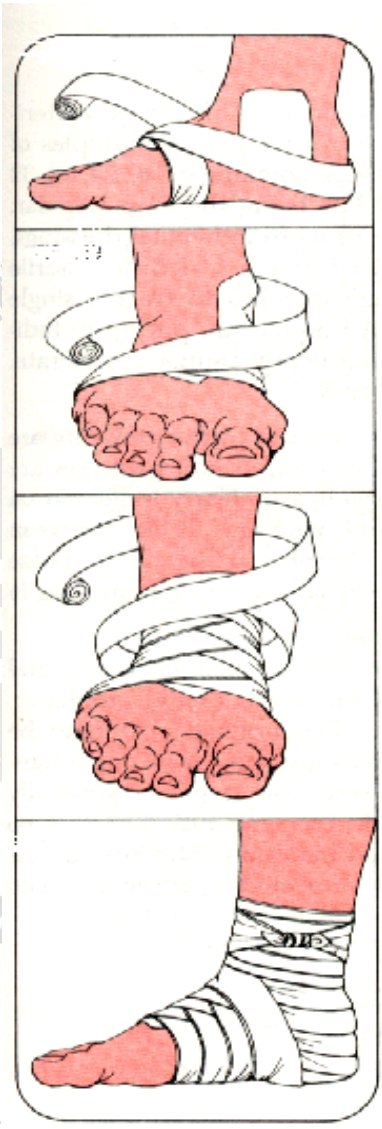


Figure 24 Figure of eight bandage for the Ankle Joint

## 4.7. Study questions

1. Define Dressing
2. What is the purpose of dressing and bandaging?
3. Mention the general principles of bandage application.
4. Enumerate different kinds of bandage.
5. Identify different kinds of first aid kits and supplies.
6. Triangular bandages are mainly useful as an emergency cover for the tip of finger.

A) True B) False

# CHAPTER FIVE

# SPECIFIC INJURIES

## 5.1. Learning objectives

After studying the materials in this chapter the student will be able to:-

1. Describe eye injuries, its sign and symptoms and first aid measures.
2. Give first aid for scalp and brain injuries.
3. Provide first aid measures for face and jaw injuries.
4. Apply first aid management of ear and nose injuries.
5. Explain precautionary measures for neck injuries and open wounds of the abdomen.

## 5.2. Eye injuries

### 5.2.1. Foreign bodies in the eye

Foreign objects are often blown or rubbed into the eyes. Such objects are harmful not only because of the irritating effect but also because of the danger of their scratching the surface or becoming embedded in the eye.

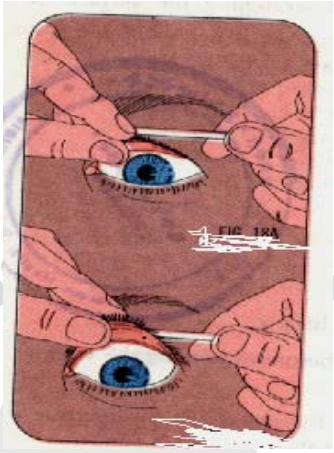


Figure 25 Eye injuries

***Signs and symptoms***

- Redness of the eye.
- Burning sensation.
- Pain.
- Headache.
- Over production of tears.
- Swelling.
- Wound.
- Presence of foreign body.

**Precautions**

- Keep the victim from rubbing his eye.
- Wash your hands thoroughly before examining the victim's eye.
- Do not attempt to remove a foreign object by inserting a match stick, tooth pick, or any other instrument.

- Refer the victim if some thing is embedded in the eye, or if something is thought to be embedded but can not be located.

**Removal of a foreign body from the surface of the eye ball or from the inner surface of the eyelid.**

- Pull down the lower lid to determine whether or not the object lies on the inner surface.
- If the object lies on the inner surface, lift it gently with the corner of clean handkerchief or paper tissue.
- If the object has not been located, it may be lodged beneath the upper lid.
- While the victim looks down, grasp the lashes of the upper lid gently.
- Pull the upper lid foreword and down over the lower lid. Tears may dislodge the foreign object.
- If foreign object has not been dislodged, depress the victim's upper lid with a match stick or similar object placed horizontally on the top of the cartilage and evert the lid to its place by pulling down gently (fig.25).
- Flash the eye with water.
- If the object is not removed, apply a dry dressing and refer to hospital.

**5.2.2. Injury of the eyelid**

- Stop hemorrhage by gently applying direct pressure.

- Clean the wound and apply a sterile or clean dressing. Seek medical help with out delay.
- Bruises above and below the eye should be treated by immediate cold application to lessen bleeding and swelling.

### 5.2.3. Blunt Injury of the eye

- A contusion occurs from direct blow, such as fist, a vehicle accident or explosions and results in black eye.
- In serious case, the structure of the eye may be torn or ruptured.
- Secondary damage may occur by the effect of hemorrhage and later by infection.
- Vision may be lost.
- Bleeding may occur after several days.
- The victim should be seen by a physician, preferably by eye specialist.
- A dry sterile or clean dressing should be applied and the victim should be transported lying flat.

### 5.2.4. Penetrating injuries of the eye

Such injuries of the eye are extremely serious and can result in blindness. Therefore, urgent referral must be arranged.

**First aid measures**

- Do not try to remove the object or to wash the eye.
- Cover both eyes loosely with a sterile or clean dressing. Secure with tape or bandage and cover both eyes to eliminate movement of the affected eye.

- Keep and transport the victim by stretcher.
- Take the victim to emergency room of hospital to get quick medical attention.

**5.3. Head injuries**

**5.3.1. Scalp injuries**

Wounds of the scalp even if small tend to profusely bleed. Deep scalp wounds may be complicated by fragment from skull fractures or they may contain hair, glass or other foreign material.

**First aid measures**

- Do not try to clean scalp wounds.
- Control bleeding by raising the victim's head and shoulder; do not bend the neck (fracture may be present).
- Place a sterile dressing on the wound.
- Apply a bandage to hold the dressing in place and to provide pressure.

**5.3.2. Brain injury**

May occur not only from wounds of the scalp and open or closed fracture of the skull, but also in the case of an illness such as a stroke or tumor.

**Signs and symptoms**

Clear or blood tinged cerebrospinal fluid draining from the nose or ears following skull fracture.

- Temporary loss of consciousness.

- Other manifestations of brain injury includes:
    - Partial or complete paralysis of muscle of extremities of the opposite side and facial paralysis on the same side of brain injury.
    - Disturbance of speech.
    - Local or generalized convulsions.

**5.3.3. Bleeding from the nose, ear canal or mouth which is indicative of skull fracture.**

- Pale or flushed face.
- Fast and weak pulse.
- Headache and dizziness.
- Vomiting.
- Unequal size of pupils.
- Loss of bowel and bladder control.

***First aid for suspected brain injury***

- Call for ambulance, and obtain medical assistance as quickly as possible.
- Keep the victim lying down and treat for shock.
- Give particular attention to insuring an open air way.
- Control hemorrhage.
- Do not give fluid by mouth to the victim (keep NPO).
- Apply dressing and bandage over the skull if wound is present.
- Record the level of consciousness.

## 5.4. Face and jaw injury

It often occurs as a result of automobile accidents or other type of violent injuries. The immediate problems are obstruction of the air passage by blood, saliva, and other secretions; swelling and severe hemorrhage.

**First aid measures**

- Call for ambulance and seek immediate medical assistance.
- Maintain an open air way.
- Provide continuous support to the head to prevent air way obstruction.
- If the victim is conscious help to lean foreword to drain secretion from mouth and cough up.
- Give artificial respiration if necessary.
- Treat for shock.
- Apply protective dressing as necessary.

## 5.5. Ear injuries

### 5.5.1. Cuts and lacerations

Any torn and detached part of the ear should be saved and accompany the victim to medical facility.

**First aid measures**

- Apply dressing with light, even pressure:

- Raise the victim's head.

### 5.5.2. Perforation of the eardrum

It may result from blast, blow on the head, diving, sudden change in atmospheric pressure or disease of the middle ear.

**First aid measures**

- Put a small gauze or cotton loosely in the outer ear canal for protection.
- Obtain medical care.
- Do not insert instrument or any kind of liquid in to the ear canal.

**N.B.** Perforation of ear drum associated with skull fracture requires special attention.

- Don't clean the ear.
- Don't stop the flow of cerebrospinal fluid from the ear.
- Turn the victim on to his injured side (unless there is some reason not to do so) to allow fluid to drain away.

## 5.6. Nose injuries and nose bleeds

Injury to the soft tissue of the nose may or may not include fracture. Nose bleeding can result from injury or disease such as hypertension. It can also occur after cold, stressful activity or exposure to high altitude.

**First aid measures**

- Keep the victim quiet.
- Keep the victim in sitting position head tilted foreword.
- Inform the victim to breathe through the mouth.
- Apply direct pressure to the bleeding nostril by pinching.
- Instruct the victim not to blow his mouth
- Apply cold compress to nose and face of the victim.
- If bleeding does not stop, insert a small clean pad of gauze into one or both nostrils and apply pressure externally with thumb and index finger.
- If it does not stop, obtain medical assistance.
- Make sure that nasal bone fractures, like all other fractures, have medical attention.

## 5.7. Neck injuries

Blunt force exerted on the face, mouth or jaw may produce tissue damage and in the process, the body fluids draining in to the air passages may block the air way.

Blockage may also result due to hard blow on the front of the neck especially if the laryngeal area is affected and throat tissue are bruised, In such case the following is necessary.

- Apply mouth- to -mouth or mouth- to- nose respiration.

- Obtain immediate medical assistance in case emergency tracheostomy is needed.
- Place the victim at rest on his back (supine position) to relax the abdominal muscles.
- Control bleeding.
- Give first aid for shock.

### 5.8. Chest injury

*Table 4: Chest Trauma and Thoracic injuries*

| *Common Traumatic Chest Injuries and Mechanisms of Injury* | |
|---|---|
| **Mechanisms of injury** | **Common related injuries** |
| **Blunt Trauma**<br>• Steering –wheel injury to chest<br>• Shoulder harness seat belt injury<br>• Crushing injury(e.g., heavy equipment, crushing thorax) | Rib fractures, flail chest, hemopneumothorax, pulmonary/ cardiac contusion, great vessels tears.<br>Fractured clavicle, dislocated shoulder, rib fracture, pulmonary, cardiac contusion, cardiac temponade.<br>Pneumothorax and hemopneumothorax, flail chest, great vessel tears and rupture |
| **Penetrating trauma**<br>• Gun shoot or<br>• Stab wound to chest | Open Pneumothorax, tension pneumo thorax, hemopneumothorax, cardiac |

| | |
|---|---|
| | tamponade, esophageal damage, trachea tear, and great vessels tears. |

**Examples and first aid managements of chest traumas**

Etiologies

**Blunt trauma**

- Motor vehicle accident
- Pedestrian accident
- Accidental fall
- Assault with blunt injury
- Crush injury
- Explosion

**Penetrating trauma**

- Knife
- Gunshot
- Stick
- Arrow
- Spear
- Other sharp objects

**Assessment Findings**

**Respiratory findings**

- Dyspnea, respiratory distress
- Cough with or with out hemopthisis
- Cyanosis of mouth, face, nail beds, mucous membranes
- Tracheal deviation
- Audible air escaping from chest wound
- Frothy secretions

**Surface findings**

- Bruising
- Abrasions
- Open chest wound
- Asthmatic chest movement
- Subcutaneous emphysema

**First aid measures**

***Initial***

- Ensure patient air way
- Remove clothing to assess injury
- Cover sucking chest wound with non porous dressing taped on three sides
- Stabilize impaled objects with bulky dressing. Do not move.
- Stabilize flail rib segment with hand followed by application of large pieces of tape horizontal across the flail segment.
- Assess for other significant injuries and treat appropriately.
- Place patient in a semi-Fowler's position or position victim on the injured side if breathing is easier after cervical spine has been ruled out.

**Ongoing Monitoring**

- Monitor vital signs, levels of consciousness, respiratory status, and urinary output.
- Release dressing if tension pneumothorax develops after sucking chest wound is covered.

## 5.9. Open wounds of the abdomen:

Wounds of the abdomen are particularly dangerous because of the risk of damage of the internal organs.

**First aid measures**

- Don't try to replace protruding intestines or abdominal organs but cover with sterile dressings.
- Hold the dressing in place with a firm bandage, but don't tighten the bandage.
- Don't give food or fluid because surgery may be necessary.
- Keep the victim's head and shoulders elevated to avoid breathing difficulty.
- Seek medical attention as rapidly as possible and take extreme care to gently transport the victim.

## Study questions

1. Mention the kinds of eye injuries, their signs and symptoms and their first aid measures.
2. Describe first aid measures for head injury.
3. State first aid measures for face and jaw injury.
4. Describe the first aid measures for head injuries.
5. Demonstrate first aid management of ear and nose injuries.

6. What are the precautions for neck injuries and open wounds of abdomen?
7. Perforation of ear dram can not be result from diving or, atmospheric pressure but can only happen from a disease of the middle ear.

