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First aid assistance – aspects for tourist activities

Abstract. First aid trainings are sufficient not only for tourist clubs, but also for specialties related to field work. There are different approaches to first aid trainings, most effective according to the authors opinion is intramural training with sport excitement – lifewrestling. The article is dedicated to first aid training in the frame of tourist activities and field work. Time of ambulance arrival in some rural tourist regions if Russia may be rather long, despite to official requirements, so presence of the people trained as first aiders can be crucial to save sufferers life. Ideally everyone in the tourist group should be able to assist with first aid before the ambulance arrival, but one first aider is a must, especially in case of school excursions. This article provides some aspects of first aid performance in need of quick response and group activities for first aid assistance. Cardiac pulmonary resuscitation and practice of precordial thump is described. Practicability of certain first aid activities is described, as well as limitations. Application of listed rules may help to save sufferers life not only during field works.

Keywords: first aid; tourism; legal requirements; clinical death; coma; precordial thump; first aid training; sufferer; time of ambulance arrival; rural area; school tourism; field work

In Russia there are a lot of interesting tourist regions incl. national sanctuaries and rural areas, where medical care can be not readily available in all cases. Need of qualified first aider in a group is also necessary in case of school excursions [1] (all teachers are trained for first aid, but unclear how qualified they are). The article reviews activities in case of cardiac arrest and group activities during first aid. Similar requirements are for field works [2]. One of the first aid training approaches is lifewrestling – first aid training with application of sport exciting – besides ordinary lections and use of equipment – championship, when different teams try to rescue group of sufferers. The winning team is indicated among the participats, taking into account time of rescue and absence of mistakes. This

approach allows to use robotic simulators and is opposite to trainings done online without any real practice.

Among different first aid activities covered in the course I precordial thump and pulmonary cardiac resuscitation.

Precordial thump (strike) is a real chance for a quick rescue

Remember! Absence of pulse in carotid artery is an order for precordial thump and beginning of resuscitation.

As soon as you made sure there is no pulse in carotid artery it is necessary to hit the breastbone. The purpose of hit (precordial thump, mechanical defibrillation) is to concuss stopped heart that makes it contract again in most cases.

Remember! Properly executed precordial thump can reanimate human in mere seconds.

Effect of mechanical "heart shake-up" was successfully used by great Russian surgeon # 1 Pirogov in the middle of 19th century during Crimean war: he reanimated several soldiers by raising them by their shoulders and throwing them down with force.

Remember! If thump is done in one minute after cardiac arrest then its efficiency exceed 70–80 %.

Precordial thump is one of the most efficient and safe components of cardiopulmonary reanimation. Hitting breastbone with a fist with force not more than 3 kg compressed into 0.01 seconds turns mechanical (kinetic) effect into electric stimulation of myocardium contraction.

Remember! Precordial thump is efficient during one minute since cardiac arrest.

Moreover, probability of cardiac arrest in case of pulse presence in carotid artery is extremely small and doesn't exceed 1:1 000 000, it is proven by death statistics in boxing matches.

Opinion, that precordial thump is banned because of its lethal risk, contradicts common sense. Otherwise almost all types of sports should be banned, except for chess and curling.

At the same time no one even thinks about forbidding closed-chest massage which consists of 30 pushes with force more than 40 kg, which can really cause cardiac arrest, rib fracture, damage of lungs and liver. Moreover, every employee, high-school graduate and driver must know how to do it.

Remember! Precordial thump is many times more efficient than closed-chest heart massage (quick revitalization) and is much safer than closed-chest massage.

That strange paradox grew up with help of dishonest manufacturers of life-saving simulators, that fall apart after one hit, and vendors of defibrillators, that cost thousands of dollars.

Remember! Leave all questions behind and do everything you can to save a dying person. The **Law** is on your side in any case!

As soon as you see signs of cardiac arrest you have to:

- **Turn sufferer on his back.**
- **Hit his breastbone (Please check local legislation for this activity!).**

Rules of executing the precordial thump

UNACCEPTABLE!

Executing precordial thump or closed-chest massage on a living person.

Rules for activities during cardiac arrest

Rule number one

You must make sure there is no pulse in carotid artery before performing the thump. Even though probability of cardiac arrest is extremely small, there is no need to test your luck. Deaths on football fields and ice rinks occur, albeit with a low frequency.

NEVER!

Perform the thump if there is pulse in carotid artery.

