

FIRST AID AND FIRE PROTECTION

CHAPTER 1

GENERAL PRECAUTIONS

1. Make adequate barriers if necessary
2. Allow the number of people which you can manage, inside the laboratory
3. Check for pinch points such as nails, extended wires etc.
4. Carefully note the sign boards in emergency.
5. Once you complete the works of each day, arrange the place for next day. Always keep the thing in order.
6. Be aware of flammable things and poisonous gases.
7. Use gloves and goggles if necessary.
8. Don't pull the wire to plug out the plugs.
9. Don't key the switches, circuit breakers, connectors, terminals exposed to public
10. Keep necessary distance from the uncovered machinery, equipment etc.
11. Always check the circuit breakers, fuses, wirings everyday before opening for the exhibition.
12. Place an instruction card consisting safety precautions near to heavy machinery, which can be seen clearly.
13. Keep the floor (walking area) free from oil like things
14. If necessary do not ignore goggles

CHAPTER 2

FIRST AID

2.1 BLEEDING

Bleeding is the escape of blood from capillaries, veins and arteries. Among these arterial bleeding is life threatening and difficult to control.

1. Pinch the edges of the wound firmly together with your fingers or press hard on it with your hand, whichever is easier and effective.
2. Place a sterile dressing or clean cloth on the wound.
3. Tie a knot or adhere tape directly over the wound.
4. Only tight enough to control bleeding.
5. If bleeding is not controlled, apply another dressing or apply direct pressure with your hand or fingers over the wound.
6. Lay down the casualty on a blanket with his injured part and leg raised and supported.

Under no circumstances is a dressing removed once it has been applied.

DO NOT apply a tourniquet.



Apply direct pressure on external wounds with sterile cloth or your hand, maintaining pressure until bleeding stops



Raise the injured part

Knot over the pad



Raise and support the legs



Keep her head low

2.2 FAINTIG

Fainting is partial or complete loss of consciousness, due to a reduced supply of blood to the brain for a short time. To prevent a fainting attack, the person who feels weak and dizzy should lie down or bend over with head at the level of his knees.

First Aid for Fainting

1. Leave the victim lying down.
2. Loose any tight clothing and keep crowds away.
3. Maintain an open airway.
4. Do not pour water over the victim's face because of the danger of aspiration; instead, bathe his face gently with cool water.
5. Do not give any liquid unless the victim has revived.
6. Examine the victim to determine whether or not he has suffered injury from falling.
7. Unless recovery is prompt, seek medical assistance. The victim should be carefully observed afterwards because fainting might be a brief episode in the development of a serious underlying illness

2.3 WOUNDS

Wounds usually result from external physical forces. The most common accidents resulting in wounds are falls, mishandling of sharp objects, tools, machinery and weapons.

First Aid for General Wounds

1. Sit or lie the patient down.
2. Wash your hands. Assemble the following items and place them on a clean towel or cloth, a bowl of warm clean water, soap, cotton wool or a clean handkerchief, gauze, a roll of bandage, safety pins.

3. Clean the skin round the wound, but not the open wound itself. Use water or soap and water, with swab of cotton wool or a clean handkerchief. Cleanse with separate strokes round the wound. Start each stroke at the edge of the wound and move away from it using a separate swab or fresh surface of the handkerchief.
4. Place a wide, protective layer of gauze over the wound and the cleaned skin area.
5. Apply a thick pad of gauze or cotton wool over this layer of gauze
6. Finish with several firm turns of a bandage, which should fully cover the pad. Let each turn of the bandage overlap the previous turn by about two thirds. Secure the bandage with safety pins.
7. Severely wounded limbs must be rested. An arm should be put in a sling while a leg should be elevated on cushions with the patient lying down.
8. If the condition is serious you may have to take measures against shock.