   A) True  B) False

# CHAPTER SIX

# SHOCK

## 6.1. Learning Objectives

After studying the material in this chapter, the student will be able to:-

1. Define shock
2. Identify different causes of shock.
3. Explain signs and symptoms of shock.
4. Describe first aid measures of shock.

## 6.2. Definition

Shock is a condition resulting from a depressed state of many vital body functions due to decreased tissue perfusion. It is a condition that could threaten life.

Traumatic shock, electrical shock, insulin shock, hypovolemic shock and other special forms of shock are among the various types of shock. Even though the victim's injuries would not otherwise be fatal, shock can threaten the life of the victim.

## 6.3. Causes

- Hemorrhage
- Severe vomiting and diarrhea.
- Burn.
- Infection.
- Heart attack or stroke.
- Poisoning by chemicals gases, alcohol or drugs.
- Other causes like stress, pain, temperature instability, and delay of treatment.
- And many other underlining causes.

### 6.4. Signs and Symptoms

- Pale or bluish skin and mucus membrane, cold extremities to touch.
- Moist and clammy skin.
- Weakness.
- Rapid and weak pulse and too faint to fell at the wrist but perceptible in the carotid artery (figure 26).
- Rapid and shallow breathing especially in case of abdominal and chest injury.
- Low blood pressure.
- Restlessness, anxiety severe thirst, vomiting or retching.

- The victim becomes apathetic and relatively unresponsive.
- The victim's eyes are sunken with a vacant expression, and his pupils may be totally dilated.
- Unconsciousness and hypothermia, finally death.

Figure 26 How to feel signs and symptoms of shock

## 6.5. Treatment Objectives

- To identify and treat the cause.
- To improve circulation.
- To ensure an adequate supply of oxygen
- To maintain normal body temperature.

- To transfer the patient to health facility immediately.

## 6.6. First Aid Measures

***A. Body Position***

- It must be based on type of injuries. The most satisfactory position for the injured person will be lying down to improve the circulation of the body.
- If injury is on the neck or spine, don't move the victim until he is prepared for transportation.
- A victim with severe wounds of the lower part of the face and jaw or who is unconscious should be placed on his side to facilitate drainage of fluids and to avoid air way blockage.
- A person with a head injury may be kept flat or propped up but his head must not be lower than the rest of his body.
- Raise foot of the stretcher or bed from 20-30 inches for other types of injuries.

***B. Regulating Body Temperature***

Keep the victim warm enough to avoid or over come chilling. If the victim is exposed to cold or dampness, blankets or additional clothing should be placed over and under him to prevent chilling.

***C. Administering Fluids***

- Give fluids by mouth if there is no medical help near by, discontinue fluids if the victim becomes nauseated or vomits.
- Don't give fluid by mouth if:
- Victim is unconscious
- Victim is vomiting or about to vomit and having a convulsion.
- When a victim likely to have surgery or anesthetic or have brain or abdominal injury.

**N.B.** When the victim is conscious give plenty of fluids prepared from half teaspoon of salt, two to three table spoon of sugar or honey and some orange or lemon juice in a litter of water. Encourage the victim to drink as often as possible especially until he/ she urinates frequently.

## 6.7. Study Questions

1. Define shock.
2. List different causes of shock.
3. What are the main signs and symptoms of shock?
4. What are the first aid measures for shock?
5. Shock is a condition resulting from a depressed state of many vital body functions due to decreased tissue perfusion that could threaten life even though the victim's injuries would not otherwise be fatal.

   A) True B. False

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# CHAPTER SEVEN

# BONE AND JOINT INJURIES

## 7. 1. Learning Objectives

After studying this chapter, the student will be able to:

1. Define fracture, dislocation, sprain and strain.
2. Recognize first aid principles for bone and joint injuries.
3. Explain specific fractures, their sign and symptoms and first aid measures.
4. Demonstrate first aid management for dislocation.
5. Apply first aid management for sprain.
6. Mention the precautionary measures which help to prevent strain.
7. Recognize preventive measures of accidents that result in muscloskeletal injuries.

Multiple injuries to the skeletal system including the bones joints and ligaments and to the adjacent soft tissue are common in all types of major accidents.

## 7.2. Fracture

A fracture is a break or crack in the continuity of bone.

### 7.2.1. Types of Fracture

1. *Closed fractures*- closed (simple) fractures are those not associated with open wounds on the surface of the body (fig.27).

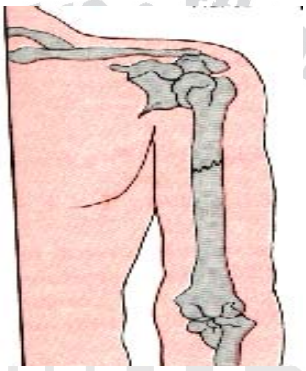


Figure 27 Closed fractures

2. *Open fractures* – open (compound) fractures are those associated directly with open wounds (fig.28).

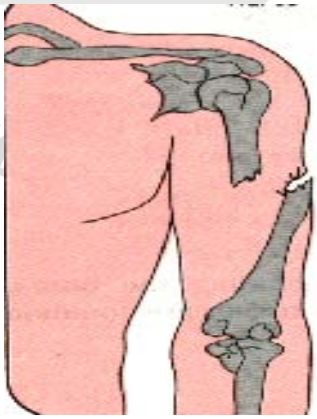


Figure 28 Open fracture

### 7.2.2. Causes of Fracture

The most common causes of fractures are motor vehicle accidents or accidents related to falls, recreational and sports activities.

### 7.2.3. Signs and Symptoms

- The victim may have heard or felt a bone snap.
- Pain, swelling, tenderness and difficulty of moving the injured part.
- Grating sensation of broken bones rubbing together.
- Abnormal movement in an area of the body.
- Difference in shape and length of corresponding bones on the two sides of the body.
- Obvious deformities.
- Discoloration.

### 7.2.4. Objectives of first aid

- To prevent blood lose
- To keep the broken bone ends and the adjacent joints from moving.
- To transport the victim to hospital
- To give care for shock.
- To relief pain

### 7.2.5. First aid principles

- Rescue if necessary and protect against further injury.
- Maintain an open air way and apply artificial respiration if indicated.
- Call for an ambulance or medical assistance if indicated.
- Prevent movements of the injured parts and the adjacent joint.
- Elevate involved extremities if possible without disturbing the suspected fracture.
- Apply splint if ambulance service is not available and if medical assistance for diagnosis and treatment is delayed. If an open fracture is evident or suspected treat the wound as outlined previously and do the following:
- Remove or cut away the victims clothing.
- Control hemorrhage by applying pressure through a large sterile or clear dressing over the wound.
- Don't wash, or probe or do not insert your fingers in to the wound.
- If a fragment of bone is protruding, cover the entire wound with sterile dressing.

- Do not replace any bone fragments.

### 7.2.6. Splinting

Splints are metallic, wooden or other devices applied to the arms, legs or trunk to immobilize the injured part when a fracture is suspected (fig.29). They also protect against further injury during transportation for medical treatment. There are many varieties of splints commercially available and they can also be made locally from different materials.

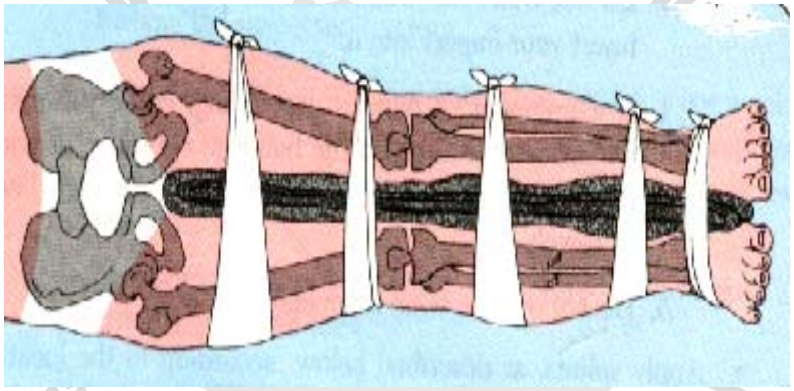


Figure 29 Splinting the legs

#### 7.2.6.1. General principles of splinting

- The splint should be long enough to extend past the joints on either side of a suspected fracture.
- It should be adequately padded between the splint and the skin especially over bony places.
- It can be held in place by stripes of clothes and other available materials.

- Joints must be immobilized above and below the location of the fracture.
- In fractures of arms, check for pulse; inspect the fingers for color and swelling which is good indication for a bandage that is too tight.
- If there is numbness, tingling sensation, or inability to move fingers or toes loosen ties immediately; otherwise permanent nerve damage may result.
- Inform the victim not to move the part below the fracture site.
- Never test for fracture by moving the victim's broken body part.
- Don't allow a victim to move his head or don't move it yourself when possible neck or spine injury is present.
- Straighten and splint a deformed limb as necessary.

## 7.3. Specific Fractures

### 7.3.1. Scalp Injuries and fracture of the skull

Wounds of the scalp, even if small, tend to profusely bleed. Deep scalp wounds may be complicated by fragment from skull fractures or they may contain hair, glass or other foreign materials.

### 7.3.2. First Aid Measures

- Do not try to clean scalp wounds.
- Control bleeding by raising the victim's head and shoulder; do not bend the neck (fracture may be present).
- Place a sterile dressing on the wound.
- Apply a bandage to hold the dressing in place and to provide pressure.

## 7.4. Brain Injury

May occur not only form wounds of the scalp and open or closed fracture of the skull but also in the case of an illness such as a stroke or tumor.

### 7.4.1. Signs and symptoms

Clear or blood tinged cerebrospinal fluid draining from the nose or ears following skull fracture.

- Temporary or long-lasting loss of consciousness depending upon the severity of the injury.
- Other manifestations of brain injury include:
  - Partial or complete paralysis of muscle of extremities of the opposite side and facial paralysis on the same side of brain injury.
  - Disturbance of speech.
  - Local or generalized convulsions.
  - Bleeding from the nose, ear canal or mouth, which is indicative of skull fracture.
  - Pale or flushed face.
  - Fast and weak pulse.
  - Head ache and dizziness.
  - Vomiting.
  - Unequal size of pupils.
  - Loss of bowel and bladder control.

### 7.4.2. First aid for suspected brain injury

- Call for ambulance, and obtain medical assistance as quickly as possible.
- Keep the victim lying down and treat for shock.
- Give particular attention to insuring an open air way.
- Control hemorrhage.
- Do not give fluid by mouth to the victim (keep NPO).
- Apply dressing and bandage over the skull if wound is present.
- Record the level of consciousness.

## 7.5. Face and jaw fracture

It often occurs as a result of automobile accidents or other type of violent injuries. The immediate problems are obstruction of the air passage by blood, saliva, and other secretions; swelling and severe hemorrhage.

### 7.5.1. First aid measures

- Call for ambulance and seek immediate medical assistance.
- Maintain an open air way.
- Provide continues support to the head to prevent air way obstruction.
- If the victim is conscious help to lean foreword to drain secretion from mouth and cough up.
- Give artificial respiration if necessary.

- Treat for shock.
- Apply protective dressing as necessary

### 7.6. Fracture of the scapula

Fracture of the scapula (shoulder blade) is generally the direct result of the impact of a fall or an automobile collision. Dislocations of the shoulder joint, sprains and contusions are common in this area. First aid consists of applying a sling and bandaging the victim's upper arm to his chest wall (fig.30).

Figure 30 Applying arm sling for fracture of the scapula

## 7.7. Fracture of the clavicle

Fractures of the clavicle (collar bone) usually occur in the weakest portion, which is one third of the distance from the tip of the shoulder to the sternum.

**7.7.1. First Aid Measures:** Consists of applying a sling to elevate and immobilize the arm and shoulder blade.

**7.8. Fracture of the humerus (The bone of the upper arm)**

***7.8.1. First aid for a closed* humerus *fracture***

- Place a pad in the victim's arm pit, apply a splint or improvised splint tied in place above and below the break area (fig.31).
- Support the forearm with a sling that doesn't produce upward pressure at the fracture site.
- Bind the victim's upper arm to his chest wall.

Figure 31 Applying a splint for upper arm fracture

**7.8.2. First aid measure for an open fracture**

- Remove the victim's cloth

- Control bleeding by applying direct pressure and elevating the part
- Cover the wound with a large sterile or clean dressing and apply a splint that does not press against the area of the break.
- Do not attempt to cleanse the wound and push a protruding bone back
- Arrange for transportation as soon as possible

**N.B.** Remember that the three places to immobilize a fracture of the upper arm are:

- Broken bone ends
- Shoulder
- Elbow

## 7.9. Elbow fracture

Elbow fractures may involve the lower part of the humerus or the upper bones of the forearm.

