ARTIFICIAL RESPIRATION

(This E.I. cancels E.I. LINES Aerial SP 9003 Issue 4).

1. GENERAL.

This E.I. describes how to apply the Expired Air methods of artificial respiration for reviving victims of electric shock, drowning, gas or smoke inhalation etc., who have ceased breathing.

The Expired Air techniques have been proved greatly superior to all other methods of artificial respiration and their simplicity and ease of application make them particularly suitable for field use. These methods are to be introduced immediately and training in the manual methods of resuscitation (Holger-Nielsen and Schafer) is to be discontinued.

Expired Air resuscitation consists of direct inflation of the lungs by the rescuer blowing into the victim's nose (Mouth-to-Nose method) or his mouth (Mouth-to-Mouth method). The process is rather like inflating a balloon (the lungs of the victim) by a single breath. When the rescuer stops blowing and withdraws his mouth, the air is automatically exhaled from the victim's lungs. The cycle of inflation and deflation of the lungs is repeated until the victim commences to breathe naturally.

Although the mouth-to-nose and mouth-to-mouth methods are equally effective, mouth-to-nose is generally preferred as much less air is blown into the victim's stomach and vomiting due to inflation of the stomach is avoided. External circumstances such as blockage of the victim's nasal passage, tightly clenched jaw or injury to either his nose or mouth may determine which of the two methods should be used. If one method fails, the other should always be attempted.

2. WHY EXPIRED AIR ARTIFICIAL RESPIRATION IS BETTER.

Forced inflation of the lungs by expired air has the following advantages over the manual methods of resuscitation :-

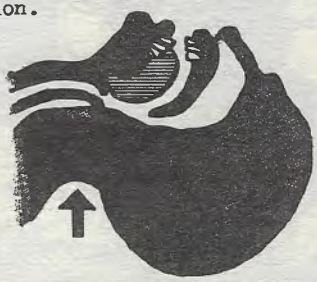
(i) A much greater volume of air is moved in and out of the victim's lungs giving a more rapid reoxygenation of the blood. (Adequate oxygen remains in the rescuer's breath for the victim's use also.)

(ii) It is more easily performed than the manual methods; it does not require frequent practice to become proficient and it can be maintained for long periods without undue strain or fatigue of the operator.

(iii) It can be applied even though the victim is suffering from fractures or injuries to the limbs or chest.

The rescue breathing technique of tilting the head backward ensures that the victim's air passageway is kept open at all times. When a person is unconscious, the tongue may sag against the back of the throat blocking the natural air passageway (Fig. 1(a)). This can occur whether the unconscious person is placed face down or face up and is a serious disadvantage with the manual methods of artificial respiration unless a second rescuer is present to maintain the head tilted position.

(a) Air passage blocked by tongue falling back.



(b) Air passage cleared by tilting head backward and pulling lower jaw forward.

FIG. 1.

3. PREPARING FOR RESUSCITATION.

3.1 Place the victim on his back, face up.

Clear any foreign matter from his mouth by turning his head to one side, forcing his mouth open and quickly wiping his mouth and throat clean with your fingers or a piece of cloth. (Fig. 2.)

FIG. 2. CLEAN MOUTH AND THROAT.

3.2 Where a pad of clothing or similar material is immediately available place it under his shoulders (clear of the neck) to raise them a few inches above the ground.

Lift the Neck. (Fig. 3.)

FIG. 3. LIFT THE NECK.

3.3 Tilt the head as far back as possible by holding the crown of the head with one hand and pulling the chin upward with the other. (Fig. 4.) This gives a clear air passageway to the lungs.

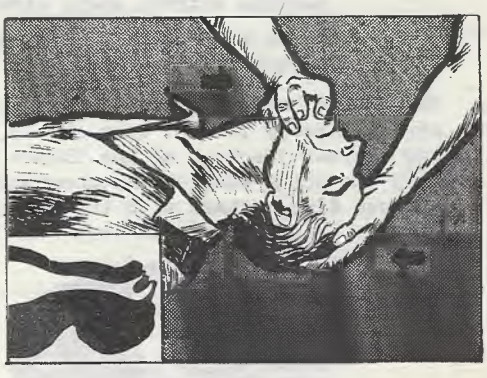


FIG. 4. TILT HEAD BACK.