WARNING:

DO NOT APPLY ANTISEPTICS. IN SIMPLE FIRST AID THEY ARE NOT USED AS THEIR PRESENCE MIGHT INTERFERE WITH SUBSEQUENT TESTS OR TREATMENT BY THE DOCTOR OR NURSE. DO NOT APPLY COTTON WOOL DIRECTLY TO A WOUND AS THE FIBRES WOULD BE DETRIMENTAL.

Eye Wound

Do not attempt to clean the wound. Cover the eye with a large, smooth pad, lightly bandaged or taped in position. Immediate medical help is essential. If movements of the eye were painful, it would be wise to cover both eyes, since they act together. Explain to your patient why you are doing this.

2.4 BURNS

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.

First Aid for General Burns

1. Immerse the burned part in cold water.
2. Apply freshly ironed or laundered cloths that have been wrung out in ice water.
3. Do not break blisters or remove tissue.
4. Do not use an antiseptic preparation, ointment, spray, or home remedy on a severe burn.
5. Do not remove adhered particles of charred clothing.
6. If the hands are involved, keep them above the level of the victim's heart.
7. Keep burned feet or legs elevated. (The victim should not be allowed to walk)
8. Do not delay getting medical help if the burn is severe.
9. If the burn is large lay the casualty down as shown in figure.

*Thorough cooling may
take 10 minutes*



*Keep her
head
low*



*Make sure the
injured area is
completely covered*

Chemical Burns

Chemical burns are caused by acids, alkalis, or other chemicals come in contact with the skin.

First Aid for Chemical Burns

1. Wash away the chemical with water using a shower or hose, as quickly as possible at least 5 minutes. Remove the victim's clothing from the areas involved. Some chemicals may need 20 minutes.
2. Gently remove any contaminated clothing while flooding the injury. Be sure not to contaminate yourself- use protective gloves if available.
3. Take or send the casualty to hospital, keeping a close watch on airway and breathing.



Make sure the injured area is completely covered



Wear protective gloves

Electrical Burns

Electrical burns may be more serious than they first appear. The entrance and exit wounds may be small, but as electricity penetrates the skin, it burns a large area below the surface.

First Aid for Electrical Burns

1. Shut off the power. IF you cannot shut off the power immediately, remove the victim from the live conductor before touching them.
2. Maintain a neutral position of the head and neck; apply a cervical collar or towel collar.
3. Establish and maintain the airway, breathing, and circulation.
4. Cover burn areas with a moist, preferably sterile, dressing.
5. Treat for shock.
6. Request medical assistance.

Thermal Burns

Thermal burns are caused by exposure to hot solids, liquids, and gases, or fire.

First Aid for Thermal Burns

1. Monitor the airway, breathing and circulation.
2. Control Bleeding.
3. Remove all jewelry from the area, unless the casualty objects.
4. Apply cool water to the affected area or submerge in cool water. **DO NOT USE ICE OR ICE WATER.**
5. Remove clothing gently from the bound area. **DO NOT REMOVE CLOTHING THAT IS STICKING TO THE SKIN.**
6. Cover area with dry, sterile dressing, if possible.
7. Treat for shock.

8. Request medical assistance.

2.5 SHOCK

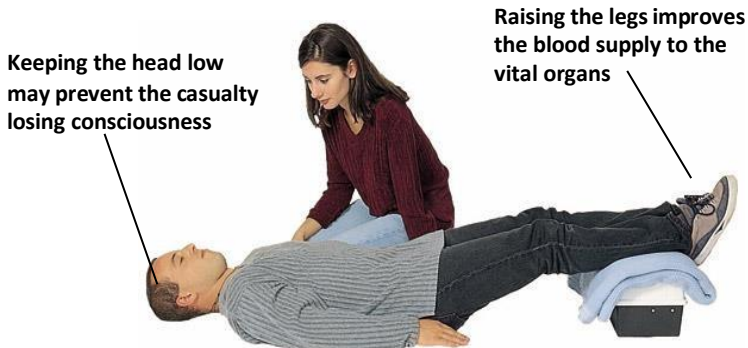
Shock is the failure of the heart and blood vessels to maintain the oxygen demand, in medical terms. In general, which needs urgent aid.