### 7.9.1. First aid measures

- Place the victim's forearm in a sling and bind it to his body (if the elbow can be bent).
- If the elbow cannot be bent, immobilize the fracture at the upper arm, at the elbow and at the wrist against the chest and the abdomen and at the hip.
- Lie the victim down and elevate the arm.
- If a splint is not available, wrap a pillow about the arm centering it at the elbow and tie or pin the two sides together.

## 7.10. Fracture of fore arm and wrist

The two bones of the fore arm (ulna and radius) may be fractured individually or together.

### 7.10.1. First aid measures

Fractures in the mid portion of the fore arm and wrist are treated in the same way as fractures of the shaft of the humerus.

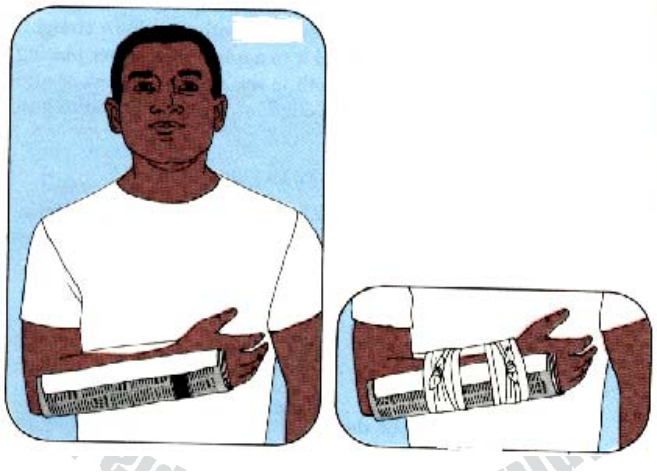


Figure 32 Splinting the fore arm

- Immobilize the broken bone ends at the wrist and the elbow, by applying well –padded splints on each side (fig.32).
- Bend the elbow and apply a sling with a slight elevation keeping the thumb pointing upward.

## 7.11. Fracture of the spine

The back bone, or spinal column is composed of 33 bones called vertebrae. It encloses the spinal cord which passes through circular openings in the separate vertebras. Fracture of the neck or back are extremely dangerous because the slightest movement may cause further damage to the spinal cord and result in paralysis.

### 7.11.1. First aid measures for fracture of the neck (Cervical Vertebrae)

Do not allow the victim's head to be bent foreword or backward or to move from side to side.

- If the victim is lying on his back, a small pad or towel may be placed in the space under his neck (do not put a pillow under his head).
- Place rolled up clothing, blankets or sand bags around to prevent movement.
- Anchor the restraining materials with bricks or stones.
- Seek medical advice and send for ambulance with trained personnel.

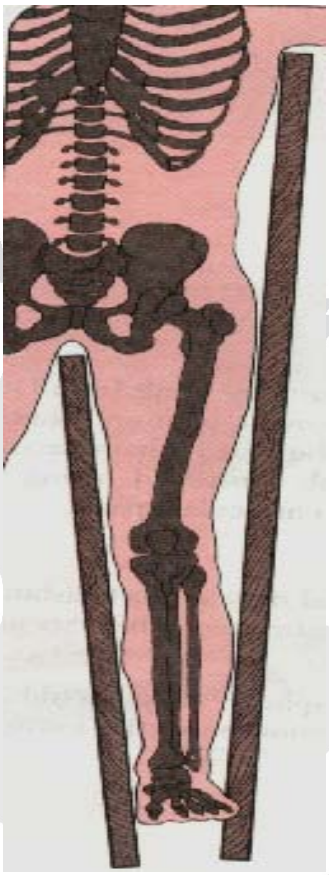
### 7.11.2. First aid for fracture of the back (Thoracic and lumbar vertebrae)

- Handle as gently as possible (avoid unnecessary movement).
- Send for an ambulance.
- Until help arrives leave the victim in the position in which he was found.

- Do not twist the neck or back.
- Arrange rolled up blankets or clothing on both sides of the trunk, head and neck for immobilization.
- If a person with a fracture of the back must be turned to obtain an open air way, make sure to obtain enough help so that the entire body is turned as a unit and no part twists or turns faster than other parts.
- While transferring the victim, the body should be held as a unit with the head, shoulder, trunk, the hip and the legs, each supported by one person.

## 7.12. Fracture of the upper leg

Fractures of the shaft of the femur usually result from falls or traffic injuries. The victim is in severe pain and shock and markedly disabled. The foot is characteristically turned outward and the limb shortened owing to overlapping of the bone ends due to muscular spasm.



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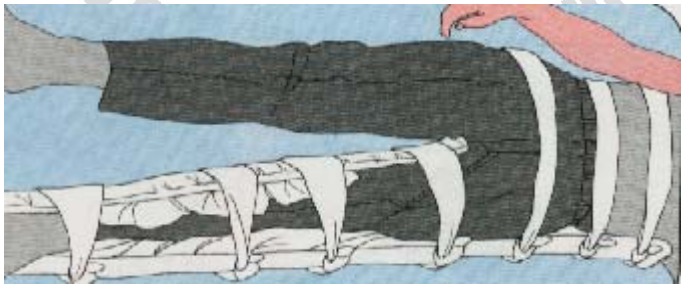

B

Figure 33 A and B Splinting fracture of the upper leg

### 7.12.1. First aid measures

- If the victim is to be transported only for short distance on a stretcher, place a blanket between the legs and bind them together.
- To apply the board splint, assemble needed supplies.
- If you use improvised board splints, they should be well padded and should reach from the victim's armpit on the outer side and groin or the inner side to below his heel(fig.33A).
- The bandages will be tied on the following areas: just below the arm pit, at the abdomen, at the hip, above and below the fracture site, at the lower leg and ankle and foot with figure of eight bandage (fig.33B).
- Don't try to cleanse open wound (if present).
- If possible apply a traction splint for the fracture of the shaft of the femur.

## 7.13. Fracture of the kneecap (Patella)

The patella is in front of the knee Joint. It is fractured usually by direct injuries sustained when control of the knee is lost, with the front thigh muscles pulling violently on the kneecap.

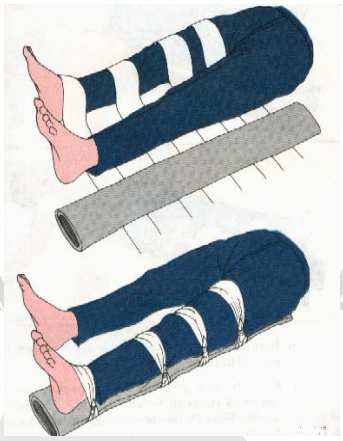

Figure 34 Splinting fracture of the knee cap

### 7.13.1. First aid measures

- Apply a pillow splint about the knee or padded splints from below the victim's heel to his buttocks along the back of the leg, with the leg extended (fig.34).
- Raise the leg slightly to prevent swelling.
- Send to hospital or a health center.

## 7.14. Fracture of the lower leg

The bones of the lower leg are the tibia (shinbone), which supports the weight of the body and the fibula, which forms the outside wall of the ankle and is on the outer side of the leg.

***First Aid for Fractures of the Tibia and Fibula***

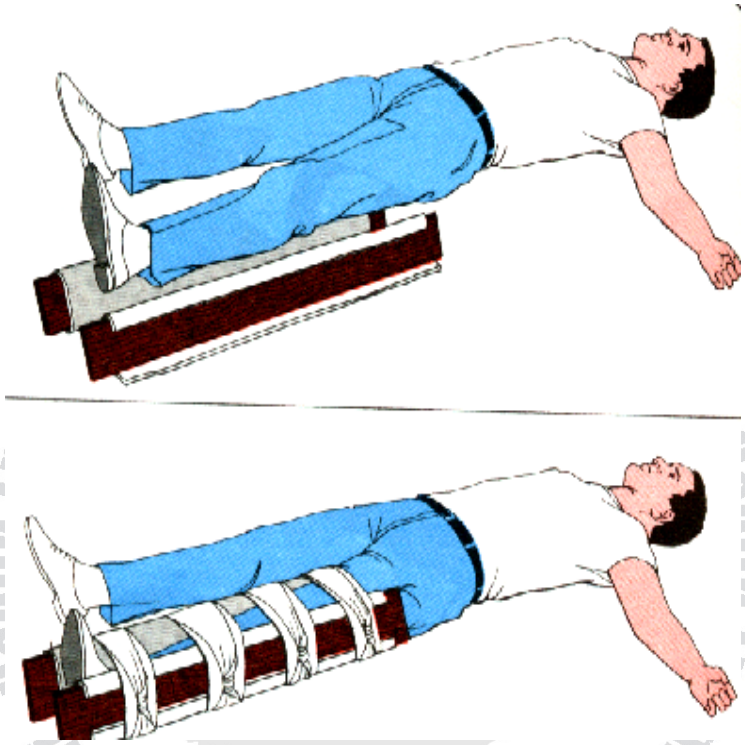

Figure 35 Splinting the lower leg fracture

- Apply well- padded splints on both sides of the leg and foot from the top of the patient's thigh to his foot (fig.35). The splint will be secured with a bandage at five sites as follows: at the thigh, at the knee, below and above the fracture and at the ankle and foot with a figure of eight bandage.
- In an emergency, insert blankets or towels between the legs and tie them to gather.

- Remember to keep the victim's foot pointing up ward and check for poor circulation, prevent movement of the broken bone ends, knees and ankle.

## 7.15. Fracture of ankle and foot

The ankle is made up of the lower ends of the tibia and fibula and the first bone of the foot (the talus). Fractures in this area occur most commonly in active sports, in falls, and in motor vehicle accident.

### 7.15.1. First aid measures

- Loosen or remove the victim's shoes, and hose (socks) and keep him lying down with his leg elevated.
- For an open wound apply large bulky dressings.

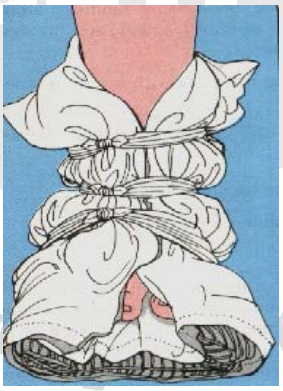

Figure 36 Splinting ankle and foot

- Splint with a pillow or blanket firmly applied with out attempting to correct the deformity (fig.36).

## 7.16. Dislocation

A dislocation is a displacement of a bone end from the joint particularly at the shoulder (fig.37), elbow, fingers or thumb usually as a result of a fall or a direct blow. Unless proper care is given, a dislocation may occur repeatedly.

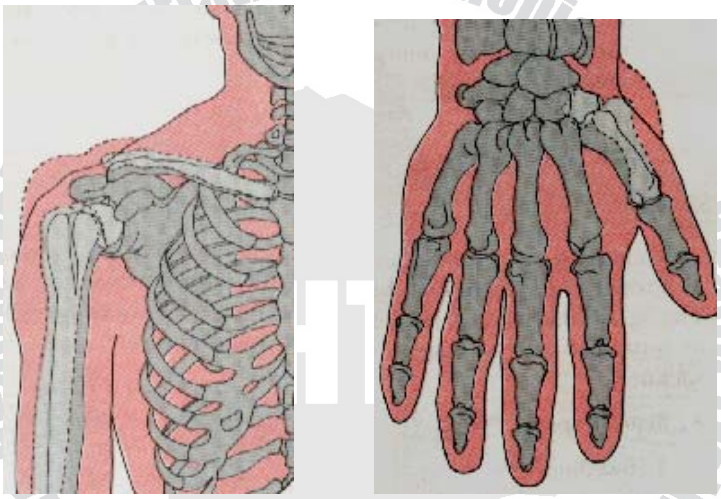

Figure 37 Common dislocation sites

### 7.16.1. Signs and symptoms of dislocation

- Swelling.
- Obvious deformity.
- Pain upon movement.
- Tenderness to touch.
- Discoloration.

### 7.16.2. First aid measures

First aid should be essentially the same as for closed fractures.

- Splint and immobilize the affected joint in the position in which it was found.
- Apply a sling if appropriate.
- Elevate the affected part if a limb is involved.
- Seek medical attention promptly.
- Never attempt to reduce a dislocation.

## 7.17. Sprain

A sprain is an injury to a joint, ligament or muscle and tendon in the region of a joint. It occurs usually as result of forcing a limb beyond the normal range of movement.

The ankles, fingers, wrists and knees are most often sprained.

