

Lecture № 4: peculiarities OF ORGANIZATION OF MEDICAL AID RENDERING TO THE DAMAGED POPULATION IN CASE OF EMERGENCY SITUATIONS



УЧЕБНЫЕ ВОПРОСЫ :

- 1. Notion on the first aid rendering to the damaged in emergency situations.
- 2. Means used at the first aid rendering in emergency situations.
- 3. Methods of the first aid rendering to the damaged in emergency situations.

- The principal aim of the first aid is saving of the victim's life, liquidation of the damaging factor continuous effect and quick evacuation of the victim outside the zone of damage.
- The first aid is a complex of simplest medical measures carried out at the place of the injury occurrence in the order of self- and mutual aid, as well as by participants of salvation-rescue works with the use of table and improvised means.



1. The first aid

- The optimal time for the first aid rendering is **up to 30 minutes** after the trauma, in poisoning - **up to 10 minutes**. In respiratory arrest this time is decreased **up to 5 - 7 minutes**.
- The importance of the time factor is emphasized by the fact that among individuals received the first aid **within 30 minutes** after trauma complications occur two times more rarely than in individuals received the aid later than within 30 minutes.

The first aid

- The first aid measures are as follows:
- temporary hemorrhage arrest;
application of a sterile bandage onto the wound and burned surface;
- artificial respiration and indirect massage of the heart;
- injection of antidotes;
- giving antibiotics, injection of analgetics (in shock);
- extinguishing of burning clothes;
- transport immobilization;
- warming, sheltering from heat and cold;
- putting on the gas mask;
- removal of the victim from the contaminated area;
- partial sanitary treatment.

Federal Law of the Russian Federation dated November 21, 2011 N 323-FL "On the principles of health protection of the RF population" Article 31:

- **1. Prior to the medical aid rendering the first aid is rendered to the citizens in case of accidents, traumas, poisonings and other conditions and diseases threatening life and health by persons who are obliged to render the first aid according to the Federal Law or to the special rule and who have corresponding training, including the personnel of the RF Internal Affairs organs, by civilian and military personnel of the State fire-protection service, workers of salvation-rescue units and services.**
- **2. The list of conditions in which the first aid is to rendered and the list of measures on the first aid rendering are approved and verified by the federal organ of the executive power under responsibility.**
- **3. Sample educational curricula of the academic cycle, subject and discipline on the first aid rendering are developed be the federal executive organ under responsibility and approved in the order established the RF legislation.**
- **4. Drivers of transport means and other persons have the right to render the first aid in case they have corresponding training or/and skills.**

2. Means used at the first aid rendering in case of emergency situations

- *For the first aid rendering both table and improvised means are used.*
- *Table means of the first aid rendering include :*
- Dressing materials – bandages, medical dressing packages, large and small sterile bandages and napkins, cotton, etc.
- For arrest of bleeding tourniquets – tape-like and tubular – are used.
- For immobilization performance special splints – plywood, ladder-like, net-like, etc. – are used.

For the first aid rendering table and improvised means are used

- For the first aid rendering some medicamentous means are used :
- 5 % iodine alcoholic solution in ampules or in a fial;
- 1—2 % alcoholic brilliant green solution in a fial;
- validol in tablets, valerian tincture;
- ammonia spirit in ampules;
- sodium hydrocarbonate (baking soda) in tablets or in powder, vaseline, etc.
- For personal prophylaxis of lesions by radioactive, poisonous substances and bacterial agents in foci of damage an individual first-aid-kit (IK-2) is used.

