

(2) Use of proper equipments :

Particular equipments used for particular games should be of standard size, strong and durable and of high quality. Strength and shape (surface) of the equipments of sports and games or gymnastics should be tested before use. To select mats of proper density for Judo and wrestling and see that mat is open enough outside the area without hindrance. Ordinary cheap equipments may look good economically, but for a player it becomes a cause for serious accident. If we use standard and strong equipments, then only accidents occurred due to equipments can be prevented.

(3) Kit of the player :

Kit of the player is an important factor for every game. Dress should be of proper cloth, proper size and make so that it may not create any hindrance in adopting skills and various kinds of devices of games. Dresses are of different types as suited for games. Button, belt, buckles etc. if needed in making dress, should be made from such a material that they may not cause any injury. Dress for games like cricket, boxing, wrestling judo, karate, skating gymnastics etc. should be prepared specially for protection.

(4) Knowledge of skills and rules of games :

If the player gets proficiency over the skills of the game, develop physical competency and take part in the game maintaining his mental balance, then he can take proper decision according to situation. As a result, accidents would be prevented. If rules of the game are strictly observed and the game would not be hazardous. While running fast if the skill of stopping suddenly and the skill of suddenly changing the direction would have been developed, then accidents could be prevented.

(5) Work according to ability :

The player should put in labour in limit of his ability, so that he is not tired much and that muscles are not stretched. If his ability to work is increased gradually more and more through training, accidental injuries can be prevented.

(6) Proper time for playing games :

Result of a game of competition is expected good in pleasant atmosphere Avoid playing in heavy rains and in severe sun-heat. Take care that body is not too much cool, while playing in chilly cold. Thus on selecting proper climate for playing games likely accidents can be prevented.

(7) Proper guidance :

Having consciousness for knowledge of probable accidents and remedies to prevent them accidents would be prevented. Frequent guidance as well as during games the teacher or coach would be useful in preventing probable accidents.

Remedies of self-defence :

If each and every player individually is seriously and aware to prevent accidents likely during games or competitions then the proportion of accidents during games would be meagre. Here some remedies for self-defence are stated:

(1) Consciousness :

While doing any activity in public life or on the play-ground if one is conscious about activity remedies for self-defence can be effective.

(2) Physical capability and mental health :

By being physically ready and developing mental health one can be saved from likely accident by taking immediate and proper decision in any accidental situation.

(3) By developing mastery over skill of the game and proficiency of applying it properly, self-defence from the accident is possible.

(4) Keeping eye-sight moving all around during activities and thereby becoming convenient to constant changing situation in game, self-defence is possible.

(5) Activities may be performed according to proper guidance through the teacher or the coach.

(6) Have your own accident insurance.

First Aid :

Immediate treatment as a relief given before the medical treatment is given to a person injured accidentally or suddenly attacked with illness is called the first aid. In other words first aid is a treatment given by any person on the location to the sufferer in situations like accidental illness or accidental injuries like wound, fracture, bleeding, drowning, burn, haemorrhage, becoming unconscious etc. before taking the sufferer to the Doctor.

The main objective of the first aid is : to save life, to give relief in pain, not to allow the pain of the sufferer to increase and to provide immediate medical help.

EXERCISE

1. Answer in detail the following questions :

- (1) How accidents occur due to the equipments used in games ?
- (2) State how the kit of a player prevents accident ?
- (3) State the things to bear in mind while preparing the play-ground.
- (4) Explain the meaning of the first aid.

2. Answer the following question in one or two sentences :

- (1) If the leg falls in a pit while running which type of injury is likely to happen?
- (2) Which type of equipments should a player use ?
- (3) In game how rains become a cause for accident?
- (4) Which things in vicinity of limit-line of the play-ground become a cause for accident?

3. Fill in the blanks on the basis of the text-book :

- (1) The incident happening suddenly is called
- (2) Running on a wet surface causes
- (3) Players running from the opposite direction to play ball in the game football suffer accident

Activity

- Arrange a visit to the nearby various games-complex and give information to students about play-grounds equipments and their maintenance.



Nowadays in this hasty and active life possibility of accidents has tremendously increased. The advisory group of the World Health Organization (WHO) recognizes accident as an unexpected event causing injury that is clearly understandable. The number of deaths due to accidents is more than that due to cancer or heart-attack. Sometimes some persons suffer lifelong physical disabilities due to accident.