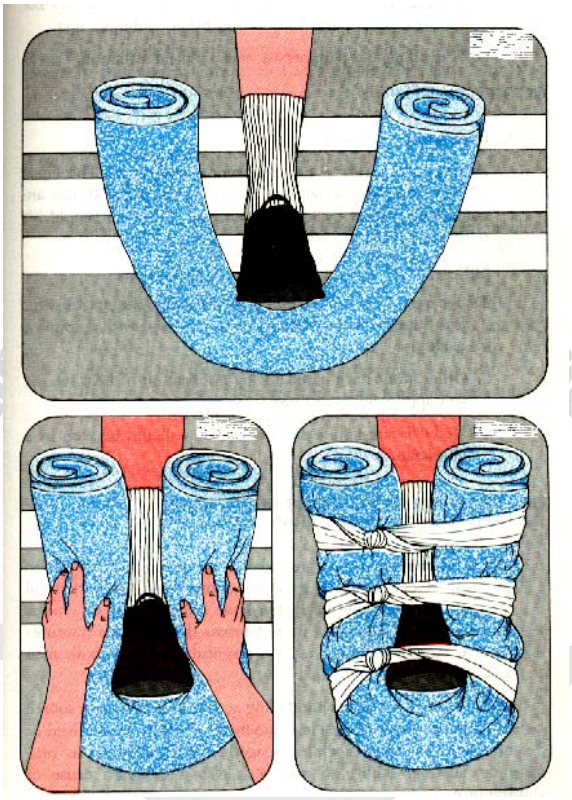

Figure 38 First aid measures for sprain

### 7.17.1. Signs and symptoms of sprain

- Swelling
- Tenderness
- Pain upon motion
- Discoloration

It might be difficult to differentiate a sprain from a closed fracture with out an X-ray.

### 7.17.2. First aid measures

- If the victim's ankle or knee is affected, do not allow him to walk.
- Loosen or remove the victim's shoes, apply a pillow or blanket, splint and elevate the victim's leg to prevent swelling (fig.38).
- Keep the injured part raised for at least 24 hours.
- Apply cold wet pad or place a small bag of crushed ice on the affected area over a towel intermittently, to protect the victim's skin.
- If swelling and pain persist, seek medical attention.

## 7.18. Strain

Strains are injuries to muscle resulting from over stretching. The fibers are stretched and some times partially torn. Commonly strains occur on the back muscles, due to improper lifting technique.

To avoid back strain when a heavy object must be lifted, observe the following precaution.

- Place the feet close to the object firmly and apart.
- Squat; do not lean foreword keeping the back as straight as possible and get a good grip on the object.
- Lift slowly, pushing up with the strong thigh and leg muscles are bearing the weight.
- Do not jerk the object upwards, or twist or turn your body as lifting takes place.

- To lower a heavy object reverses the above procedure.

#### 7.18.1. First aid measures

- Bed rest, heat and use of a board under the mattress for firm support are recommended for person with a strained back.
- Cool the area by applying an ice pack or cold compress for the first 24 hours.
- After 24 hours, apply heat, warm, wet and rest care.
- Seek medical care; (severe back strains should be seen by a physician).

## 7.19. Prevention of accidents resulting in skeletal and muscular injuries

When an impact force between any part of the body and some physical object is strong enough to overcome the structural strength of underlying bone, it either breaks or cracks.

Motor vehicle accidents and falling accidents are a major source of bone and joint or muscle tissue injury. Prevention of skeletal and muscle tissue injuries require that the source, direction and amount of destructive impact forces be eliminated, controlled or avoided. Many conditions that produce wounds and measures that prevent wounds are applicable to the bone, joint and muscle accidents.

The following discussion on prevention will limit it self to additional consideration regarding motor vehicle accidents:

### *7.19.1. Motor vehicle accident prevention*

Nowadays almost half of all accidental deaths result from accidents that involve a motor vehicle. Essentially the problem is one of people, and its solution is the responsibility of people. What follows is intended to provide a basis for discussion of the over all high way accident.

- Driving skill, judgment and condition of driver
- Vehicle condition
- Environmental conditions
- Pedestrian safety

### *7.19.2. Falling accidents*

Falls are the second leading cause of accidental death. Ranking behind motor vehicle fatalities and a head of fire and burn fatalities. The reader should further develop his/ her understanding regarding the following types of accidents by referring standard references.

*C. Slipping and Tripping (Slight Walking) Hazards*

*D. Climbing and Reaching*

*E. Special Precautions*

*F. Joint and Muscle Tissue Injury Prevention*

## 7.20. Study Questions

1. Define fracture, dislocation, sprain and strain.
2. Mention the principles of first aid for fracture.
3. Explain specific fractures, their sign and symptoms and first aid measures.

4. Describe first aid measures for dislocation and sprain.
5. State the precautions to prevent strain.
6. Identify preventive measures of accidents that result in musculoskeletal injuries.
7. Now days almost half of all accidental deaths result from accidents that involve a motor vehicle.

   A) True  B) False

# CHAPTER EIGHT

# POISONING

A poison is a substance which, if taken in to the body in sufficient quantity, may cause temporary or permanent damage. Poisons can be swallowed, absorbed through the skin, inhaled, splashed in to the eyes, or injected. Once in the body, they may inter the bloodstream and be carried swiftly to all organs and tissues. Signs and symptoms of poisoning vary with the poison- they may develop quickly or over a number of days. Vomiting is common if it has been ingested and breathing difficulties if inhaled.

## 8.1. Learning Objectives

After studying the material in this chapter, the student will be able to:-

1. Describe poisoning
2. Identify different causes of poisoning
3. State different poisonous substances around home environment
4. Explain signs and symptoms of poisoning
5. Give first aid for different types of poisoning

## 8.2. Definition

A poison is any substance solid, liquid or gas that tends to impair health or cause death when introduced in to the body or on to the skin surface.

Small children are especially likely to become poisoned since they tend to put in their mouths nearly every thing that they pick up. However, adults are subject to poisoning also.

## 8.3. Types of poisoning

Some poisons are man-made, such as chemicals and drugs- and this are found in the home as well as in industry. Almost every household contains substances that are potentially poisonous, such as bleach and paint stripper, as well as prescribed or over-the-counter medicines, which may be dangerous if taken in excessive amounts. Other poisons occur in nature fore example, plants produce poisons that may irritate the skin or cause more serious symptoms if ingested, and various insects and creatures produce venom in their bites and stings. Contamination of food by bacteria may result in food poisoning-one of the most common forms of poisoning.

*Table 5: Recognizing and treating the effects of poisoning*

| Root of enter of the body | Poison | Possible effects | Action |
|---|---|---|---|
| Swallowed (ingested) | • Drugs and alcohol<br>• Cleansing products<br>• Diy and gardening products<br>• Plant poisons<br>• Bacterial(food poisons)<br>• Viral(food poisoning) | Nausea and vomiting; abdominal pain; seizures; irregular, or fast or slow heartbeat; impaired consciousness | • Monitor casualty<br>• Seek medical help<br>• Resuscitate if necessary |
| Absorbed through the skin | • Cleaning products<br>• Diy and gardening products<br>• Industrial poisons<br>• Plant poisons | Pain; swelling; rash; redness; itching | • Remove contaminated clothing<br>• Wash area for at least ten minutes<br>• Seek medical help |

| | | | |
|---|---|---|---|
| | | | • Resuscitate if necessary |
| Inhaled | • Fumes from cleaning and die products<br>• Industrial poisons<br>• Fumes from fires | Difficulty breathing; hypoxia; cyanosis (grey-blue skin coloration) | • Help casualty in to fresh air<br>• Seek medical help<br>• Resuscitate if necessary |
| Splashed in the eye | • Cleaning products<br>• Diy and gardening products<br>• Industrial poisons<br>• Plant poisons | Pain and watering of the eye; blurred vision, pain, redness and swelling at injection site, | • Irrigate the eye<br>• Seek medical help<br>• Resuscitate if necessary |
| Injected through the skin | • Venom from stings and bits<br>• Drugs | blurred vision; nausea and vomiting; difficulty breathing; seizures; | *For sting/venom.*<br>• Remove sting, if possible<br>• Seek |

| | | | |
|---|---|---|---|
| | | impaired consciousness; anaphylactic shock | medical help<br>• Resuscitate if necessary<br>*For injected drugs*<br>• Seek medical help<br>• Resuscitate if necessary |

## 8.3. Frequent causes of poisoning

- Aspirin overdose especially in children.
- Poisons transferred from original containers to other containers or soft drink bottles.
- Carelessness of the parents in leaving dangerous substance and medicines within reach of children (lack of supervision of children).
- Improper storage and disposal of poisonous substances.
- Improper handling of spray equipment including the mixing of pesticides, insecticides and weed killers.
- Inhalation or swallowing of poisonous substance.
- Carelessness in taking a poison from the medicine cabinet.
- Over doses of drugs taken either accidentally or with suicidal intent
- Combining some drugs and alcohol

### 8.3.1. Examples of poisons around the home

Poisonous substances with in the home environment are extremely prevalent and it would be difficult to name all of them. A few typical household poisons are listed below:

- Cosmetics and hair preparations
- Gasoline, kerosene and other petroleum products.
- Paint and turpentine
- Strong detergents
- Bleaches
- Cleaning solutions
- Acids

- Ammonia
- Glue
- Poisonous plants
- Non edible mushrooms
- DDT
- Dry cell
- Malathine etc.

## 8.4. Ways in which poisoning may occur

- Through the mouth (by ingestion)
- Through the skin (by absorption)
- Through the lung (by inhalation)
- By injection

## 8.5. Signs and Symptoms of Poisoning

Symptoms of poisoning vary greatly. Aids in determining whether or not a victim has swallowed poison include:

- Information from the victim or from an observer.
- Presence of a container known to contain poison.
- Conditions of the victim (sudden onset of pain or illness).
- Burns around the lips or mouth.
- Breathe odor.
- Pupils of the eyes contracted to pinpoint size from an over dose of morphine or similar drugs.

## 8.6. Objectives in treatment of poisoning by mouth

The objectives in treatment of poisoning by mouth are:

- To dilute the poisons quickly as possible.
- To seek medical advice from a physician or a poison control center.
- To maintain respiration or circulation.
- To preserve vital functions and to seek medical assistance with out delay.

### 8.6.1. First aid measures for poisons swallowed through mouth for a conscious victim

In most cases, the first-aider can try to remove the poison from his body by inducing vomiting.

- Give him a drink of tepid water with soap in it.
- Repeat the procedure of inducing vomiting until the vomiting is clear.
- Do not induce vomiting if the poison is one which burns or if it is petrol or kerosene. Instead, give milk with egg whites or a mixture of flour and water.
- Safe the label or container of the suspected poison for identification. If the victim vomits safe a sample of the vomited material for analysis.

### 8.6.2. For unconscious victim

- Maintain an open airway and administer artificial respiration.

- Don’t give fluids and don’t induce vomiting.
- If the victim is vomiting, position him and turn the head so that the vomitus drains out of the mouth.
- Safe the label or container of the suspected poison for identification. If the victim vomits safe a sample of the vomited material for analysis.

**8.6.3. First aid for victim having convulsion**

- Do not attempt to restrain the victim but position him in a way that he should not injure him self
- Loosen tight clothes at the victims neck and west
- Watch for an obstruction of air way and attempt to correct by head positioning, if necessary give artificial respiration.
- Do not give any fluid
- Do not induce vomiting

***8.7. Contact poisoning***

***8.7.1. Contact with Poisonous Chemicals***

Harsh chemicals and corrosive poisons if spilled on the skin produce chemical burns which require immediate first aid action.

**8.7.2. First Aid for Contact Poisons chemicals**

- Remove the contaminated clothing immediately, drench and flush the affected skin with large amounts of water or special neutralizing agents if they are available as you remove the clothes.

- If poisoning is from a pesticide, a corrosive substance (strong acid or alkali), send for ambulance immediately.
- Continue washing all contaminated skin with soap and water for at least 5 minutes.
- Keep the victims air way open, give artificial respiration if indicated
- Do not leave the victim alone.

## 8.8. *Contact with Poisonous Plants*

The majority of skin reactions following contact with offending plants is allergic in nature and is characterized by:

- General symptoms of headache and fever
- Itching
- Redness
- Rash

### 8.8.1. First Aid Measures for Poisonous Plants.

- Remove contaminated clothing.
- Wash all exposed areas thoroughly with soap and water followed by running alcohol.
- Apply calamine or other soothing skin lotion if the rash is mild.
- Seek medical advice if a severe reaction occurs or if there is a known history of previous sensitivity.

## 8.9. Poisoning Through Inhalation (Gas Poisoning)

Carbon monoxide poisoning is the most poisonous gas formed from incomplete burning of fuel, particularly treacherous because it is completely odorless.

### 8.9.1. First Aid Measures

- Move the patient in to fresh air to help get rid of the gas in his lungs.
- Give mouth-to-mouth respiration and cardiac massage if necessary. Take care that his breath does not contaminate your breathing, by turning your mouth away from the victim's mouth between breathes.

## 8.10. Poisoning Through Injection (Snake Bites)

Three are different kinds of poisonous snakes in different parts of the world. All reaction from poisonous snake bites is aggravated by acute fear and anxiety.

### 8.10.1. Factors affecting the out come of poisonous snake bites

A. The amount of venom injected in the speed of absorption of the venom in to the victim circulation.
B. The size of the victim
C. Protection from clothing, including shoes and gloves
D. Location of the bite
E. Specific anti venom therapy as soon as possible

### 8.10.2. Signs and symptoms of major snake bites

1). Pit viper bits

A) Characteristics

a) Extremely painful

b) Rapid swelling

c) One or more puncture wounds created by the fangs

d) General discoloration of the skin

B) Manifestations such as general weakness rapid pulse, nausea and vomiting, shortness of breathe dimness of vision and shock.