For the first aid rendering table and improvised means are used

- In case of natural disasters, industrial, automobile transport incidents and catastrophes, household accidents there sometimes occur situations when table means for the first medical aid rendering are either insufficient or not at hand.
- In such cases in order to save the victims' lives and health **improvised means** have to be used.
- In such conditions the choice and preparation of improvised means are of great importance. For this purpose any objects may be used: **pieces of clean fabric, straight tree branches, boards, metallic plates, skis, ropes, soft wires, etc.**

Table means

- **Individual first-aid-kit (IK-2).** It is a plastic box with sockets for medical means used for the first medical aid rendering in the order of self- and mutual aid.
- Individual first-aid-kit IK-2 contains the medical means used for self- and mutual aid rendering in wounds and burns (to control pain), for prevention and reducing damaging by radioactive, poisoning and life-threatening substances, as well as for prevention of infectious diseases.



Individual first-aid-kit (IK-2)

- IK-2 contains a set of medical means located in sockets in a plastic box. The size of the box is 90x100x20 mm, its weight is 130 g. The size and shape of the box make it convenient to carry the box in the pocket all time.



- Individual anti-chemical packages (IAPs) are meant for decontamination of droplet-liquid poisonous substances and some incident-threatening chemical substances which have contacted the body and clothing of an individual, means of individual protection and instruments. It is a disposable thing used in the temperature interval from -20°C to $+40^{\circ}\text{C}$.



Individual anti-chemical packages (IAPs)

- **IAP-11** is a hermetically sealed membrane of a polymeric material, which contains non-fabric tampons soaked according to “Langlic” prescription. There are grooves on the membrane sutures for quick opening of the package. When using IAP-11 it is necessary to take the package with the left hand, open the package alongside the groove with a sharp movement of the right hand; take the tampon and evenly cleanse open skin sections (face, neck, hands) and adjacent to them clothing edges with the tampon.
- The guaranteed period of IAP storage is 5 years. The weight of the equipped package is 36 – 41 g; its size is 25-135 mm in length and 85-90 mm in width. At cleansing with the liquid there may occur the sense of skin burning which quickly subsides and does not make any effect on physical state and working capability.



- In case IAPs are lacking, drops (smears) of poisonous substances may be removed with tampons made of paper, rags or a handkerchief.
- Sections of the body and clothes may be sufficiently cleansed with water and soap providing that the poisonous drops have contacted the body and clothing not longer than 10-15 minutes.
- If the time of the contact has been longer it is all the same necessary to perform the cleansing because it will reduce the degree of the damage and exclude the possibility of mechanical transfer of the poisonous drop and smears of chemicals into other sections of the body and clothes.

- It is possible to decontaminate droplet-liquid poisonous substances with domestic chemicals.
- To cleanse the skin of an adult person it is necessary to prepare beforehand one liter of 3% hydrogen peroxide and 30 g of caustic soda (or 150 g of silicate glue) which are to be directly mixed.
- Cleansing with the help of IAPs or improvised means does not exclude the necessity for further carrying out of complete sanitary treatment of people and decontamination of clothes, shoes and means of individual protection.

Individual bandaging package (IBP)

- 4 types of bandaging packages are manufactured industrially in Russia: individual, ordinary, for the first aid with one pad, for the first aid with two pads.



Individual bandaging package (IBP)