Accident is not merely accidental. It is not unexpected. Accidents do not happen, but they are rather made to happen. There is a chain of incidents behind every accident. Most of these are such as could be avoided. In a chain of incidents accident is such an incident which causes unexpected injury, death or harm to the property.

Immediate treatment given prior to (before) the medical treatment is given to a person injured accidentally is called the First Aid. If such a treatment is not possible then sometimes the patient dies or suffers permanent physical disability. Knowledge of first aid becomes useful to a person suffering accident. Hence in some of the ordinary accidents, the information regarding how to provide the first aid is essential for a student, teacher or any person.

"Immediate treatment (as a relief) given before the medical treatment is available to a person injured accidentally or suddenly attacked with illness is called the First Aid."

Thus when the body is injured due to sudden unexpected incident then in order that the injury may not result more harmful and his life could be saved the treatment rendered before a doctor comes for medical treatment is first aid.

Primary treatment rendered at the critical times is called First Aid. First aid's Treatment expects merely immediate treatment nothing much more (nothing else).

A person providing First Aid should be properly trained. His observation power should be good enough. He may be able to take proper decisions frequently according to the situation. During the First Aid treatment, he should keep patience, perseverance and courage.

When an accident occurs, first give first aid. Then arrange to call a doctor. If the patient is required to be shifted to the hospital, arrange for that. Make an arrangement for the government ambulance of 108 number. First of all take care that the trouble to the injured in the accident does not increase. If the injury is due to some machine, then switch off the machine. In case of electric shock, first of all switch off the electric current. If a person is pressed under some load, remove that load. Afterward know the proportion and types of injuries the patient suffers and give him treatment accordingly. If the patient is still unconscious, try to bring him to consciousness. In case of bleeding apply remedy to stop it. In case of bone-fracture or joint - fracture apply necessary bandages accordingly.

If a person becomes unconscious due to accident, at first loosen his clothes. Keep doors and windows open. Change clothes, if wet. If the patient's body becomes very cold, use available conveniences like shawl, blankets etc and cover the patient. Apply rubbing dry ginger or balm to bottom of feet or ferment with hot water bag. When a person is unconscious no medicine or liquid be given keep by mouth keeping

in mind the above points, attendant giving treatment can do much for the patient suffered with the accident. We should get the information as to how to render first aid in case of accident. First Aid depends on the type of injury.

Cuts :

Cuts are caused to body with thin-edged tools like knife, sword. Bleeding starts. Clean the cut with antiseptic solution and apply a bandage. Inject tetanus toxoid unfailingly.

Wounds :

A wound is caused by sharp edged weapon, tool, or by falling down, collision etc. Skin, muscles and blood vessels are cut due to wound. Hence bleeding starts, wound can be shallow or deep. Bacteria, harmful dust-sand particles etc. enter inside through the wound. Types of wounds are as follows :

(1) Wound due to cut of blood vessels :

Sharp-edged tools like knife, sword etc. cause wound and blood vessels are cut.

(2) Wound caused due to cutting of skin :

In this type of wound skin is broken irregularly. These types of wounds are caused due to any organ of the body. Sharp-edged tool or by bomb or shell. In such a wound, blood vessels are also cut. Bleeding starts. sometimes bleeding starts after some time.

(3) Wound caused due to crushing and pressing :

Such a wound is caused due to lathi (thick stick), hammer, stone, circle, discus, or any heavy and blunt tool other than sharp-edged tools. Skin and muscles on the part that is injured gets crushed or pressed.

(4) Wound due to piercing :

Sharp-edged tools cause such a wound. Injury is caused due to piercing of spear, lance, knife, gupti (blade of sword consealed in a stick), small and big nails, needle etc. Wounds of such injuries are deep and narrow. Their area is externally limited.

First Aid :

- Make the patient sit or sleep according to the injury caused and give him relief - convencience.
- Clean the skin arround the wound by medicated cotton dipped in antiseptic solution. Remove dust, sand particles adhered to it and wash the wound with clean water.
- Keep in mind that skin around the wound may be cleaned with only antiseptic solution, water and soap. Cleaning of the wound is not sufficient, but clean slowly and gently the edge of the wound with medicated cotton or clean handkerchief. Change it frequently. The blood coagulated on the wound may be kept as it is, so that germs of disease may not enter inside.
- The wound and the cleaned skin around should be covered with porous cloth.
- Stop immediately the bleeding by applying pressure directlty on the wound and through tourniquet on the pressure point.
- Apply cotton as necessary to cover porous cloth.
- Take care that the bandage is not loose and the wound is not open.
- The hand when wounded should be kept in jholi (improvised sling). If leg is wounded keep the patient sleeping and the wounded part should be kept higher as compared to heart by putting cushion.