2). Coral snake bite-manifestation. Only slight burning pain and mild local swelling at the wound, blurred vision, dropping eye lids, slurred speech, drowsiness, increased saliva and sweating, nausea and vomiting, shock, respiratory difficult, paralysis, convulsion and possible development of coma.

**8.10.3. Objectives of first aid**

a. To reduce the circulation of blood through the bite area

b. To delay absorption of venom.

c. To prevent aggravation of the local wound and to sustain respiration

### 8.10.4. First Aid Measures

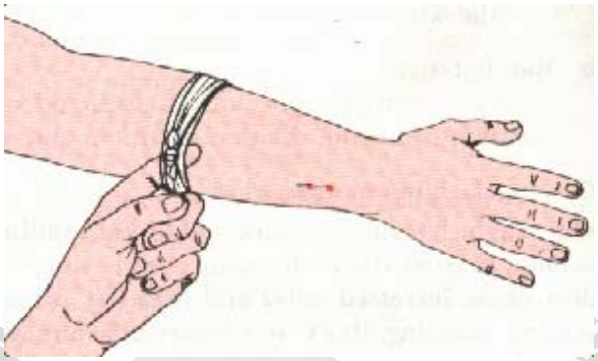

Figure 39 Application of a firm cord above the snakebite

The most important step is to get a snake bite victim to hospital quickly. Meanwhile take the following first aid measures.

- Keep the victim from moving around
- Calm the victim
- Immobilize the bitten extremity and keep it at or below the heart level.
- Apply a firm but not tight cord just above the bite (fig.39). This must be removed within 15 minutes or when you have the medical assistance.
- Wipe the wound of venom which may have spilled from the fangs at the time of biting.

## 8.11. Study Questions

1. Define poisoning
2. What are different causes of poisoning?

3. List different types of poisoning.
4. What are the most common poisoning substances around your area?
5. Explain signs and symptoms of poisoning.
6. Describe first aid measures for different types of poisoning.
7. The most important step in the case of snake bite victim is to give quick first aid measures rather than attempting to take to hospital.

   A) True B) False

# CHAPTER NINE

# BURN

Burn, is injury to the skin and deeper tissues caused by hot liquids, flames, radiant heat, and direct contact with hot solids, caustic chemicals, electricity, or electromagnetic (nuclear) radiation. Skin exposed to temperatures as low as 120°F is burned after about 5 minutes.

## 9.1. Learning Objectives

After studying the material in this chapter, the student will be able to:-

1. Define burn injury.

2. Differentiate different causes of burn in different areas.
3. Identify different classifications and degrees of burn.
4. Recognize first aid measures for different degrees of burn.

**9.2. Definition:** A burn is an injury that results from heat, chemical agents, or radiation. It may vary in depth, size, and severity causing injury to the cells in the affected area.

## 9.3. Causes

Burns are caused most commonly by:

- Carelessness with matches and cigarette smoking.
- Scalds from hot liquids.
- Defective heating, cooking and electrical equipment.
- Use of open fires that produce flame burns especially when flammable clothing is worn.
- Unsafe practices in the home in the use of flammable liquids for starting fires, for cleaning and for rubbing wax off floors.
- Immersion in over heated bath water.
- Use of chemicals such as dyes strong acids and strong detergents.

## 9.4. Hazards effects of burn

In addition to surface burns and the effect of heat on the blood and body tissues other than the skin, the hazards of fire include the following:

- Inhaling very hot air or irritating or poisonous gases including carbon monoxide.
- Asphyxia from insufficient oxygen in the air.
- Falls and injuries from collapsing walls in burning buildings.

## 9.5. Classification

Burns are usually classified according to depth or degree of skin or other tissue damage damage, often the degree will differ in various parts of the same affected area.



**A.** ***First Degree Burn***

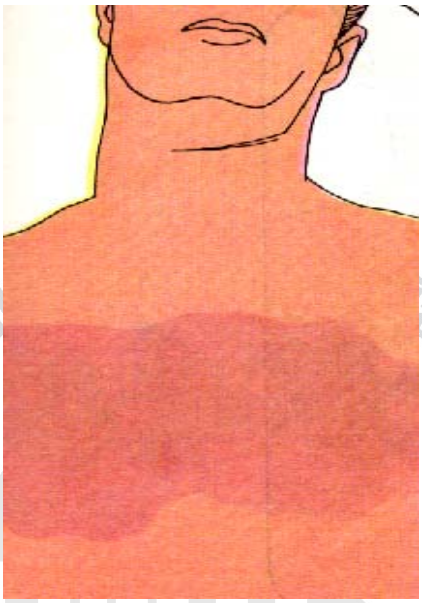

Figure 40. First degree burn

First -degree burns (fig.40) are those resulting from over exposure to the sunlight, contact with hot objects, or scalding by hot water or steam.

The usual signs are:-

- Redness or discoloration
- Mild swelling and pain
- Rapid healing

### 9.5. 1. First Aid Measures

The objective of first aid for first degree burn is to relieve pain, prevent complications and treat for shock; usually medical treatment is not required.

- Apply cold water applications or submerge the burned area in cold water.
- Apply a dry dressing if it is necessary

**Note:-** severe sun burn should receive medical care as soon as possible

***B . Second Degree Burn***

Figure 41. Second degree burn

Second-degree burns (fig.41) are those resulting from very deep sunburn, contact with hot liquids, and flash burns from gasoline, kerosene and other products. Second degree burns are usually more painful than deeper burns in which the nerve endings in the skin are destroyed.

The usual signs are:-

- Greater depth than first degree burns.
- Red or mottled appearance.
- Development of blisters.
- Considerable swelling over a period of several days.
- Wet appearance of the surface of the skin due to the loss of plasma through the damaged layers of the skin.

**9.5.2. First Aid Measures**

- Immerse the burned part in cold water.
- Apply freshly ironed cloths that have been wrung out in ice water.
- Blot to remove and dry gently.
- Apply dry sterile gauze or clean cloth as a protective bandage.
- Do not break blisters or remove tissue.
- Do not use an antiseptic preparation, ointments, spray, or home remedy on a severe burn.
- If the arms or legs are affected keep them elevated.

***C. Third Degree Burns***

Third degree burns (fig.42) can be caused by a flame, ignited clothing, immersion in hot water, contact with hot objects, or electricity.

Temperature and duration of contact are important factors in determining the extent of tissue destruction.

Figure 42 Third degree burn

*The usual signs are:-*

- Deep tissue destruction.
- White or charred appearance (at first the burn may resemble a second degree burn).
- Complete loss of all layers of the skin.

### 9.5.3. First Aid Measures

- Do not remove adhered particles of charred clothing.

- Cover burns with thick, sterile dressings or a freshly ironed or laundered sheet or other household linen.
- If the hands are involved, keep them above the level of the victim's heart.
- Keep burned feet or legs elevated (the victim should not be allowed to walk).
- Have victims with face burns sit up or prop them up and keep them under continuous observation for breathing difficulty.
- Do not immerse an extensive burned area or apply ice water over it, because cold may intensify the shock reaction.
- Arrange transportation to the hospital as quickly as possible.
- If medical help or trained ambulance personnel does not reach for an hour or more and the victim is conscious and not vomiting give him a weak solution of salt and soda at home. (2 table spoon of sugar and 1 table spoon of salt in one liter of water).
- Do not apply ointment, commercial preparations, grease or other home remedies.

### *9.5.4.* First Aid Measures when the Person's Clothes are on Fire

- Put out the flames with cold water or sand if either is on hand.
- If water is not available, smother suppress the flames by laying the victim down and wrapping a blanket, coat or rug very lightly around him.
- Tear off smoldering clothing by seizing the non-burning areas of the material.
- Immerse the affected part in cold water.

- Remove any clothing which is soaked in boiling water, oil or other fluid
- Do not remove burnt clothing which has cooled.
- Remove any constricting items such as shoes, boots, rings and bracelets before swelling begins.
- Cover the area lightly with a sterile or very clean cloth or sheet.

**9.5.5. Electrical Burns (Electrocution)**

Electrical burns are usually deep. A patient who receives an electrical burn may also suffer cardiac arrest due to the electric current passing through his heart.

The first- aider must insure that the patient is no longer in contact with the current before touching him; otherwise you too will be electrocuted. If it is not possible to switch the current off, remove the patient from it by using clothing or wooden sticks. Do not use any thing metal. If cardiac arrest has occurred external cardiac massage must be carried out, together with artificial respiration and treat the burn later.

**9.5.6. Extent and Location of Burn**

In addition to classification of burns according to depth or degree, burns are ordinarily described according to the extent of the total body surface involved .In general (an adult who has suffered from burns of 15 percent of his body surface, a child, 10 percent) wherever located requires hospitalization. Burns of the face are often associated with injury to the respiratory tract, and may obstruct

breathing as swelling increases. Hence prompt medical attention is imperative.

**Table 6: First aid measures of burns according to their causes**

| A. CHEMICAL BURNS | | |
|---|---|---|
| ETOLOGY | ASSESSMENT FINDINGS | INTERVENTIONS |
| Acids<br>Alkalis<br>Corrosives<br>Organophosphates | ▪ Burning<br>▪ Redness, swelling of injured tissue<br>▪ Degeneration of exposed tissue<br>▪ Discoloration of injured skin<br>▪ Localized pain<br>▪ Edema of surrounding tissue<br>▪ Respiratory distress if | ▪ Ensure patent airway<br>▪ Assess airway, breathing , and circulation before decontaminating procedure<br>▪ Brush chemical from wound and surrounding area with eater<br>▪ Remove clothing including shoes watches jewelry |

| | | |
|---|---|---|
| | chemical inhaled<br>▪ Decreased muscle coordination (if organophhate)<br>▪ Paralysis | and eye glass if face exposed<br>▪ Blot skin dry with clean cloth or dry sheet<br>▪ Transport |
| **B.THERMAL BURNUS** | | |
| ETIOLOGY | ASSESSMENT FINDINGS | INTERVENTIONS |
| Hot Liquids/solids<br>Flash flame<br>Steam<br>Hot surface<br>UV rays | *Partial-Thickness (superficial)*<br>▪ Redness<br>▪ Pain<br>▪ Moderate to severe tenderness<br>▪ Minimal edema<br>▪ Blanching with pressure<br>*Partial - thickness (Deep)*<br>▪ Moist blebs, blisters<br>▪ Mottled white , pink to cherry | Initial<br>▪ Ensure patent airway<br>▪ Stop the burning process<br>▪ Inspect face and neck for singed nasal hair , hoarseness of voice stridor, soot in the sputum<br>▪ Remove clothing and jewelry<br>▪ Identify and treat associated |

| | | |
|---|---|---|
| | red<br>▪ Hypersensitive to touch or air<br>▪ Moderate to severe pain | injuries (e.g. fractured ribs, pneumothorax)<br>▪ Determine depth , extent and severity of burn<br>▪ Cover large burns with dry dressing<br>▪ Apply cool compress or immerse in cool water for minor injuries only (less than 10% TBSA burn) |
| | ▪ Blanching with pressure<br>*Full- Thickness*<br>▪ Dry, leathery scar<br>▪ White, waxy, dry brown ,or charred appearance<br>▪ strong burn | ▪ Present loss of body heat<br>▪ transport as soon as possible to the nearest hospital or burn center<br>▪ Do not debride burns or apply topical agents |

| | | |
|---|---|---|
| | odor<br>▪ Impaired sensation when touched<br>▪ Absence of pain with severe pain in surrounding tissues<br>▪ Lack of blanching with pressure | before transfer to C<br>▪ hospital<br>▪ Administer tetanus prophylaxis as appropriate<br>**Ongoing monitoring**<br>▪ Monitor vital signs, level of consciousness , and urine output<br>▪ Monitor temper and pain |

### 9.5.7. Prevention of Heat Emergencies

A responsible attitude towards acquiring additional preventive information, particular in regard to fires and burns should lead you to resources beyond the basic discussion contained here in.

***A. Injuries from Extreme Heat (Thermal Burn)***

- Take care, of smoking and matches.
- Take care, of cooking and heating equipment.
- Take care, of fires of electrical origin.

***B. Radiation Burns (Sun Burn and Others)***

The usual source of radiation burn is an exposure to the ultraviolet rays of the sun during warm weather season. This can be prevented by minimizing the amount of exposure.

### *C. Chemical Burns*

When irritating chemicals come in contact with the skin or mucous membrane, injury usually commences instantly and first aid should be immediate. Among such chemicals are acids and alkalis, some cleansing agents, lime and cement, petroleum products and some antiseptics.