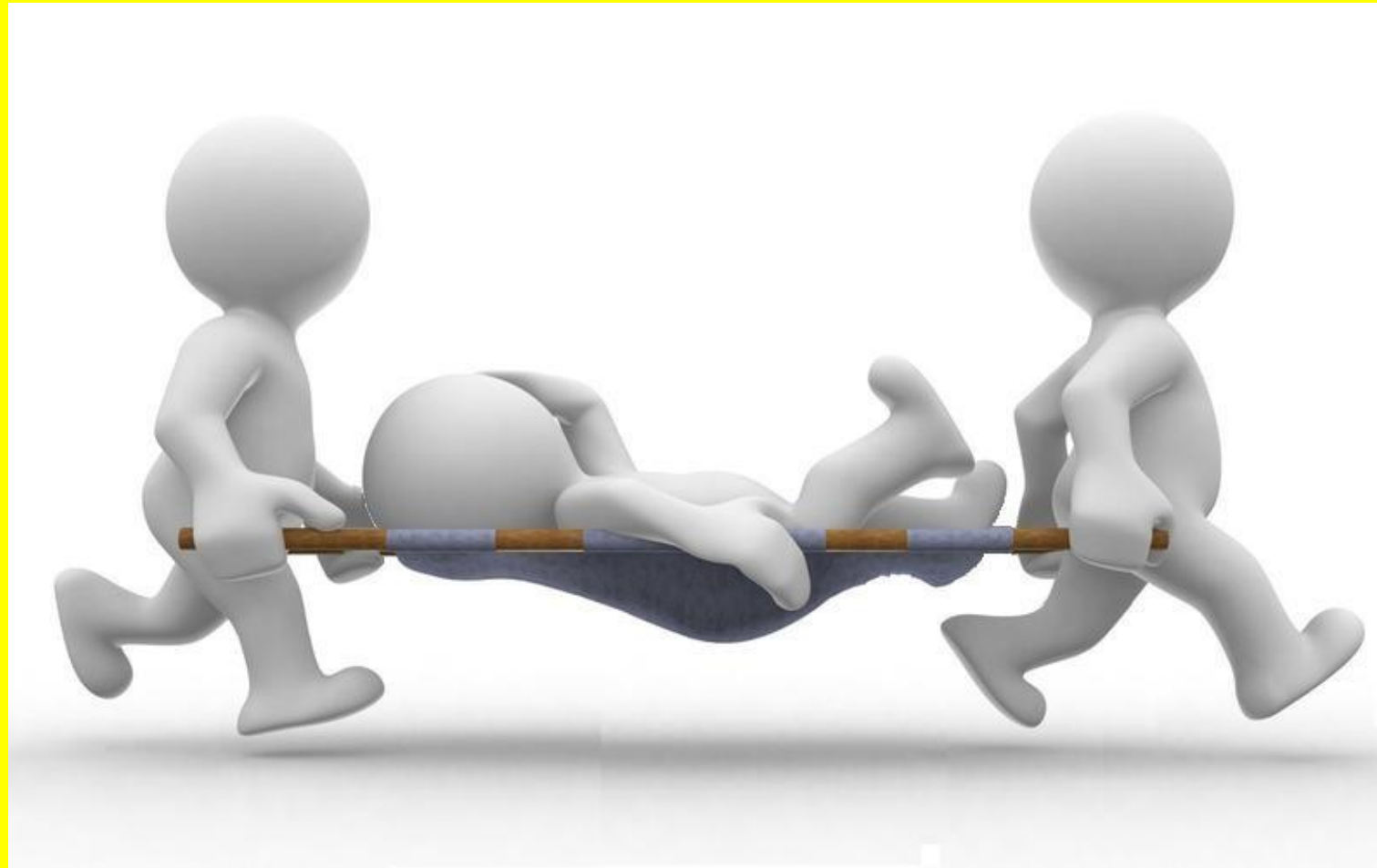
- Individual bandaging package (IBP) is used for application of primary bandages onto the wounds.
- IBP consists of a roller bandage (of 10 cm in width and of 7 m in length) and two cotton-gauze pads. One of the pads is immovably sutured near the end of the bandage, the other pad may be moved alongside the bandage.
- The pads and the bandage are usually wrapped in a waxed paper and placed inside the hermetical case made of a rubberized fabric, cellophane or a parchment paper. There is a pin in the package. Rules of the package use are indicated on the case.



- The ability to use individual means of the medical aid in case of emergency situations may help to save the life and health of a damaged person.



3. Methods of the first aid rendering to the damaged people in case of emergency situations



Terminal states

- This term denotes marginal conditions between life and death , last stages of the organism's death.

Terminal states may be conditioned by various causes :

massive blood loss , shock, obstruction of the respiratory tracts (asphyxia), electric trauma, myocardial infarction, drowning , covering with soil, etc.

Terminal states

- Pre-agonal state,
- witch is characterized by the victim's consciousness preservation, but it is confused; the pulse rate is rapid and weak (thread-like); respiration is rapid and forced, the skin is pale, motor excitement is noted.