- Don't apply antiseptic inside the wound.
- Don't put cotton on the surface above the wound. Cotton fibres harm the wound.
- Don't try at all to stretch out the thing, if any entangled inside the wound. This may cause blood-vessels, arteries and veins cut, which can result in much harm.

Muscle's Strain :

- On giving excessive labour or activity to muscles, they get stretched more than their limit of flexibility. Hence it produces a situation of muscle's strain or muscles get excessively stretched. During activities in which actions are performed very fast, possibility of stretch in muscle, is much more.

First Aid :

- Muscle at the point having pain should be given rest.
- Rub ice on the injured muscle or pour cold water. Tie a wet bandage, soaked in cold water.
- Keep the injured part higher as compared to the heart.
- Take bed rest for at least two days (48 hours). Rub ice for 20 to 30 minutes for three or four times a day. Keep the injured muscle under bandage.
- Continue the remedial treatment of cold and hot water according to convenience of the patient.
- Give light exercises to the muscle and then heavy exercises.

Sprain :

When a person does excessive movement as compared to his working ability or out of limit of his movement or he does reverse action during his normal working then in that case the injury that is caused is called sprain, Causes of sprain are :

- Excessive pushing.
- Unknowingly the leg falls in some pit being dashed. Then causes a sprain in various joints of hands or feet.

First Aid :

- Give rest to the injured organ.
- Tie a simple bandage to control movement of the part suffering sprain. Elastocrepe bandage is more beneficial.
- Apply ice on the injured organ or bandage of cold water.
- Keep the injured part higher as compared to the heart.
- After applying ice, tie the injured part with a bandage.

Constant Bleeding :

When blood starts coming out from the blood vessel from any part of the body, it is called bleeding. Bleeding occurs from artery, vein or capillary tube. Blood coming out of artery is of bright red colour. It showers like a fountain intermittently and it comes out from the cut of artery, that is towards heart. Blood coming out from the vein is of dark red colour. It does not shower like a fountain. Its flow is even like tap-water.

First Aid :

- Injured organ constantly bleeding may be kept higher as compared to the level of heart.
- The blood flowing from an artery comes toward the wound from the heart. In order to stop it, give pressure with thumb on just upper part of the wound, and that too in between the heart and the wound.
- If bleeding is from the artery of the part near to temples, forehead or skull, apply pressure with thumb near the ears below temples.
- For the part behind the skull, apply pressure with thumb or finger behind ear, where throbbing is felt.
- If bleeding is from the artery of the throat, apply pressure to the nearby bone of the throat so that breathing is not obstructed.
- In order to stop bleeding from the artery of hand, apply pressure with thumb near biceps muscle.
- Bleeding is controlled by tying a bandage of clean cloth on the part that is bleeding.
- If bleeding is from some vein, tie a bandage by applying pressure away from the heart. If bleeding is from some capillary tube then tie bandage of clean cloth with pressure.
- Until bleeding stops, the patient should not be given stimulating drinks like tea, coffee. Little cold water or piece of ice for sucking can be given.
- If bleeding is from nose let the patient be seated in open air or near window so that his head is kept backside, and loosen clothes that are on the chest or neck. Apply strip of cold water or ice on the backside of neck, on the forehead or nose. If bleeding is fast, put a pellet of clean cotton or a ball made of a piece of clean cloth in the nostril.

Fracture :

- Apply splint and tie bandage, so that the injured part may not move slightly and then take the patient immediately to a doctor.
- If long bones have broken then tie hard board to stop movement. Hence, ends of bones broken do not work out and harm is reduced. Severe pain is also avoided thereby.
- Support the broken organ by tying proper elastic bandage.
- Take care that broken bones are in the rest position.
- If a bone of hand is broken keep the hand in Zoli (Sling).
- If vertebra of a waist or that of spinal column has broken, take the help of a trained person, because if any brain - nerve is pressed, the patient may suffer attack of paralysis or even death. and sometimes that part loses sensation.

The following points to be borne in mind in case of fracture :

- The part that has fractured should be made fixed and motionless and then the patient should be moved.
- Don't make the patient stand or let him not stand so that there is no load on the injured part.
- If you think vertebra has been broken, shift him to the hospital in the same position.
- In case of fracture, or bone-breaking, do not try to tackle with it and it is very essential to carry the patient to the primary health centre or the hospital.