PREPARE PATIENT WITH UTMOST SPEED, HIS LIFE DEPENDS UPON GETTING AIR INTO HIS LUNGS WITHOUT DELAY.

4. MOUTH-TO-NOSE METHOD.

4.1 Lie or kneel to one side of the victim's head so that you are looking downward into his nostrils.

With your hands, continuously maintain maximum extension and backward tilt of the victim's head and hold his mouth closed.

Open your mouth widely and place it around both of his nostrils and well on to the nose, reaching the bony part of the nose. (Fig. 5.) (For infants cover both nose and mouth.)

Take care not to press more on one side of the nose than the other (or that side of his nose may become blocked while the other side is possibly blocked already). See that you make a good seal with your mouth.

FIG. 5. POSITION OF LIPS.

4.2 Press your cheek against his mouth to seal it but make sure you don't 'lose' head-tilt by pressure against his mouth.

Take a deep breath and blow steadily into his nose. (Fig. 6.)

Do not blow with a jerk but steadily as inflating a balloon. Blow forcefully for adults, gently for children and very light puffs only for infants.

Watch the victim's chest as you blow. If you cannot see his chest shift your hand momentarily from below his jaw to his chest to feel its expansion.

FIG. 6. BLOW AIR INTO LUNGS.

4.3 When his chest rises take your mouth away to let him breathe out naturally. (Fig. 7.) With some persons it may be necessary to open the mouth to assist exhalation.

Listen to the air being exhaled. When the flow of air stops blow in the next breath.

Make the first ten breaths deep and at a rapid rate (but without jerking your breath into the patient) to give a good quick supply of life giving oxygen. Then determine the rate of breathing by the time taken to inflate and deflate the lungs. This varies from 10 breaths per minute for a large adult to 20 breaths for a small child.

FIG. 7. LET HIM BREATHE OUT.

5. MOUTH-TO-MOUTH METHOD.

5.1 Use this method if you cannot get air into the victim's lungs by blowing through his nose.

While holding his head back with your hands, separate his lips with your thumb.

Open your mouth widely and place it tightly over his mouth. (Fig. 8.)

Press your cheek against his nostrils to prevent air leakage.

Blow in steadily to inflate his lungs as described for mouth-to-nose breathing.

FIG. 8. POSITION OF LIPS.

5.2 If the lungs cannot be inflated draw the tongue further forward to clear the air passageway. Insert your thumb between his teeth and pull his lower jaw forward so that the lower teeth are in front of the upper teeth. (Fig. 9.)

If you have difficulty in sealing his nose with your cheek, pinch his nostrils closed between your fingers and thumb.

FIG. 9. PULL LOWER JAW FORWARD.

6. POINTS TO NOTE WHEN APPLYING EITHER METHOD.

Gauging Amount of Breath Required.

Blow steadily until you see the victim's chest expand. Don't force more air into the patient than is required to fully inflate his lungs as it serves no useful purpose and can be harmful in the case of children.

If the Patient's Chest does not rise.

Increase the backward head tilt, hold his lower jaw forward, improve the mouth seal and blow again. If still unsuccessful, look for a foreign body in the victim's throat. If a foreign body cannot be seen or dislodged with the fingers, place the victim over your forearm (small child) or knee (adult) in a face down position, then slap him firmly between the shoulder blades to dislodge it.

If the Patient's Stomach Bulges.

This may be due to blockage of the air passageway as a result of improper support of the head or too forceful blowing.

Slight swelling of the stomach will not stop air entering the lungs and no action is required. If the stomach is badly swollen and tight, stop blowing for a moment and press your hand between his navel and breast bone. This will cause the air in the stomach to be "burped". If the patient vomits, turn his head well to one side, press his abdomen again, quickly clean his mouth and resume rescue breathing.

Removal of Water from Drowning Victims.