Signs of shocks are,

Pale gray skin, sweating, cold skin, weakness, thirst, vomiting, rapid shallow breathing, restlessness and loss of consciousness.

First Aid for Shock

1. Try to keep an open airway; If possible treat him at where he is.
2. Stop and bleeding at once.
3. Dress any wounds rapidly and simply.
4. Position the casualty in the way blood circulation is balanced throughout the body, i.e. legs elevated. Lower the head.
5. Cover the casualty with a coat or blanket to prevent heat loss, but it should not be very tight.
6. Mentally give the casualty confidence.
7. Do not give anything through mouth, but if he is thirsty let the person suck a handkerchief well moistened with water.



2.6 ELECTRIC SHOCK

1. Disconnect the victim from the current at once.
2. Switch off the current or pull the plug or its insulated cord to free it from the socket.
3. Knock, shove or pull the victim away from his electrical contact. This can be difficult for while he is in contact, You must not touch him with your hand or with wet or metallic objects. Use dry or insulating substances: a wooden stick, chair, thick cloth, a strong kick with a dry shoe.
4. If the patient has stopped breathing use artificial respiration.
5. Check for Other injuries and treat them.
6. Refer the previous topic “shock”

DO NOT TOUCH THE PATIENT UNTIL THE CURRENT HAS BEEN TURNED OFF, OR HE HAS BEEN SEPARATED FROM THE ELECTRICALLY LIVE OBJECT.

2.7 INJURIES

Some general instructions for specific injuries.

Eye Injury

1. Keep the victim from rubbing his eye.
2. Wash your hands thoroughly before examining the victim’s eye.
3. Do not attempt to remove a foreign object by inserting a match, toothpick etc.

Head Injury

1. Do not attempt to cleanse scalp wounds of contaminants; to do so may cause serious bleeding and if the skull is fractured, can lead to contamination of the brain.

2. Control the bleeding by raising the victim's head and shoulders, if possible; but do not bend the neck, since a fracture may be present.
3. Place a sterile dressing snugly on the wound. Excessive pressure should not be used, however, because the bone may be fractured.
4. When bleeding is under control, apply a bandage to hold the dressing in place and to provide continuing pressure.

Face and jaw Injury

The immediate problems are obstruction of the air passage by blood, saliva etc.

1. Have someone call for an ambulance or medical assistance as quickly as possible.
2. Continuously maintain an open airway. Remove any dentures, broken teeth, or other foreign matter.
3. Provide continuous support of the victim's head and jaw to prevent airway obstruction by the tongue.
4. Treat for shock.
5. Apply protective dressing as necessary.

Ear Injury

1. For cuts apply a dressing with light. even pressure and raise the victim's head.
2. For rupture of the ear drum (due to blast, a blow on the head, sudden change in atmospheric pressure etc.) place a small swab of gauze or cotton loosely in the outer ear canal for protection. Do not allow the victim to hit himself on the side of his head in an effort to restore hearing.
3. Do not insert instrument or any kind of liquid into the ear canal.

Leg and feet injury

1. Cover wounds of the legs and feet and wrap them with supportive- not constrictive – bandages if available.
2. Keep an injured limb elevated with pillows or a Rolled-up coat.
3. Do not allow the victim with a leg or foot wound to wall.
4. Remove shoes and hose and examine colour of the toes from time to time. If toes become blue or swollen, loosen the bandage but do not remove dressings.

Hand injury

1. Elevate the hand above the level of the heart.
2. If the wound is major, do not try to clean it.
3. Apply pressure over a sterile or clean pad to control bleeding; place a roll of bandage or cloth, fluffed up gauze squares, or other material into the palm of the victim's hand and curve his fingers around it.
4. Separate the fingers by cloth dressing material and cover the entire hand with a sterile towel, a clean cloth or an unused plastic bag.
5. Elevate the victim's hand in a sling or on pillows during transportation to receive medical care.