When animals bite :

Animals like the dog, the cat, the horse, the camel etc. and wild animals can become rabid. When the rabid animal bites, virus of rabies enter human body through its saliva. In such cases give the following first aid treatment, even though the animal that has bitten may not be rabid.

First Aid :

- When any animal bites, first clean the wound by any antiseptic medicine. Take care that the animal's saliva does not enter inside the wound.

When the serpent bites :

When the serpent bites, the patient should be made to lie down in a cot or a bed. Keep the bitten part at lower level. In order that the blood may not flow from the part stung to other the parts of the body, tie a tight bandage toward the side of the heart.

Take care that the patient may not feel (experience) any mental shock.

Arrange that the patient gets immediate medical treatment.

If the scorpion has bitten :

Clean the stung part with antiseptic medicine.

Dissolve some salt in hot water. The patient feels relief by dipping the stung part in that solution.

When a honey-bee or a wasp bites :

The sting of a honey-bee or a wasp is such a strong and painful that it makes the patient even unconscious. If a honey-bee bites remove its sting. It gives relief in pain by rubbing ice on the stung part. Make a paste of baking soda in a little water and apply it to the wound. It gives relief in pain.

Drowning :

Give the following First Aid to a person drowned, after pulling him out of water.

First remove his wet clothes and cleanse him with cloth. Then wrap him with a woolen blanket.

Arrange for removing mud etc. if any from his nose or mouth.

Put a pillow below his stomach and make him lie down or sleep such that his head bends down.

Apply pressure on the back of the patient forcibly with both hands then withdraw your hands immediately. Repeat this for a minute or two. This will remove all water entered in his stomach and the breathing (respiration) system will be open.

Then make the patient lie down on his back and start the process of the artificial respiration. Continue this process till respiration starts naturally.

The processes of respiration and circulation of blood start again on giving treatment of artificial breathing in and out (respiration) to the person drowned and the patient regains consciousness.

Unconsciousness :

There may be many causes of fainting or unconsciousness. First Aid treatment depends on these causes.

(1) If unconsciousness is due to some injury on the head, then arrange to admit the patient to the hospital immediately. Until an ambulance arrives, the patient's head is turned to one side to be kept higher by putting some bricks or something below the legs of the cot towards his head-side. Don't put a pillow below his head because the vertebral region might have broken. It may harm him. If the patient is suffering from diabetes and has taken tablets or injection for diabetes but eating (or dining)

thereafter is missed any how, then also he becomes unconscious due to lowering proportion of sugar in blood. That is rather dangerous. If in few minutes supply of sugar is missed, then there is probability even of death of the patient. In such a case if the patient can drink, then give him glucose or sugar water immediately and shift him to the hospital urgently.

(2) If a patient is suffering from high blood pressure, then first he will feel giddiness and then will be unconscious. Make the patient lie down in a quiet place. Call the doctor and get his B. P. measured and checked. If B. P. is high, the doctor will prescribe him medicines. Get the patient admitted to the hospital.

If there is clotting or coagulation of blood in the brain-artery, then attack of paralysis alongwith unconsciousness is also possible. Shift the patient immediately to the hospital and take doctor's treatment.

(5) Burning unconsciousness : There are two causes of unconsciousness due to being burnt : (1) Because of unbearable pain on being burnt. (2) Due to being burnt, liquid of the body decreases and the circulation of blood falls short. The brain does not get enough oxygen and glucose. Take such a patient immediately to the hospital and get him medical treatment. Till then pouring cold water on the burn would give him relief. Sending the patient to the hospital may be given priority. If a doctor is in vicinity get him treatment immediately.

Sometimes other causes like weakness of heart, too much fatigue, tight clothing, feeling very hungry. severe pain, experiencing fear, sudden shock to mind etc. also can cause unconsciousness.

First Aid : Such an unconscious patient requires open and fresh air (breeze). Hence any crowd should not gather around. His clothes particularly clothes on neck and chest should be loosened and try splash of cold water on his face. Unconscious patient should get much blood to his brain. Hence make him lie down on his back and keep his head in lower position. Keep his legs high. When the patient regains consciousness, give him stimulating drink like tea or coffee.

First Aid treatment in case of Heart Attack :

On coagulation of blood in blood vessels carrying blood to the heart, the blood-flow is hindered and hence heart-attack is caused. Hence such a patient is given intravenous injection of enzyme and coagulated blood is dissolved. But only an expert doctor can do this. In such a situation the patient should be admitted to the hospital.