Commence artificial respiration immediately. Water may have entered the victim's lungs and stomach but generally this can be disregarded, as water cannot be satisfactorily removed from the lungs without special equipment.

Do not waste valuable seconds turning the victim to try to drain the lungs or empty the stomach. When the stomach is obviously bulging or when the throat continues to fill up with regurgitated material empty it by hand pressure between the navel and breast bone. Clean mouth and throat quickly and continue resuscitation.

To Help Shallow Natural Breathing.

If the victim is breathing only faintly, blow in at the moment he inhales and take your mouth away quickly when he exhales.

7. NEED TO APPLY ARTIFICIAL RESPIRATION PROMPTLY.

If the victim is not breathing commence artificial respiration immediately - seconds may mean the difference between life and death.

Unless air is moved in and out of the victim's lungs immediately, lack of oxygen will cause the brain cells to die or suffer irreparable damage and the heart will cease to function within three to five minutes.

Send for a doctor as soon as possible, but do not let this interfere with the commencement or continuation of artificial respiration.

While one man is applying artificial respiration others should try to restore circulation by briskly rubbing the patient's limbs towards the heart which tends to promote movement of blood in the veins, and by covering him with blankets or other warm material.

Don't be discouraged if the victim takes a long time to revive as in some cases it has taken several hours to restore breathing. Death must not be assumed therefore, and artificial respiration must be continued until breathing is restored or a Doctor declares the patient dead, or if medical attention is not available, until unmistakable signs of death appear e.g. stiffening, or blue colour of skin.

8. TREATMENT OF ELECTRIC SHOCK.

Immediately the victim is cleared from the cause of the accident and there is no danger to the rescuer, commence artificial respiration if he is not breathing. At this stage seconds are precious.

Where it is necessary to rescue a workman from a pole top give him, if possible, ten quick breaths (mouth-to-nose or mouth-to-mouth) as soon as he is cleared from the live wires. This will give the victim enough oxygen to last for three to five minutes. During this period it will generally be possible to lower him to the ground where continuous artificial respiration can be applied. (The method of lowering the victim is given in E.I. LINES Aerial SP 9002.)

Soon after artificial respiration is commenced, check the carotid artery (on either side of the throat behind wind pipe) for pulse. If pulse cannot be felt, commence stimulation of the heart in conjunction with artificial respiration by pressing sharply with the hand on the centre of the breast bone three or four times during the exhalation period. This heart massage action tends to stimulate the heart into voluntary action.

9. FIRST AID ON RESTORATION OF NORMAL BREATHING.

When the victim's normal breathing has been restored, the following first aid may be given before doctor arrives -

(i) If the victim is breathing normally but still unconscious hold his head backward and his jaw forward to keep the air passageway clear until he is fully conscious.

(ii) Control bleeding from any wounds and attend to serious burns.

(iii) Keep him warm and quiet.

(iv) Do not give any liquids by mouth unless he is fully conscious. A stimulant such as hot tea or coffee, aromatic spirit of ammonia in water or a little spirits and water may be given after he has recovered consciousness.

(v) Immediate rest for any victim of electric shock is essential, especially where there has been unconsciousness. Watch him closely and do not allow him to sit up or walk until placed in the care of a doctor.

10. TRAINING METHODS.

It is not practicable to practise mouth-to-nose or mouth-to-mouth resuscitation on human subjects owing to the danger of spreading infection. Training in these methods must therefore be by demonstration only. As there are no complicated methods to be learnt demonstrations are sufficient to enable a rescuer to apply artificial respiration effectively in an emergency. It is easy to remember the three simple steps -

(i) Tilt the head backward to provide a clear air passageway.

(ii) Blow in the nose or mouth until the chest expands.

(iii) Listen to air being exhaled, then blow in again.

Demonstrations should be given and, training films (where available) shown in conjunction with the annual practice of pole rescue drill (E.I. LINES Aerial SP 9002). Instructors should use a dummy or a live "victim" to demonstrate the methods fully. A piece of plastic sheet placed over the mouth or nose of the "victim" will enable the mouth positions to be indicated without actually breathing into his lungs.

E N D.