2.8 HEART ATTACK

Heart attack is the blockage of one of the small arteries supplying the muscular wall of heart.

Frist Aid for Heart Attack

1. Put the patient at rest, lying down with his head raised on a couple of pillows. If he has severe breathing difficulties, he may be more comfortable in a sitting position.

2. Loosen tight clothing.
3. Let in fresh air but keep the patient warm.
4. Gently mop away any sweat.
5. Give psychological help by being calm, by showing concern for his distress but in no way expressing the fear for his safety. Reassure him that medical help is on the way.
6. Give him ordinary aspirin if the casualty is conscious, and tell him to chew slowly.

Make him comfortable to ease strain on the heart



He must chew the aspirin without water



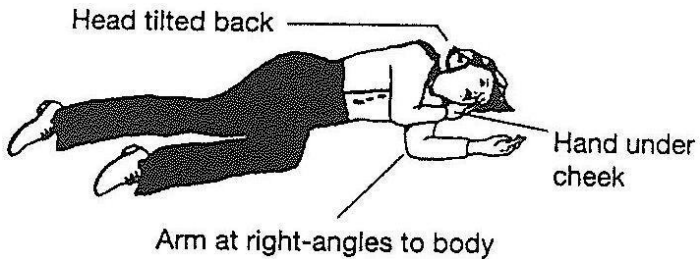
2.9 FITS

This may happen when a child develops a high temperature. He becomes unconscious, goes rigid and may have a convulsion.

First Aid for Fits

1. Immediately put the patient in the recovery position.
2. If he has vomited, clear his mouth.
3. If his temperature is very high remove his cloths and cool him a little by cold sponging along his limbs or by using an electric fan.

4. Get medical aid.



2.10 SHORT DISTANCE TRASFER

If a person is ill or injured to the extent that he will require transport to a medical facility, transportation has to be done in proper way. More harm can be done through improper transportation. Some possible transferring techniques are shown in the following figures.

With All Emergency Carries

- Use good body mechanics/lifting techniques
- Don't try to lift/carry person before checking for injuries



8

Modes of carrying

⊕ When space does not permit
two hand seat



⊕ Improvised (chair)





CHAPTER 3

TYPES OF FIRES

“A” Type fires

These are due to papers, cloths, wood etc. Earlier Soda-Acid extinguishers are used to stop this type of fire. But now, CO₂ – H₂O extinguishers are used.

“B” Type fires

These are due to fuels such as diesel and petrol. By using sand or thick cloth we can stop this fire. Earlier air-foam extinguishers were used. Now chemical foam extinguishers are used.

“C” Type fires

These are due to gas or electricity. Usually CO₂ extinguishers are used.

“D” Type fires

These are due to chemicals. When using the extinguishers for this, face has to be covered with wetted cloth.

Colour Code for Extinguishers

A – RED

B – CREAM

C – BLACK

D – BLUE

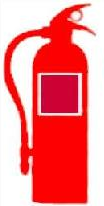

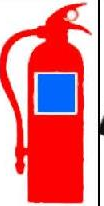







In some extinguishers the colour code will be indicated as stickers.

CLASSES OF FIRES	TYPES OF FIRES	SYMBOL
A	Wood, paper, fabric, plastic, and most kinds of trash.	
B	Flammable liquids (for example, gasoline).	
C	Burning gases (for example, natural gas).	
D	Combustible metals* such as magnesium, potassium, titanium, and zirconium. * Exception of the metals that burn in contact with air or water (for example, sodium).	
E	Fires involving potentially energized electrical equipment .	
F	Unsaturated cooking oils in well insulated cooking appliances located in commercial kitchens.	