If the heart-attack is severe, the patient can be unconscious. In such a situation the functioning of the heart and lungs is required to be re-established. For this, arrange for the doctor immediately.

Some times it is found that at the time of heart-attack people crowd together and tumultuous noise increases. In such circumstances the patient should be shifted to a separate restful and peaceful place. Keep him in noiseless free atmosphere.

In case of heart-attack, if need be, the patient should be given mouth-to-mouth breathing. The details of this method are as follows :

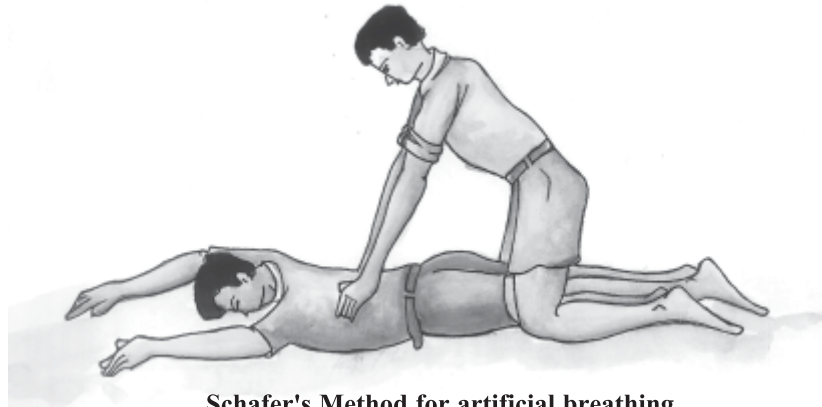
Artificial respiration :

Artificial respiration means : when the organs taking part in respiration and muscles of the chest are paralysed then the treatment given for making them active again is called artificial breathing. By performing artificial breathing the respiration and blood-circulation processes get reactivated and the unconscious patient is recovered to consciousness.

Methods of artificial breathing (respiration) are as follows :

Schafer's Method :

In this process, first the patient should be made to lie prone (on his belly). The head of the patient be kept on one side. Straighten both the hands in the direction of the head. Make sure that there is nothing in his mouth and neck. Then the nursing person would sit near his hip or on the upside of his head.



Schafer's Method for artificial breathing

Put organ-palm and fingers of your both the hands on lower ribs of the patient on both the sides of the spine. Sit straight applying pressure on your hand. Go on giving pressure evenly from downside to upside upto back. So, the air inside the patient's chest would go out. Thus the patient would start artificial breathing out. Repeat this activity of giving pressure for about two second.



Schafer's Method for artificial respiration

Then go on reducing load on his back. Sit again in a position of bent knees but let your hands be in the same position as before. On load being reduced hollowness of the chest would increase (i.e. the chest would expand) and the lungs also would expand and air would enter in. This is called artificial breathing in. Continue this activity for two seconds.

The activity as stated above, may be repeated generally fifteen to sixteen times per minute.

This method is not suitable for pregnant women and small children.

Dr. Silvester's Method :

- Make the patient lie on his back. Put a pillow below his back towards upside. Keep his neck straight and make his head carefully slanting back. Then open the patient's mouth. Hold his tongue slightly out. The nursing person for artificial respiration should sit on his knees backside to his mouth. Hold his hand at the knees and take them toward his head. So his ribs would expand upside and the chest would expand. Due to this air outside would enter in the lungs through his mouth and nose. This is called artificial breathing (in).



Dr. Silvester's Method

- Then bring his hands down and let lean his hand on his chest. Apply pressure in this position. As a result, the chest would contract. Air inside the lungs would go out. This is called breathing out. Repeat this process about sixteen to eighteen times per minute. Continue this process till the patient breathes in and out on his own naturally.

Mouth to Mouth Breathing :

- The method of filling in air through mouth is good in cases like drowning, suffocation, strangulation, serpent-bite, electric shock and heart attack.
- Make the patient lie on the back.
- Keep the patient's head leaning backward. The nursing person may close his nose with one hand and hold his chin with the other hand and then open his mouth. Then the nursing person would arrange his mouth tight with the mouth of the patient. He would then breath out air from his mouth into the mouth of the patient.
- By filling air thus in the patient's mouth, the chest of the patient would expand.
- When the patient's chest comes upward, you may move your mouth and let the patient's chest go down.
- Continue and repeat this process ever, five to six seconds until the patient breaths in and breaths out of his own or till the doctor comes.
- Breathing air can be supplied to the patient through his nose rather than mouth.