### 9.5.9. Specific Fire or Burn Preventive Measures

- Install fire extinguishers in danger spots.
- Keep a garden hose near a faucet for use in case of fire.
- Install adequate insulation at all heating surfaces.
- Repair or replace defective or in adequate electrical wiring.
- Perform the required maintenance on heating systems.
- Dispose of trash immediately.
- Use only non flammable cleaning fluids.
- Hang clothes well away from stoves or fire places.
- Place curtains so that they will not blow in to flames from any stove, candle etc.
- Store flammable materials in a safe place.
- Do not overload electrical circuits.
- Supervise children playing near an open fire.
- Store matches in a metal container and out of reach of children.
- Do not smoke in bed.

- Do not smoke if you are sleepy.
- Provide adequate ashtrays throughout the house.
- Install home fire detectors.

## 9.6. Study Questions

1. What is a burn injury?
2. What are causes of burn?
3. Mention different classifications and degrees of burn.
4. What are the first aid measures for different degrees of burn?
5. When Irritating chemicals in contact with the body, it only affects the skin and results in injury. There fore the need for quick first aid is not necessary as in the other emergency cases.

   A) True B) False

**CASE STUDY**

***Sever burn patient***

***Patient profile:*** Zinash, a 43 year--old women was brought to you with extensive full- thickness burns to her upper body. Her stove exploded while she was manually lighting the oven with firewood and kerosene. Her 10 children remain at home and her husband is in the field, unable to be reached.

***Subjective Data:***

- Complains of feeling very cold

- Cannot remember the accident
- Is hoarse and has difficulty talking
- Express great deal of fear

***Objective Data:***

- Is awake and oriented but in obvious distress
- Has dark brown, leathery burns involving the head, neck, chest, and upper extremities
- Has hair and eye brow that are signed
- You are un able to palpate peripheral pulses; apical pulses: 140/ minute

**Critical Thinking (Application) Questions**

1. What are the first priorities in the pre-hospital environment? How should her airway be managed?
2. Why should Zinash be considered at high risk for an inhalation injury? What intervention can be anticipated?
3. What first aid management should you anticipate in-patient with full- thickness circumferential burns to the extremities?
4. Describe the rationale for Zinash's lack of pain and complaints of being cold.
5. What fluid and electrolyte imbalances would be expressed in the first 48 hours? Explain the physiologic bases for these changes.
6. What are the important actions to prevent burn accidents at home?

# CHAPTER TEN

# SUDDEN ILLNESS AND UNCONSCIOUSNESS

## 10.1. Learning Objectives

After studying the materials in this chapter students will be able to:

1. Describes signs of sudden illness and unconsciousness
2. Explain the signs and, symptoms of a heart attack and first aid measures needed.
3. Differentiate between major and minor strokes
4. State first aid measures for major and minor strokes.
5. Describe the manifestations of fainting and appropriate first aid measures.
6. Explain convulsion and it's appropriate first aid measures.
7. Describe epilepsy

Although sudden illness is not always urgent, sometimes it endangers a person's life, especially if associated with a heart attack or a massive internal hemorrhage. An important first aid measure in such an instance is to secure transportation for the victim to receive medical care as quickly and safely as possible.

## 10.2. Heart Attack

Heart attack usually involves a clot in one of the blood vessels that supply the heart. A heart attack may or may not be accompanied by

loss of consciousness. If the attack is severe, the victim may die suddenly.

### 10.2.1. Signs and Symptoms

- Persistent chest pain usually under the sternum (breasts bone).
- Gasping and shortness of breath.
- Extreme pallor or bluish discoloration of the lips, skin and finger nails.
- Extreme prostration.
- Shock (as a rule).
- Swelling of the ankles which may be an indication of heart disease.

**N.B.** The two principal symptoms are shortness of breath and chest pain.

### 10.2.2. First Aid Measures

- Place the victim in a comfortable position (sitting position).
- Provide ventilation and guard against drafts and cold.
- If the victim is not breathing begin artificial respiration.
- Call for ambulance.
- Do not give liquids to an unconscious victim.

## 10.3. *Stroke*

It is a sudden loss of brain function resulting from disruption of the blood supply to the part of the brain. It usually involves a

spontaneous rupture of a blood vessel in the brain or formation of a clot that interferes with circulation.

### 10.3.1. Major Stroke

### 10.3.2. Signs and Symptoms

- Unconsciousness.
- Paralysis or weakness on one side of the body.
- Difficulty in breathing and swallowing.
- Loss of bladder and bowel control.
- Unequal size of pupils of the eye.
- Lack of ability to talk or slurring of speech.

### 10.3.3. First Aid Measures

- Provide moderate covering.
- Maintain an open air way.
- Give artificial respiration if indicated.
- Position the victim on his side to drain secretion.
- Do not give fluids unless the victim is fully conscious.
- Transport the patient to hospital immediately.

## 10.4. Minor Stroke

In a minor stroke small blood vessels in the brain are involved. These usually do not produce unconsciousness.

### 10.4.1. Symptoms

Minor stroke may occur during sleep and be accompanied by:

- Headache.
- Confusion.
- Slight dizziness and ringing in the ears.
- Other mild complaints.

Later there may be:

- Minor difficulties in speech.
- Memory changes.
- Weakness in arm or leg.
- Some disturbances in the normal pattern of the personality.

### 10.4.2. First Aid Measures for Stroke

- Protect the victim against accident or physical exertion.
- Suggest medical attention.

## 10.5. Fainting

Fainting is a partial or complete loss of consciousness due to a reduced supply of blood to the brain for a short time. Occasionally a person collapsed suddenly without warning. To prevent fainting, a person who feels weak and dizzy should lie down or bend over with his head at the level of his knees.

### 10.5.1. Manifestations

Signs and symptoms are usually preceded or accompanied by:

- Extreme paleness
- Sweating
- Coldness of the skin
- Dizziness
- Numbness and tingling of the hands and feet
- Nausea
- Possible disturbance of vision

### 10.5.2. First Aid Measures

- Leave the victim lying down.
- Loosen any tight clothing and keep crowds away.
- Turn the head to the side.
- Maintain an open air way.
- Do not pour water over the victim's face instead bath his face gently with cool water.
- Do not give any liquid unless the victim has revived.
- Unless recovery is prompt, seek medical assistance

## 10.6. Convulsion

A convulsion is an attack of unconsciousness usually of violent onset. Convulsions associated with head injury or brain diseases such as a tumor, an abscess or hemorrhage often tend to be localized with rigidity and jerking of groups of muscles instead of the whole body.

### 10.6.1. Common Causes of Convulsion

- Severe dehydration
- Febrile illnesses such as
    - Meningitis
    - Malaria
    - Tetanus and other illnesses
- Epilepsy
- Toxemia of pregnancy

### 10.6.2. Signs and Symptoms

- Rigidity of body muscles from a few seconds to perhaps half a minute followed by jerking movement
- Bluish discoloration of the face and lips
- Foaming at the mouth or drooling
- Gradual subsidence (improvement )

### 10.6.3. First aid Measures

- Prevent victim from hurting himself
- Give artificial respiration ,if indicated
- Do not place a blunt object between the victims teeth
- Do not restrain him
- Do not pour any liquid in to his mouth
- Do not place a child in a tub of water
- Avoid overcrowding
- Reassure and advise to seek medical attention

## 10.7. Epilepsy

Epilepsy is a chronic disease usually of unknown cause characterized by repeated convulsions.

### 10.7.1. First Aid Measures

First aid for epilepsy is the same as for other convulsions, which includes the following:

- Keep air way open
- Give artificial respiration, if breathing stop
- Push away near by objects
- Do not force a blunt object between the victim's teeth. If the victim's mouth is open you might place a soft object such as rolled hand kerchiefs between his side teeth.
- When jerking is over, loosen the clothing around his neck.
- Keep him lying down.
- After the seizure, allow the victim to sleep and rest

### 10.2.2. Study Questions

1. Describe sudden illness and unconsciousness.
2. What is heart attack? Enumerate it's signs and symptoms and its first aid measures
3. What are is the differences between major and minor strokes?
4. What are the first aid measures for stroke?
5. Describe fainting and give example.
6. What is a convulsion?

7. Describe epilepsy and mention its first aid measures.
8. Epilepsy is a chronic disease usually of known cause characterized by repeated convulsions.

   A) True B) False

# CHAPTER ELEVEN

# HEAT STROKE, HEAT CRAMPS, AND HEAT EXHAUSTION

## 11.1. Learning Objectives

On the completion of this chapter, the student will be able to:-

1. Define heat stroke, heat cramps and heat exhaustion
2. Recognize different causes of heat stroke, heat cramp and heat exhaustion.
3. Differentiate the signs and symptoms of heat stroke, heat cramp and heat exhaustion
4. Give first aid intervention for heat stroke, heat cramps and heat exhaustion.

## 11.2. Introduction to Heat Disorders

Heat disorder is a mild to grave reactions to high environmental temperature due to inadequate or inappropriate responses of heat-regulating mechanisms.

Exposure to high ambient temperature without efficient heat loss may lead to heal cramps, heatstroke, or heat exhaustion. acute (e.g. 3 to 4 hours of strenuous effort) or prolonged (10 to 12 days)

exposure to heat with excessive sweating uncompensated by fluid intake leads to dehydration , sodium and potassium depletion, and hypovolemia.

Associated vomiting and diarrhea contribute to fluid loss.

Evaporation is the most important source of heat loss, depends on relative humidity:

The higher the humidity, the less efficient the heat loss. Therefore, high ambient humidity (Which decreases the cooling effect of sweating) and prolonged strenuous exertion (Which increase heat production by muscle) increase the risk of developing heat disorders.

Age, obesity chronic alcoholism, debility, and many drugs (e.g. anticholinergics, antihistamines, phenothiazines, numerous psychoactive drugs, alcohol, cocaine) increase susceptibility to heat disorders, numerous psychoactive drugs, alcohol, and cocaine) increase susceptibility to heat disorders, particularly heatstroke. Heatstroke and heat exhaustion both occur in hot; humid environments, but they are markedly different disorders (See Table below).

**Table 7:** Differentiating heatstroke and heat exhaustion

| FEATURE | Heatstroke | Heat Exhaustion |
|---|---|---|
| Cause | Inadequacy or failure of heat loss mechanism | Excessive fluid loss leading to hypovolemic shock |

| | | |
|---|---|---|
| Warning Signs | Headache, Weakness, Sudden loss of consciousness | Gradual weakness nausea anxiety excessive sweating syncope |
| Manifestations | Hot, red dry skin with little sweating , forceful rapid pulse very high temperature | Pale grayish clammy skin weak slow pulse low BP faintness |
| Management | Emergency cooling by wrapping or immersing in cold water or ice immediate hospitalization | Patient positioned flat or with the head down replacement of lost salt and water 9usually orally) |

**Prophylaxis (Prevention) of heat Disorders**

Using common sense is best strenuous exertion in a very hot environment or in inadequately ventilated space should be avoid and heavy insulating clothing should not be worn. If exertion in a hot environment is unavoidable, fluid and electrolytes (Often lost imperceptibly in very hot very dry air) should be replaced by frequently drinking fluids slightly salty to taste (i.e., near isotonic) and evaporation , which helps the ski8n cool should be facilitated by wearing open mesh clothing or using fans. Thirst is a poor indicator of dehydration .During strenuous exercise; fluids should be drunk every hour regardless of thirst.

**Heat Stroke (Sun stroke, Thermic fever Siriasis)**

## 11.2. Definition:

It is a response to heat characterized by high body temperature and disturbance of sweating mechanism. It is an immediate, life-threatening emergency, which urgently needs medical care.

Figure 43 Heat stroke

### 11.2.2. Signs and Symptoms of Heat Stroke

- Hot red and dry skin (fig.43), because the sweating mechanism is blocked.
- The victim may be unconscious.
- An abrupt onset is sometimes preceded by headache , vertigo, and fatigue

- Sweating is usually decreased and the skin is hot flushed and usually dry.
- The pulse rate increases rapidly and may reach 160 to 180 beats/min: respiration usually increase but Bp seldom affected.
- Disorientation may briefly precede unconsciousness or convulsions.
- The temperature climbs rapidly to 40 to $41^0$ C , causing a feeling of burning up.
- Circulatory collapse may precede death after hours of extreme hyperpyrexia, survivors are likely to have permanent brain damage.

**11.2.3. First Aid Measures**

The first-aider should focus towards immediate measures to cool the body quickly. However, take care of over chilling of the victim once his temperate is reduced below $38^0$c. The following first aid measures are applicable whenever the body temperature reaches $40.5^0$c.

- Repeated sponging of the bare skin with cool water or rubbing alcohol.
- Apply cold packs continuously
- Place the victim in a tub of cold water (do not add ice) until his temperature is lowered sufficiently.
- When the victim's temperature has been reduced enough, dry him off with a towel.

- Use fans or air conditioners, if available, since drafts will promote cooling.
- If the victim's temperature starts to go up again, start the cooling process again.
- Do not give the victim stimulants.

## 11.3. *Heat* Cramps

Exercise- induced cramps of striated muscles resulting from excessive fluid intake with out sodium replacement.