KNOW YOUR FIRE EXTINGUISHER CODE

CO ₂	DRY POWDER	AFFF FOAM	WATER	VAPOURISING LIQUIDS
 <div style="background-color: green; color: white; padding: 2px; font-size: 8px;">FOR USE ON: Flammable Liquids</div> <div style="background-color: green; color: white; padding: 2px; font-size: 8px;">FOR USE ON: Live Electrical Equipment</div> <div style="background-color: red; color: white; padding: 2px; font-size: 8px;">DO NOT USE ON: Wood, Paper and Textiles</div> <div style="background-color: red; color: white; padding: 2px; font-size: 8px;">DO NOT USE IN: a confined space</div>	 <div style="background-color: green; color: white; padding: 2px; font-size: 8px;">FOR USE ON: Wood, Paper and Textiles</div> <div style="background-color: green; color: white; padding: 2px; font-size: 8px;">FOR USE ON: Flammable Liquids</div> <div style="background-color: green; color: white; padding: 2px; font-size: 8px;">FOR USE ON: Gaseous Fires</div> <div style="background-color: green; color: white; padding: 2px; font-size: 8px;">FOR USE ON: Live Electrical Equipment</div>	 <div style="background-color: green; color: white; padding: 2px; font-size: 8px;">FOR USE ON: Wood, Paper and Textiles</div> <div style="background-color: green; color: white; padding: 2px; font-size: 8px;">FOR USE ON: Flammable Liquids</div> <div style="background-color: red; color: white; padding: 2px; font-size: 8px;">DO NOT USE ON: Live Electrical Equipment</div> <div style="background-color: red; color: white; padding: 2px; font-size: 8px;">DO NOT USE ON: Flammable Metal Fires</div>	 <div style="background-color: green; color: white; padding: 2px; font-size: 8px;">FOR USE ON: Wood, Paper and Textiles</div> <div style="background-color: red; color: white; padding: 2px; font-size: 8px;">DO NOT USE ON: Live Electrical Equipment</div> <div style="background-color: red; color: white; padding: 2px; font-size: 8px;">DO NOT USE ON: Flammable Liquids</div> <div style="background-color: red; color: white; padding: 2px; font-size: 8px;">DO NOT USE ON: Flammable Metal Fires</div>	 <div style="background-color: green; color: white; padding: 2px; font-size: 8px;">FOR USE ON: Wood, Paper and Textiles</div> <div style="background-color: green; color: white; padding: 2px; font-size: 8px;">FOR USE ON: Flammable Liquids</div> <div style="background-color: green; color: white; padding: 2px; font-size: 8px;">FOR USE ON: Gaseous Fires</div> <div style="background-color: green; color: white; padding: 2px; font-size: 8px;">FOR USE ON: Live Electrical Equipment</div>

Know your Fire Extinguisher

<i>Symbols found on fire extinguishers and what they mean</i>						
		WATER	FOAM SPRAY	ABC POWDER	CARBON DIOXIDE	WET CHEMICAL
Wood, paper & textiles		✓	✓	✓	✗	✓
Flammable Liquids		✗	✓	✓	✓	✗
Flammable Gases		✗	✗	✓	✗	✗
Electrical Contact		✗	✗	✓	✓	✗
Cooking oils & fats		✗	✗	✗	✗	✓

About Extinguishers

1. Inspection of extinguishers should be carried out annually.
2. If the weight loss is more than 10% refilling is necessary.
3. Dry powder cartridges should be recharged every two years.
4. Halon gas extinguishers can be used on electronic items. such as TV, computer. But this gas is toxic. Be aware of this when using.
5. CO₂ gas extinguishers are effective only indoors.
6. Use only CO₂ gas extinguishers on important documents, books, electronic items etc.

CHAPTER 4

SAFTY SIGNS

Safety Signs warn the workplace hazards and instruct the workplace users on the proper precautions to take to avoid injuries.

Safety signs must be used whenever a hazard or danger can not be avoided adequately or reduced in another way.

Safety signs must be followed by the users of the workplace. Common safety signs are given in the figures below.



SOURCES

1. First – Aid Manual issued by the British Red Cross and St. John’s Ambulance
2. First - Aid Hand book issued by St. John’s Ambulance
3. A. S. Playair “First – Aid for every home”