Method of Cardiac Massage :

- Heart is an organ made up of very flexible involuntary muscles. It is made up of soft bag of flesh. It is situated between two lungs behind the bone named sternum (ଓରେସ୍ଥି). It is arranged oblique and inclined from right to left. Coronary artery supplies blood to the heart. If there is some hindrance in any branch of coronary artery, supply of blood in certain part of the heart is cut off and contraction and expansion of muscles of the heart become irregular and hence it stops functioning. It is called heart attack. In such a situation necessity of giving pressure from outside to the heart arises.
- The nursing person giving pressure should have complete knowledge, otherwise instead of any benefit, harm is possible.
- Nails of the nursing person should be trimmed (cut). The nursing person should, not have ring in his hand or circular rod ring (ଝୁଞ୍ଜି) on wrist or elbow otherwise there is danger of injury to the patient.
- Method of giving pressure should be harmonious in middle of the chest in vertical direction, and it should be atleast 100 compression.
- During the process of giving pressure, don't indulge in unnecessary delay.
- Keeping constant contact on the surface of the skin, do the process of vertical compression. Generally after 30 compression, give two mouth to mouth respiration.

First Aid in acute Diarrhoea :

- Due to impure water or food, the intestine gets infected and the person suffers from loose motion and vomiting. In the disease of cholera also much water is lost due to loose motion. In vomiting also water is thrown out. As a result the patient suffers a condition of dehydration. Hence the patient feels weakness. He feels giddy. Slowly the condition worsens. Hence the following first aid should be treated so that the situation may not be out of control.
- Immediately give the patient ORS (Oral Rehydration Solution) Water to be taken orally. ORS powder is easily available in the market. It is also available at the primary health centres or hospital. If it is not handy then prepare it like this : Take a glass of water. Add two spoonful salt and one spoonful sugar in it. Then add little lemon-juice and keep giving this solution to the patient to drink at every five minutes. Moong water, water taken out of cooked rice, butter-milk etc. can also be given to the patient instead of water. Anyhow the body should get enough necessary water. Hence intake amount of liquid should be much more than that going out.
- Boil water and milk and then let it be cold and then give.
- Take care that proper proportion of water and energy is maintained in the patient's body.
- Don't allow the patient to remain hungry with empty stomach.
- Arrange for immediate medical treatment to the patient.
- Try to control over loose-motion and vomiting so that the intestine would not be weakened.
- Keep the patient in fresh air and well-lit place.
- To prevent vomiting give the patient a mixture of baking soda, lemon juice and water as domestic remedy.
- When there is no surety purity of water available in the bazaar, then insist on boiled drinking water.

General remedies :

- (1) Keep dilute solution of antiseptic medicines handy and easily available. It will be very much useful. In case of small-big stretches and cuts the wound can be cleansed and then a bandage should be tied. If there is pain in throat, gargle with warm salty water gives relief. In case of erupt (pimples) or small boils, bath with solution prepared by boiling nimb leaves gives relief.
- (2) Tincture iodine and tincture benzoin liquid also can be applied to small and big injuries. Cotton dipped in tincture benzoin may be stuck to the wound. Once it is stuck, then cotton would get detached only after the wound is healed completely from inside in few days. No other process is required to do.
- (3) Cold is a troublesome disease known to all. In cold throat and tonsils get infected. This infection spreads in ears also. There is swelling on trachea, coughing increases. For this, take turmeric, bishop's seeds (carum copticum) and ginger etc. A doctor may be consulted. Get the tonsils operated if needed. Remedies have been shown in different methods like, Aayurved, Homoeopathy and Naturopathy for in the form of first aid.

EXERCISE**1. Answer the following questions in detail :**

- (1) Which precautions should be taken while giving First Aid treatment ?
- (2) Which First Aid would you give in case of the wound ?
- (3) Which things would you bear in mind in case of fracture ?
- (4) Give information regarding Schafer's method in artificial respiration.

2. Write short notes :

- (1) First Aid in sprain
- (2) Dr. Silvester method in artificial respiration
- (3) First Aid when a dog bites
- (4) First Aid in case of serpent-bite
- (5) First Aid in case of muscles - strain.

3. Write answers to the following questions in one or two sentences :

- (1) What is the cause of muscles strain ?
- (2) In constant bleeding in which position the injured organ is to be kept ?
- (3) What is 'fracture' ?
- (4) In case of scorpion-bite how to cleanse the stinged part ?
- (5) In case of constant loose motion and vomiting which liquid is required to be given frequently ?