Heat cramps occur after exercise at higher ambient temperature (> $38^0$ C) when fluids lost through excessive sweating are replaced only by water. The result is a relative loss of sodium and occasionally potassium and magnesium. Heat crumps are common in manual laborers (e.g. engine room personnel, steelworkers, miners, diggers), in tennis players and other weakened athletes, and in persons not acclimatized to hot, dry climates in which excessive sweating is almost undetected because of rapid evaporation.

It involves muscular pains and cramps due to loss of large amount of salt from the body in sweating or due to inadequate intake of salt. It may be associated also with heat exhaustion.

### 11.3.1. Assessment findings (Signs and symptoms)

- Onset is often abrupt, with muscles of extremities affected first.
- Crumps are brief, intense, and tend to occur during rest after exercise or heavy labour.

- Nausea, tachycardia, pallor, weakness, and profuse diaphoresis are often present.
- The condition is seen most often in healthy, acclimated athletes with inadequate salt intake.
- Sever pain and carpopedal spasm may incapacitate the hands and feet.
- Often episodic, the cramping makes the muscles feel like hard knots.
- When the cramps affect only abdominal muscles, the pain may simulate an acute abdomen.
- Vital signs are usually normal
- The skin may be hot and dry or clammy and cool, depending on the humidity.

In the case of heat cramps, the muscles of the leg and abdomen are likely to be affected first.

**11.3.4. First Aid Measures**

- Cramps resolve rapidly with rest and oral replacement of sodium and water.
- Elevation, gentle massage, and analgesia minimize pain associated with heat cramps
- The patient should avoid strenuous activity for at least 12 hours after the development of heat cramps.
- Education should emphasize salt replacement during strenuous exercise in hot, humid environment.

- Apply firm pressure with hands on the cramped muscles, or gently massage them to help relieve the pain.
- Give the victim sips of salt water 1 teaspoonful of salt in a liter of cool boiled water (half a glass every 15 minutes over a period of about 1 hour).

## 11.4. Heat Exhaustion

Excessive fluid and electrolyte loss due to sweating, resulting in hypovolemia and electrolyte imbalance. It is a response to heat characterized by fatigue, weakness and collapse due to intake of water inadequate to compensate for loss of fluids through sweating.

Figure 44 Heat exhaustion

### 11.4.1. Assessment findings

- Pale and clammy skin (fig.44)
- Profuse perspiration
- Nausea, dizziness (possible vomiting)

- Possible fainting, but the victim probably gains his consciousness as his head is lowered.
- Excessive sweating without concomitant fluid replacement cases heat exhaustion with increasing fatigue, headache, weakness and anxiety.
- Circulatory collapse ensues, with slow, thready pulse, slow perceptible blood pressure; cold, pale, clammy skin, and disorientation followed by shock like unconsciousness.
- Core temperature ranges from 38.3 to 40.6 $^{0}$C. are due to dehydration.
- Mild heat exhaustion, precipitated by prolonged standing in hot environment (because blood pools in heat – dilated vessels in the legs), is manifested by a subnormal body temperature and simple syncope.

**11.4.2. First Aid Measures**

- Give the victim sips of salt water 1 teaspoonful of salt per liter of cool boiled water. (half a glass every 15 minuets, over a period of about one hour).
- Have the victim lie down and raise his feet from 20 to 30 cm.
- Loosen the victim's clothing
- Apply cool, wet clothes or take him to an air conditioned room.
- If the victim vomits, do not give him any more fluids and take to hospital as soon as possible.
- After an attack of heat exhaustion, advise the victim not to return to work for several days and see that he is protected from exposure to abnormally warm temperature.

## 11.5. Study Questions

1. What are the differences between heat stroke, heat cramp and heat exhaustion?
2. Mention different causal factors for heat stroke, heat cramp and heat exhaustion.
3. Enumerate the signs and symptoms of heat stroke and its first aid measures.
4. What are the signs and symptoms of heat exhaustion and first aid measures?
5. Mention symptoms of heat cramp and its first aid measures.
6. Heat stroke is a response to heat characterized by high body temperature and disturbance of sweating mechanism.

   A) True B) False

# CHAPTER TWELVE

# EMERGENCY RESCUE AND SHORT DISTANCE TRANSFER

## 12.1. Learning Objectives

On the completion of this chapter, the student will be able to:-

1. Define Emergency rescue and short distance transfer.
2. Recognize indications for immediate rescue.
3. List down procedures of emergency rescue and short distance transfer.
4. Demonstrate different methods of short distance transferring of victim.

## 12.2. Definition

Emergency rescue is a procedure for moving a victim from a dangerous location to place of safety.

Emergency rescue and short distance transfer deal with the movement of victims away from hazardous locations and the use of protective methods to support a victim's body during emergency transfer. Involvement of the first- aider in emergency rescue and transfer is limited to removing victims when there is immediate danger to their lives.

If a person is ill or injured to the extent that she/he will require transport to a medical facility, the first decision to be made by the first- aider is whether it is necessary for the victim to be transferred a short distance before being placed on stretcher. Unless as those listed below, he should not be transferred until such life threatening problems as airway obstruction and hemorrhage are cared for, wounds are dressed, and fractures are splinted.

It should be recognized that more harm could be done through improper rescue and transportation than through any other measures associated with emergency assistance. Pending their arrival, the first- aider should gain access to the victim, give him emergency care, reassure him, and avoid ill- advised or foolhardy attempts at rescue that might harm the safety of the victim as well as that of the first- aider.

## 12.3. Indications for Immediate Rescue

A. Fire, danger of fire, or explosion
B. Danger of asphyxia due to lack of oxygen or due to gas poisoning
C. Serious traffic hazards
D. Risk of drowning
E. Exposure to cold or intense heat or to intense weather conditions.
F. Possibility of injury from collapsing walls
G. Electrical injury or potential injury
H. Pinning by machinery

## 12.4. Procedure

***A*. *When it is necessary to remove victims from a life-threatening situation, the first- aider must:***

1. Avoid subjecting the victim to any unnecessary disturbances
2. Ensure an open airway and administer artificial respiration if it is needed
3. Control bleeding
4. Check for injuries
5. Immobilize injured parts prior to movement of the victim, if possible
6. Arrange for transportation

***B. It is difficult for inexperienced helpers to lift and carry a person gently. They need careful guidance. If there is time, it is wise to rehearse the lifting procedure first, using a practice subject. Other factors to be considered:***

1. If you must lift someone to safety before a check for injuries can be made, protect all parts of the body from the tensions of lifting.
2. Support the arms and legs, the head, and the back, keep the entire body in a straight line and keep it from moving.
3. Sometimes, although a checkup can be made, an injured part cannot be immobilized until the victim has been moved a short distance. If a limb is injured, place one hand just above the injured area and one just below it. While

helpers lift the body and another helper keeps the adjacent joints from moving, keep the injury from bending and twisting.

4. Any transfer is harmful unless the injured parts are immobilized.

   "Splint them where they lie," unless there is urgent danger.

5. It is usually best to wait until an ambulance is available. People who may have head injuries, fractures of the thigh, leg, and pelvis, or back injuries should not be transported sitting up. The injured parts need immobilization and the victim should be transported lying down, with the first-aider giving particular attention to maintaining an open airway at all times.

## 12.5. Methods of Transfer

**A. Immediate Rescue without Assistance**

***1.*** ***Pulling the Victim*****:** If a person must be pulled or dragged to safety, he should be pulled in the direction of the long axis of his body, preferably from the shoulders, not sideways. Every effort must be made to avoid bending or twisting his neck or trunk. The danger is less if a blanket or similar object (such as a small rug or a piece of cardboard) or a board, can be placed beneath him so that he can "ride" the object. Do not try or carry an injured person before a check for injuries can be made, unless you are sure that there is no major fracture or involvement of his neck or spine.

2. ***Lifting the Victim*:** A lightweight adult or a child who has no serious wounds or skeletal injuries may be carried by one person. Place one hand under his knees and the other under his upper back and armpit for support.

3. ***Supporting the Victim*:** A person who has no serious wounds or skeletal injuries, who has not had a heart attack, and who is conscious may be assisted to walk to safety. Help him to his feet, place one of his arms around your neck, hold his hand at your chest (or shoulder) level, and place your other arm about his waist for additional support. An assistant may be used, if available.

**B. Immediate Rescue with Assistance**

Sometimes, the hazards are so great that it is necessary to move an injured person a short distance without first immobilizing the affected parts. If the victim is to be lifted by several persons, the first aid worker should devote himself to the area of greatest injury, protecting it as much as possible. He should prevent bending and twisting of injured parts, such as the limbs.

1. ***Fore-and -aft carry:*** The fore- and - aft carry is a two-man technique. It may be used in moving an unconscious person but it is not applicable when there are serious injuries of the trunk or there are fractures.

2. ***Two- handed and four- handed seats:*** Another two- man rescue technique is the two - handed seat or swing . If the

victim has no serious injuries and is able to cooperate with his rescuers, he may be placed on a two- handed seat with his arms about the necks of the first aid workers and his back supported by their free hands, or the four- handed seat may be used. In which case better support is provided for seating but the victim's back is not supported.

**C. Blanket Techniques**

If transfer is necessary before a litter can be provided, a blanket can be placed under a person for lifting and carrying him a short distance. A blanket should never be used if there is a suspected fracture of the neck or back, unless the hazard is so great that time does not permit procuring a backboard. If the use of a blanket is necessary, one first aid worker should hold the victim's head, with traction in a straight line away from his trunk. If his body is to be turned, it is moved as a unit so that no twisting or side- to side motion of his neck or back occurs.

***1. Placing blanket under victim from the side:*** Allow about two- thirds of the blanket to fall in folds or pleats beside the victim. Then place the folded (not rolled) Portion snugly against his body. Grasp the victim at his helps and shoulders and roll him gently about one- eighth of a turn away from the blanket. Push the folded part of the blanket as far under the victim as possible and roll him back over the folds and approximately one- eighth of a turn in the opposite direction. Pull the blanket on through. This procedure places

the victim in the middle of the blanket, which can then be rolled from the sides and used to lift him onto a stretcher or to carry him to safety.

***2. Blanket Lift***

a. Roll the blanket tightly at the sides until it fits the contours of the victim's body.

b. Two persons at the victim's shoulders grasp the blanket with their top hands at his shoulders and their bottom hands at his lower back.

The two persons at the lower part of his body grasp the blanket with their top hands at the victim's hips and their lower hands at the legs, just below the knees.

Figure 45 Blanket lifting

c. At a signal, the persons holding the blanket lean back (away from the victim). Using their back muscles and body weight. This action lifts the victim from 14 to 17cm from the floor or ground so that a litter can be slid underneath (fig.45). The same procedure is used when a victim is in a prone position.

d. All parts of the victim's body should be supported - the extremities, the head, and the trunk- and the victim's entire body should be kept immobile and in a straight line. Helpers should lift gradually, following the proper lifting instructions as given, so that they themselves will not suffer back injury. They also should guard against losing their balance. In all lifts, the leader should give appropriate preparatory signals prior to the actual signal for action so that all move as a unit

**D. Three - Man or Four- Man Lift**

1. Three bearers take up positions on one side of the victim and facing him, one at his shoulder, one at his hip, and one at his knees. If one side is injured, the three bearers should be on the uninjured side. A fourth bearer, if available, takes a position on the opposite side, at the victim's hip.

2. Each bearer kneels on his knee that is closer to the victim's feet. Then, simultaneously, the bearer at the victims' shoulder puts one arm under he victim's head, neck, and victim's back. Each bearer at the victim's hips places one thigh. The bearer at the victim's knees places one arm under the victim's knees and the other under his ankles (fig.46A).

3. The command “prepare to lift!” is followed by the command ”Lift!” and immediately all the bearers lift together and place the victim in line on their knees (fig.46B).

4. If there is a fourth bearer, be places a stretcher under the victim and against the toes of the three kneeling bearers. The command “Prepare to lower!” is followed by the command “Lower! And the victim is gently lowered to the stretcher.

   To unload a stretcher, the rescuers reverse the procedure. The method described above is also used to place a victim in bed. When it is necessary to transport a victim in a confined area, three bearers may carry him. The victim would then be rolled toward them.

A

B

Figure 46 A and B Three man victim lifting

**E. Six - Man Lift and Carry**

There are three bearers on each side of the victim. Each kneels on his knee that is closer to the victim's feet. The bearers' hands, wrists, and forearms are worked gently under the victim until the palms of their hands are about at the midline of the victim's back (or

stomach). The hands should be alternated from the two sides. The two hands under the victim's head may have the fingers interlocked to form a cup for his head. The command ''prepare to lift ''is followed by the ''Lift'' and the victim is lifted on the bearers hands and fore arms to their knees (fig.47). The command ''prepare to stand'' is followed by the command ''stand'' and all bearers' stand erect. To lower the victim to the ground or on to the stretchers, reverse the procedure.