- **Agony**, which is characterized by the lack of consciousness, pulse, pupils' light reaction; irregular, superficial respiration, manifesting itself as air gulping, or as rare, short, convulsive respiratory movements (2-6 per minute). Agony finishes with the last inspiration or the last heart contraction and turns into the clinical death.

Terminal states

- **Clinical death.** Its durations is 3-5 minutes. This condition is characterized by the lack of consciousness, respiration, blood circulation. The pupils are maximally enlarged and do not respond to the light, paleness is sharply pronounced, and sometimes cyanotic skin and mucosa are observed. The state of clinical death, however, is reversible if during the first 3-5 minutes certain measures are taken to return the victim to life (resuscitation).

Terminal states

Biological death. Is occurs if the victim has not been given the resuscitation aid, and it is characterized by irreversible changes in the central nervous system and in other vital organs of the victim. This state is irreversible.

- Evaluation of the victim's condition severity and determination of indications to cardiac-pulmonary resuscitation performance:
- Evaluation of the victim's condition, checking on the presence of his consciousness, respiration and cardiac activity must be carried out quickly, within the first 10-15 seconds.



Primary cardiac-pulmonary resuscitation

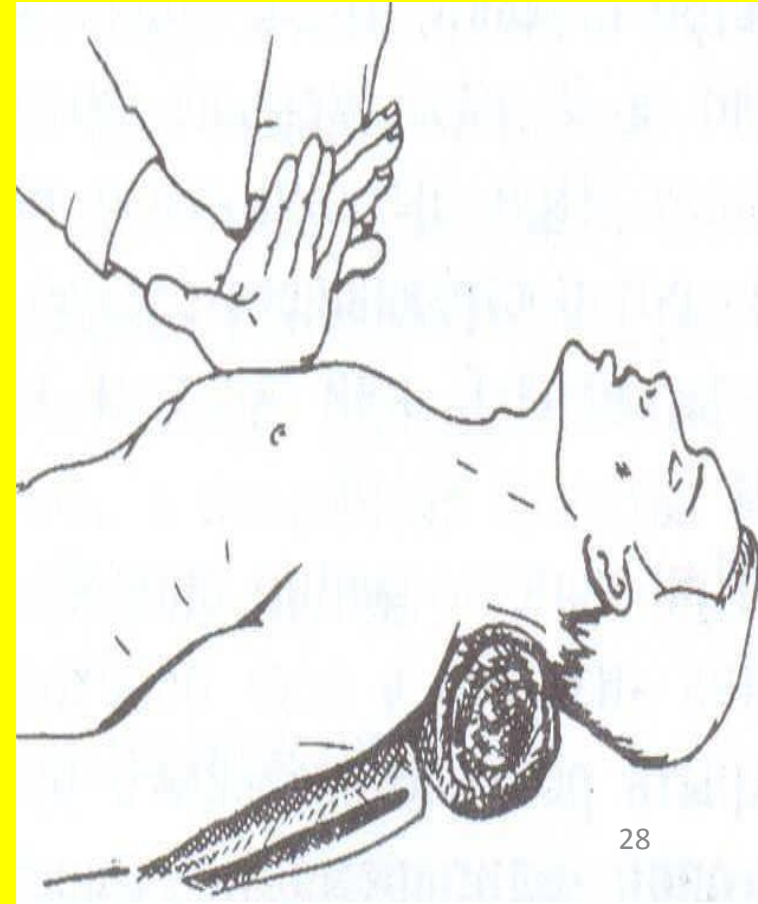


Checking on the victim's condition

- **Evaluation of the victim's consciousness.** For this purpose try to talk to him or slightly shake his shoulder. In case there is no reaction massage his ear lobules. The lack of reaction means that the individual is unconscious and the situation is life-threatening, because his tongue may retract and block the upper respiratory tracts.
- (If you are left alone with the victim first perform resuscitation measures for 2 minutes as described below and then call the ambulance having dialed "03").
- **Establishing the presence of independent respiration.** Look at the victim's chest: it must move up and down. Simultaneously put your hands on the victim's chest to feel its movements. Bend your ear close to the victim's mouth and nose and try to hear his breathing. If there is no respiration **provide the respiratory tract patency.**