4. Answer the following questions by selecting a correct choice from the choices given below :

- (1) In order to prevent bleeding from artery of hand, where should pressure be applied ?
(a) Near triceps (muscle) (b) Near bones of neck
(c) Near biceps (muscle) (d) On the upside of the injury
- (2) Which solution is required to start in case of dehydration ?
(a) Salt (b) Sugar (c) Lemon (d) ORS
- (3) In case of the honey-bee bite, what is to be rubbed on the stung part ?
(a) Ice (b) (b) Tincture Iodine
(c) Hot water soaked piece of cloth (d) Tincture Benzoin
- (4) In case of fracture what should be applied while tying a bandage ?
(a) Solution (b) Splint (c) Antiseptic (d) Thick cloth
- (5) What care would you take in case of serpent-bite ?
(a) To give rest to the patient
(b) Let the patient sleep
(c) The patient should not be allowed to sleep
(d) Make arrangement for medical treatment
- (6) In Schafer method of artificial respiration how the patient is required to lie down ?
(a) On the back (b) Inverted (c) On the side (d) Not to sleep
- (7) In Dr. Silvester method of artificial respiration how the patient is required to lie down ?
(a) On the back (b) Inverted (c) On the side (d) Not to sleep

Activity

- Activities of artificial respiration to be performed.
- Make them draw the figure of organs of the respiratory system.

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Before knowing about the effects of exercises on respiratory and circulatory systems, we shall know, what is Vyayam. In Gujarati and Hindi Dictionaries the meaning of "Vyayam" is 'Exercise'. Presently, the word Exercise become is more prevalent instead of Vyayam. In simple language, Vyayam or exercise means the physical movements or we can say, physical movements being done by physical activities. In these physical activities walking, jogging, swimming, play any game and doing exercises for different parts of the body, like the exercises of neck, shoulders, elbows, wrists, waist, knees, hands, legs, the fingers of hands and legs etc. are included.

The games and the exercises can be individual, in pairs or in a group. There also exercises with and without equipments.

Exercise is an important mean to know the effects on various systems of the body. Over and above, the effects of exercise is a result oriented component of "Exercise physiology".

(1) Effects of light exercises

In light exercises slow walking; the exercises of hands, legs, neck, shoulders, waist, knees, ankles and the fingers of hands and legs in medium speed and counts (8 to 16); cycling with medium speed, swimming with less speed etc. can be included generally. In such exercises the effects are seen as follows :

- (1) An increase in the counts of respiration in resting position.
- (2) The efficiency of taking the oxygen in lungs increases, i.e. there is an increase in the general efficiency of 250 ml/min in one minute.
- (3) The efficiency of the lungs', throwing out the carbon dioxide increases i.e. there is an increase in the general efficiency of 215 ml/min in one minute.
- (4) The efficiency of the diaphragm of, lower pulling while inhaling and upper pressure while exhaling increases.

(2) Effects of heavy exercises :

In heavy exercises brisk walking, speedy cycling, cycling on cycle-ergometer with different work-loads and different speeds, speedy swimming and playing of all the games are included. In doing such exercises generally, the following effects are seen.

- (1) The chemical reactions in the muscles of various parts of the body become speedy. To cope up with this speedy reaction, the necessity of oxygen, is arises. This necessary oxygen is provided to the muscles through blood circulation.
- (2) To provide necessary oxygen for speedy chemical reactions, the heart and the lungs have to react speedily.
- (3) The energy produced in the presence of oxygen is called aerobic energy and the energy produced in the absence of oxygen is called anaerobic energy. Taking into consideration the respiratory system only, an individual who practise the exercise for longer period, gets approximately 38% more aerobic energy and approximately 18% more anaerobic energy.
- (4) In the resting position, the requirement of oxygen per minute is 15 to 20 litres, which increases to 100 litres per minute in heavy exercise.
- (5) In the resting position, the proportion of breathing rate is normally 14 to 16 per minute, which increases upto 30 during the exercise.

(6) In the resting position the required volume of air in every breathing is 0.4 to 0.6 litre normally, which increases upto 3.5 litres during the exercise.

(7) The vital capacity of an individual increases because of heavy exercise.

(3) The oxygen debt produced during heavy exercise:

During heavy types of exercises, if the muscles do not get the required oxygen and deficiency of oxygen is created is called "oxygen debt". This debt is cleared during the recovery period of few minute after the completion of the exercise.

During the light exercise no oxygen debt is created.