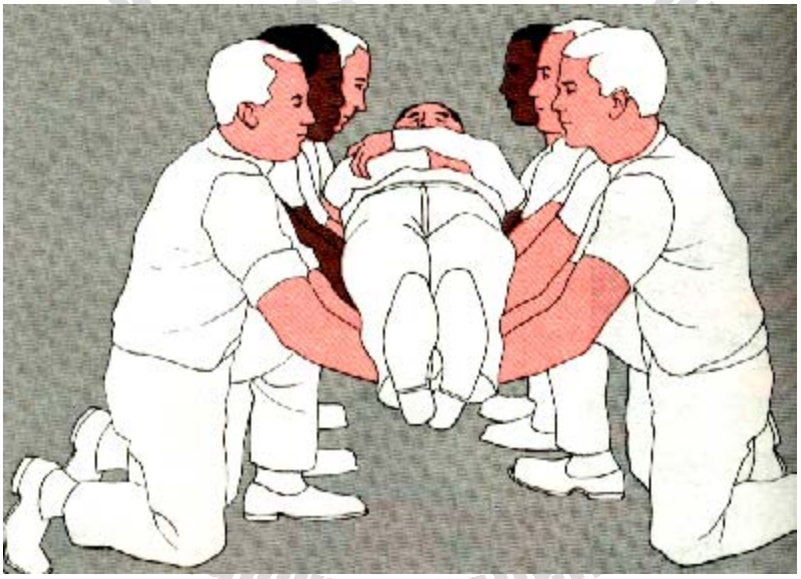

Figure 47 Six-man lifting and carrying steps

**F. Stretchers and Litters**

Among other litters the ''army litter'' is most satisfactory for general use. Before using the litter for the victim, test it by lifting some one at least as heavy as the victim.

### *1. Improvised Litter*

In an emergency case or in remote areas where a litters or back boards are not available, an improvised litter may have to be used to transport a person either to shelter or to a source of transportation to a medical facility. A litter may be improvised from clothing , a rug, or a blanket placed over poles. If available, a lightweight canvas lounge chair, an ironing board, a leaf from a table, or a door may be used.

### *2. Carrying Techniques*

Care must be taken to secure the injured person or invalid properly, so that he will not roll or slide during transportation. If a neck fracture is suspected, additional padding is necessary to support the victim's head and neck. Use cravat bandages or other improvised ties.

### *3. Positions of Bearers*

It is preferable to have four bearers: one at the victim's head, one at his feet, and one at each side , all facing the direction of intended movement. Each side bearer holds the side of the litter with his hand that is closer to the victim. All assume the proper lifting stance, and at the command ''Lift!" all stand erect.

At the command "March!" the bearer at the head of the litter steps off on his right foot, and the bearers at the sides and feet step off on their left feet. To lower the litter, the bearers reverse the steps used to lift the litter.

## F. Rescues Involving Electrical Emergencies with Home Appliances

Electrocution is common in the home from low voltage current. The danger in the home is often underestimated, especially the danger to the rescuer if he touches the same equipment or the injured person. The rescuer should disconnect the attachment plug from its socket or throw the main house electrical switch if possible. It may be necessary to separate the victim from the contact by utilizing a long, very dry pole, a dry rope, or length of dry cloth. Be sure that your hands are dry and that you are standing on a dry surface.

## G. Rescues Involving Fires

If you are trapped in a burning building (or must enter to rescue someone), put a thick, wet cloth over your mouth and nose. This cloth will protect your air passages from the heat. It will not, however, protect you from the poisonous gases.

Before opening a door in a burning building, feel the door to check for extreme heat. If the door is very hot, try to find another way out. If the door is cool (or slightly warm), crouch low behind the door as you open it slowly.

Usually the stairway is safer than the elevator when you are escaping from a burning building. The fire may damage the elevator and trap you inside.

If you are trapped on an upper floor, find a room with a window in it. Close the door and transom; open the window slightly and breathe

the incoming air; signal for help by hanging something large (coat, sheet, rug) out of the window; then lie on the floor.

## H. Water Rescue

### *1. General Information*

Most drowning occurs within reach of safety; rescue is, hence, often possible even if the first- aider is unable to swim.

### *2. Procedure*

A swimming rescue should not be attempted except by some one trained in lifesaving.

a. If a swimmer is in trouble near the dock or the side of a pool, lie down and extend your hand or foot to him; or hold out a towel, shirt, stick, fishing pole, float, deck chair, tree branch, or other object at hand and pull him to safety .Use a line or ring buoy, if possible. If the swimmer is too far from shore for these measures, wade into waist- deep water first with a suitable object to extend to him, or push out a board to which he can cling while you go for helps, or grasp his wrist and pull him to safety.

b. If a rowboat is available, row out to the victim and let him grasp the stern, or extend an oar and draw him around to the stern where he can hang on while you row to shore. If he is unable to hold onto the stern or the oar, pull him to the boat, and, after checking for injuries, pull him into the boat.

c. Persons who drown usually die from lack of air and not from water in the lungs or stomach. Do not try to get water out a victim. Start artificial respiration right away, whether you are

in a boat, supporting the victim at the side of a boat, pulling him ashore, or on the shore.

d. As soon as the victim is able to breathe for himself, give him care for shock and get medical assistance.

## 12.6. Study Questions

1. What is emergency rescue?
2. What are the indications for immediate rescue?
3. List down steps of emergency rescue and short distance transfer.
4. Mention different methods of victim transferring measures.
5. When you are rescuing the victim from fire involved area, putting clothe on your mouth will protect your air passages, however, It will not protect you from the poisonous gases.

A) True B) False

# CHAPTER THIRTEEN

# DISASTER

## 13.1. Learning objectives

After studying the materials in this chapter, the student will be able to:

1. Define disaster
2. Identify different types of disaster
3. Recognize rescue operations for disasters
4. Explain preventive measures of disaster

## 13.2. Definition

Disaster is a condition, which occurs as a result of human activity or natural phenomena.

Types of natural disasters

- Earthquakes
- Volcanic eruptions
- Gales
- Tidal waves
- Draughts
- Floods and others

## 13.3. The Community Rescue Operations in Natural Disaster

### 13.3.1. *Fear:*

In most cases, despite their fear, people tend of their own accord to give assistance to their family, their neighbors and their friends to take the injured to the local health facility. In the subsequent time, fear must be countered by providing certain information or instruction or instruction (by using loudspeakers and mobilizing volunteers) on:

- What to do to be safe,
- Information on the evolution and consequences of disaster,
- Where to obtain information on the scattered members of the family,
- Information on essential matters: water, shelter, food etc.
- Instructions should be given according to the type of disaster,
- First -aiders are also expected to discriminate such information in collaboration with local authority and other sectors.
- Perceiving the community as acting in a coordinated manner and that information is being circulated gives people a feeling that the situation is under control and in that way helps to control fear.

### 13.3.2. *Panic*

Panic is not a common reaction. It may occur when the disaster finds people crowded in an enclosed space (a space of worship, a cinema, etc.). In some cases instructions given over a loudspeaker

(asking people to be calm, indicating where the exits are) may help to reduce the adverse effects of panic.

## 13.4. Rescue operations

A disaster may result in people being:

- Trapped under the ruins of buildings that have collapsed.
- Buried under mud or landslides.
- Cut off by floods or the blockage of communication routes.
- These people must be reached and secured. Relatives, friends and local volunteers will mostly assist the rescue work out spontaneously.
- Often it is essential to have available:
- Ladders,
- Ropes,
- Heavy gloves,
- Spades,
- Picks,
- Planks,
- Pocket torches,
- Groups of volunteers must be organized to reach families that live in isolated places. Certain elementary rules must be observed:
- Do not trample over ruins
- Do not rubble before insuring that it will not cause further collapses of buildings or falls of materials.
- Use manual methods for preference and handle spades and picks very gently and cautiously.

- When it is difficult to reach a victim or when there is the risk of caving, it is advisable to leave the work for experts (firemen, building workers, the army etc.).
- Maintain and ease respiration.
- Clear the victim's air way by using fingers to clean the mouth and throat, taking out dentures and loosening collars, belts and clothes
- Use blankets to prevent the victim from being cold
- While the rescue workers are freeing the trapped person, those responsible for transporting him or her to the health facility should prepare the stretcher.
- The stretcher must be put down near the injured person. If no stretcher uses locally available resources such as blanket.

#### *13.4.1. While lifting the victim:*

- Move gently and slowly
- Keep the head, neck, and trunk in the same axis (see chapter12 for victim lifting )

## 13.5. Prevention of disaster

There are a number of activities that the community and the local health personnel can undertake in order to be ready to deal with disaster situations.

#### 13.5.1. *Action by the community*

- Analysis of the past experience
- Information on disaster

- Knowledge of the risks and the resources
- Evaluation of the population
- Twinning
- Exercises and activities to promote community preparedness
- Basic education

### *13.5.2. Action by the local health personnel (First- Aider)*

- Essential professional qualities of local health personnel for coping with disasters.
- Improving certain professional skills.
- Preparation of health facilities.
- Training of voluntary health workers
- Preparedness of activities for the population

## 13.6. Study Questions

1. Define disaster
2. Mention types of natural disaster
3. Describe the rescue operations by the community.
4. Explain the preventive measures of disaster by the community and by the local health worker.
5. There are a number of activities that the community and the local health personnel can undertake in order to be ready to deal with disaster situations.

   True False

# GLOSSARY

- **Asphyxia:-** Apparent or actual cessation of life due to interruption of effective gaseous exchange in the lungs.
- ***Aspiration:-*** The act of inhaling
- ***Cardiopulmonary Resuscitation:-*** The re establishment of heart and lung action after cardiac arrest or apparent sudden death resulting from electric shock ,drowning respiratory arrest ,and other causes.
- ***Diaphragm:-*** The musculo-membranous partition separating the abdominal and thoracic cavities and serving as a major inspiratory muscle.
- ***Drowning:-*** Suffocation and death resulting from filling of the lungs with water or other substances.
- ***Morbidity:-*** The condition of being diseased or morbid.
- ***Mortality:-*** The quality of being mortal (death).
- ***Poison:-*** A substance which on swallowing, inhalation, absorption, application, injection, or development within the body , in relatively small amounts, may cause structural damage or functional disturbance.
- ***Prostration:-*** Extreme exhaustion or lack of energy or power.
- ***Reduction of Fracture:-*** The correction of a fractured bone.

- ***Stoma:-*** A mouth like opening, particularly an incised opening which is kept open for drainage or other purposes.
- ***Strangulation:-*** Choking or throttling arrest of respiration by occlusion of the air passage.
- ***Stroke:-*** A sudden and severe attack due to various reasons. E.g. heart disease, heat stroke. etc.
- ***Thermal Burn:-*** Injury to tissues caused by contact with heat or flame.
- ***Torniquet:*** A plastic material wrapped around extremities to control bleeding
- ***Tumour:-*** Mass of diseased cells in the body which have divided and increased quickly ,causing swelling.
- ***Venom:-*** Poison, especially a toxic substance normally secreted by a snake, insect or other animals.

# Annex I

## Answer Key for Study Questions

### Chapter 1

1. See in the text
2. See in the text
3. See in the text
4. See in the text
5. True

### Chapter 2

1. See in the text
2. See in the text
3. See in the text
4. See in the text
5. See in the text
6. True

### Chapter 3

1. See in the text
2. See in the text
3. See in the text
4. See in the text
5. See in the text

6 See in the text

7. See in the text

8 B) False

9. A) True

10. A) True

## Chapter 4

1. See in the text
2. See in the text
3. See in the text
4. See in the text
5. See in the text
6. False

## Chapter. 5

1. See in the text
2. See in the text
3. See in the text
4. See in the text
5. See in the text
6. See in the text
7. False

## Chapter 6

1. See in the text
2. See in the text
3. See in the text
4. See in the text
5. True

## Chapter 7

1. See in the text
2. See in the text
3. See in the text
4. See in the text
5. See in the text
6. See in the text
7. True

## Chapter 8

1. See in the text
2. See in the text
3. See in the text
4. See in the text
5. See in the text
6. See in the text
7. False

## Chapter 9

1. See in the text
2. See in the text
3. See in the text
4. See in the text
5. False

## Chapter 10

1. See in the text
2. See in the text
3. See in the text
4. See in the text
5. See in the text
6. See in the text
7. See in the text
8. False

## Chapter 11

1. See in the text
2. See in the text
3. See in the text
4. See in the text
5. See in the text
6. True

## Chapter 12

1. See in the text
2. See in the text
3. See in the text
4. See in the text
5. True

## Chapter 13

1. See in the text
2. See in the text
3. See in the text
4. See in the text
5. True

# Annex II

**First aid kits and supplies.**

There are two general types of first aid kits.

1. The unit type.
2. The two cabin type

**A. *Unit - type kit:-***

It has a complete assortment of first aid materials, put up in standard packages of unit size or multiples of the unit size and arranged in case, containing 16, 24 or 32 units with the 16 and 24 unit kits being the most popular.

**B. *Cabinet -type kits***

They are made for a wide variety of uses and range in size from pocket versions to large industrial kits. They are made to accept packages in different shapes and sizes.

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