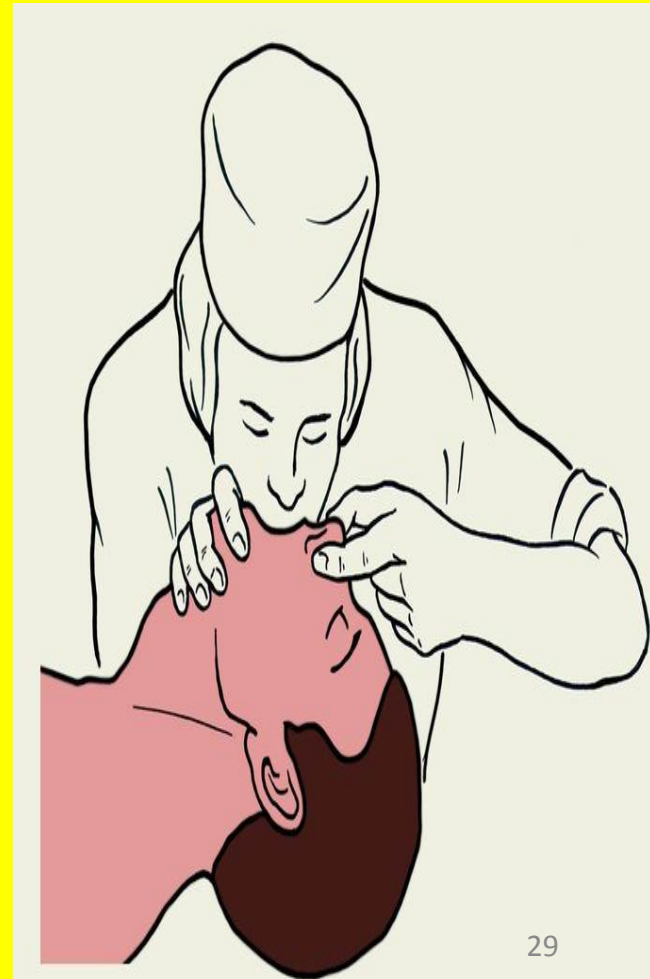
Primary cardiac-pulmonary resuscitation within the first aid rendering measures

- **Cardiac-pulmonary resuscitation** (CPR) is a system of measures aimed to restore the vital activity of the organism and to bring it out of state of clinical death.
- CPR includes artificial lung ventilation (artificial respiration) and external (indirect) massage of the heart.



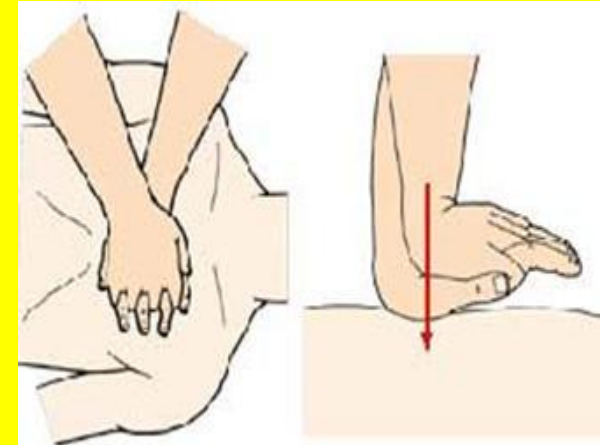
Artificial lung ventilation (artificial respiration)

- Artificial respiration is applied in cases of respiratory arrest, if there is a heartbeat (pulsation on the carotid artery). For this purpose simple methods of artificial respiration –“mouth-to-mouth” or “mouth-to-nose” may be used.