(4) "Second wind" condition created during heavy exercises :

During the offensive actions like sprints, rowing etc. the distress is created in the body, which results into breathlessness. There is throbbing in the head and one feels that a particular activity can not be done. The experience of removal or disappearance of such distress or throbbing is called "Second wind". During the condition of second wind or before, no other physiological differences either are seen or the reasons of removal of such distress are experienced. Because of this condition, symptoms of neither improvement in the actions nor the decrease in fatigue are seen. But there is a belief that the early distress happens because of accumulation of the metabolics in the muscles and the blood, which is mostly because of creation of the deficiency of the oxygen in the muscles. After few seconds when one experiences relief, is because of the reach of the oxygen. This time, one experiences relief in breathing, the efficiency of pumping the blood by the heart increases and the capillaries become efficient in providing the blood.

Now, we shall get the information regarding the temporary and permanent effects of light exercises and heavy exercises on circulatory system.

Temporary effects :

Temporary effects are as under :

(1) Chemical reaction:

While doing the exercise, the chemical reaction in the muscles becomes speedy. This reaction happens in the presence of the oxygen carried by the hemoglobin in the blood.

(2) Speed in the action of circulation :

Because of the speedy chemical reaction by doing the exercise, the requirement of oxygen increases, as a result there is an increase in the speed of circulation. This is because of the circulation of the pure blood being emptied in the left auricle through pulmonary veins and the impure blood being emptied in the right auricle and then in the right ventricle, through the superior vena cava and inferior vena cava of the circulatory system.

(3) Pumping action of the heart :

In the resting position, about 5 litres of the blood is being pumped in one minute, by the heart. In comparison of the untrained individual, the heart of a trained individual pumps double the blood in one minute.

(4) Quantity of blood :

During an exercise, the quantity of blood of an untrained individual, in one heart beat happens to be 70 ml. where as, the quantity of blood of a trained individual in one heart beat becomes 175 ml.

(5) Heart beats :

In comparison with the heart beats of an untrained individual in the resting position in one minute, those of a trained individual are half in number in one minute.

The increase or decrease of number of heart beats are not dependent only on the exercise, but the matters which play an important role are the posture's position of an individual, sex difference, age, feeling, outer atmosphere, type of exercise and the intensity of an exercise. The information of these matters is as under.

Posture :

Various positions of the body like, in sleeping, sitting, standing etc. are included in posture. The positions of the body have the effects on the heart beats. While sleeping the centre of gravity of the body remains nearer to the ground, hence the heart beats are less comparatively. In comparison with the sleeping position, in standing position about 10 to 12 heart beats are more in number.

Sex difference :

In the resting position, the heart beats of an adult woman are 5 to 10 more in one minute in comparison of an adult man. The heart beats of a woman in one minute happen to be 84 where as those of a man happen to be 78.

Age :

At the age of 10 years, the average heart beats in one minute are maximum. With the increase of age, the heart beats go on becoming less.

Feeling (Emotion) :

The heart beats of an emotional individual in resting position and while doing the exercise are more in comparison with other individuals.

Atmosphere :

In higher temperature and at the higher altitude place, any individual's heart beats are comparatively more than the generalised heart beats. At higher altitude places the air is thin and the measure of oxygen is always less, hence to get required oxygen the heart beats increase in numbers over and above, if the air is steady and if the humidity in the air is more, the heart beats increase in numbers.

Type of Exercise :

In sprints the heart beats are very speedy. But the exercise like weight lifting in which more strength is required, here the heart beats are less, i.e. there is less increase in heart beats. But in endurance type of exercise like long distance running, the heart beats are less in comparison with sprints and are more in comparison with weight lifting exercise.

(6) Circulation of blood in kidneys :

While doing an exercise, the circulation of blood toward the kidneys decreases, so that it may circulate more toward other muscles. This decrease in blood circulation toward kidneys remains for one hour after completing the exercise. So, the patients whose kidneys are defective, should take care while doing any labour work.

Permanent effects of exercise**(1) Haemoglobin :**

During training, increased proportion of haemoglobin is seen.

(2) Capacity to endure lactic acid;

When anaerobic energy is created, lactic acid is produced. At the end of long period training, an individual gets more efficiency to endure lactic acid.

(3) Blood pressure :

The upper pressure of blood, is called systolic blood pressure and that of lower is called diastolic blood pressure. During long period of training systolic pressure becomes 180 millimetre and the diastolic pressure becomes 110 millimetre.

A healthy young individual is having 120 mm systolic pressure and 80 mm diastolic pressure in normal circumstances.