External (indirect) massage of the heart

- The victim must lie on a rigid surface. His legs should be lifted.
- When performing the **external massage of the heart** the breastbone must be bent **at 4 cm**.
- The rendering aid person locks his fingers and suppresses the point of massage with the base of the palm.
- It is important to perform pressings strictly perpendicular to the breastbone not to damage the ribs.





Cardiac- pulmonary resuscitation

It must be performed only on an even firm surface. Massage of the heart must be alternated with artificial respiration.

1



MAKE SURE there is no pulse on the carotid

You cannot !

spare time to detect the signs of respiration

4

MAKE a blow onto the breastbone with a fist



You cannot!

make a blow in case there is pulse on the carotid artery.

2

FREE THE CHEST out of the clothes and unfasten the waist belt



You cannot!

make a blow onto the breastbone and perform indirect massage of the heart if you have not freed the chest and unfastened the waist belt

5

Start indirect massage of the heart



The depth of pressing of pressing of the chest must be not less than 3-4 cm with the frequency of pressing 50-80 times per minute

You cannot!

place the palm of the hand on the chest in such a position that the thumb is directed on the rescue worker

3



Cover the xiphoid process with two fingers

You cannot!

make a blow onto the xiphoid process or into the region of the clavicles

6

Make "a breathing in" of artificial respiration



Clutch the nose, capture the chin, throw back the victim's head and make a maximal breathing out into his mouth

You cannot!

make "a breathing in" of artificial respiration unless the victim's nose is previously clutched

Resuscitation in a limited space.

1

Make a blow onto the breastbone with a fist



The blow may be made in the "sitting" and "lying" position of the victim

2

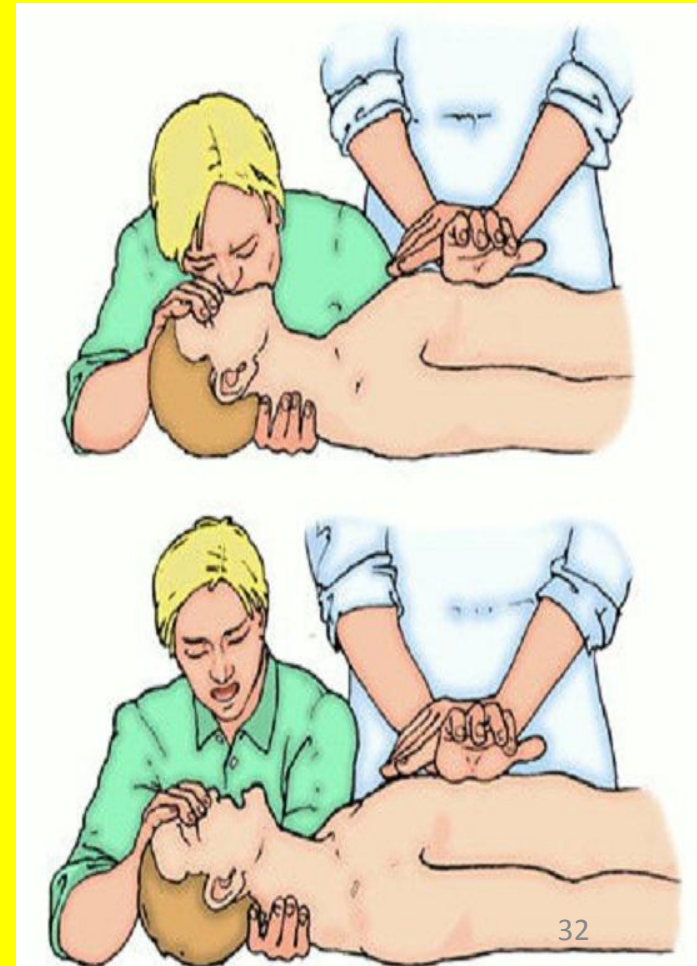
PUT the victim in the lying on the back position



The resuscitation complex must be carried out only in the victim's position "lying on the back"

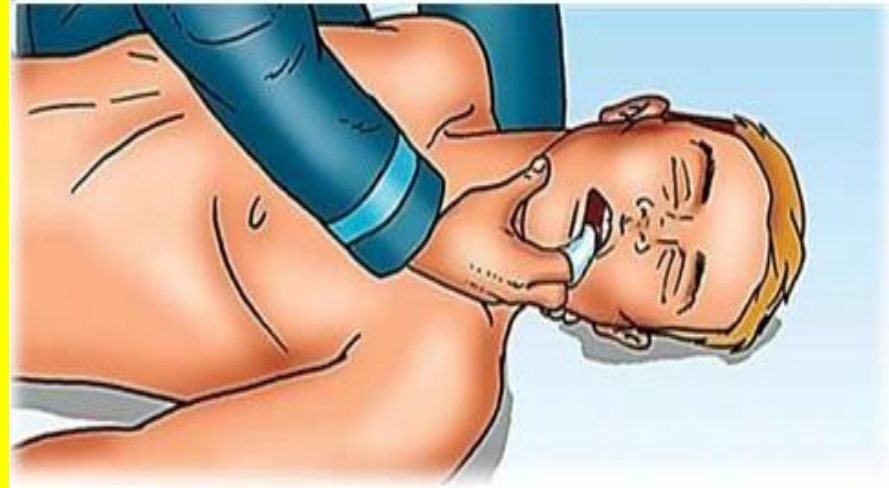
Primary cardiac-pulmonary resuscitation

- If there is only one resuscitator **30 suppressions onto the breastbone and 2 air blowings** in to the lungs are performed.
- If there are two aid rendering persons resuscitation is more effective and less exhausting for them. The first resuscitator makes **5 suppressions onto the breastbone**, the second resuscitator performs **1 air blowing in** .
- It is necessary to make not less than **60 suppressions** per minute. Approximately every **2 minutes** of resuscitation the second resuscitator checks if there is pulsation on the carotid artery.



- **Remember!** You must always control the patency of the upper respiratory tract.
- If after the undertaken first two blowings in there is no independent respiration -check on the pulse on the victim's carotid artery.

Remove the mucus, dirt, sand, slit with the finger wrapped in the bandage (clean gauze).



- **Mind!** In case there are two resuscitators the ratio of compressions to ventilation is **5:1**, in case there is only one resuscitator – the ratio is **30:2**.
- Even in the case there are no life signs in the victim (heartbeat, pulse, respiration, pupils' light reaction), resuscitation aid must be continued to be rendered up to the arrival of medical workers or up to the delivery of the victim to the nearest medical institution.

To ensure the patency of respiratory airways (AW)

[AIRWAYS]

(to throw back the head, open the mouth, withdraw the jaw)

To check on the respiration

no respiration there is respiration → to maintain the airways open

artificial respiration
[BREATHING]
(up to 5 breathings)

→ If there is no effect:

- to check on the airways;
- artificial lung ventilation (ALV)

Evaluation of signs of life
(to check on the pulse for 10
seconds)

↓ no pulse

Massage of the heart

(5 pressings per 1 breathing in, 100 compressions per 1 minute)

Evaluation of cardiac-pulmonary resuscitation effectiveness

- **Pupils' narrowing and appearance of their light reaction.** It indicates that oxygenated blood enters the patient's brain.
- **Appearance of the pulse on the carotid arteries.** It is checked in the interval between the chest compressions. At the moment of compression a pulse wave is felt on the carotid artery, which means that the massage is being carried out correctly.
- **Restoration of independent breathing.**

- The ability to render the **first aid** quickly and effectively is very valuable in normal circumstances.
- However in emergency situations, when the aid of specialists is unavailable, the importance of this ability significantly increases .
- Despite the insufficiency or absolute lack of medicamentous agents and medical instruments you may render the **first aid** to yourself and other alive people. Despite your limited possibilities, combination of minimal knowledge and skills with improvised technique may save human lives.