Rule number two

You must free chest from clothes before hitting the breastbone or at least make sure there are no buttons, medallions or other items. Even small cross can play a fatal role.

NEVER!

Hit the breastbone without freeing chest from clothes.

Rule number three

You must cover ensisternum with two fingers of your left hand to save to from a blow. Ensisternum can easily be snapped off breastbone and it damages liver, it can lead to death.

NEVER!

Hit the ensisternum.

Rule number four

You must hit breastbone with an edge of your first a bit above ensisternum, that is covered with 2 fingers of the other hand. Purpose of precordial thump is not to crush the breastbone, but to shake it up. Elbow of thumping arm must be pointed towards sufferer's stomach. Otherwise hit would be directed across breastbone and it may result in injures for aged people.

NEVER!

Hit across the breastbone when elbow thumping arm is directed towards the rescuer.

Rule number five

Precordial thump can be deadly for children under age of 5. Breastbone doesn't have enough rib and muscle support at this age, so thump can cause contusion of internal organs.

NEVER!

Perform precordial thump on children under the age of 5.

Rule number six

You must check pulse on carotid artery after the thump. If revitalization didn't happen then you need to perform cardiopulmonary reanimation consisting of closed-chest heart massage and artificial respiration.

How to properly execute precordial thump?

As soon as you made sure there is no pulse in carotid artery, you must put two fingers on ensisternum and hit breastbone with you other arm a bit above your fingers.

Closed-chest heart massage

Remember! Your hands are heart of the sufferer during closed-chest massage.

Purpose of closed-chest massage is to push blood from heart and lungs into arteries during every hard push on chest and to push it back through veins when chest returns into its initial position.

Remember! To achieve reanimation effects you must push chest in for 3–5 cm with force of not less than 40–60 kg.

Accordingly closed-chest massage consists of two parts: "hearts and lung pump" that appears due to heart and lungs getting squeezed, and more significant "chest pump" that creates suction effect when chest returns into its position. That's why you have to wait until chest fully extends before pushing again.

Remember! Every proper push replaces one heart beat.

Efficient execution of closed-chest massage at a rhythm of 40–100 pushes per minute provides up to 30–40 % percent of normal blood circulation. That's enough to sustain life for several hours.

Remember! Massage is efficient if you can see pulse wave in carotid artery during every push on the chest.

You can evaluate efficiency of the massage after 1–2 minutes of performing, when you see face skin and lips getting pink and pupils narrowing.

Remember! Signs of massage efficiency are pink face skin and narrow pupils.

If these signs are present and there is still no pulse in carotid artery, then closed-chest massage can be continued for an infinite amount of time.

Remember! You can't stop doing closed-chest massage until you see signs of biological death.

You must pay close attention to pupil reaction to light during execution of closed-chest massage. If pause in heart beats or pushes during massage is longer than 15–20 seconds, then pupils stop reacting to light and fully expand. This sign is hardly noticeable during first seconds of checking sufferer's condition.

However, if you periodically look at pupils during reanimation, you can notice pupil contraction and extension. In first case you can talk about successful resuscitation, even if there is still no pulse in carotid artery. In second case – about failure. But in no case you should stop attempting revitalizing.

In what cases is it necessary to start doing closed-chest massage?

- If unconscious sufferer has no pulse in carotid artery.
- If there is still no pulse in carotid artery after precordial thump.

Rules of executing closed-chest massage and unrespiratory reanimation

Remember! Priority of actions: closed-chest massage is first and then mouth-to-mouth inhalation, if possible. Moreover, you should limit yourself to closed-chest heart massage if emissions from sufferer's mouth are contagious or can be poisonous.

300–500 ml of air are ejected from lungs during every 3–5 cm push on the chest. After compression is over, chest returns into its initial position and the exact same amount of air is sucked into the lungs. Active exhalation and passive inhalation occur.

Remember! When you do closed-chest massage, your arms are not only sufferer's heart, but are also his lungs

Rule number one

If sufferer is lying on the ground you must get down on your knees. There is no difference from what side you should approach the sufferer. But for right-handers it should be more convenient to perform precordial thump when sufferer is by their right side.

Rule number two

Closed-chest massage must be performed on flat firm ground for it to be efficient.

Rule number three

Put heel of your right hand above ensisternum so your thumb is directed at sufferer's chin or stomach. Put your left palm on your right palm.

Rule number four

Move your center of gravity on sufferer's chest and execute closed-chest massage with straight arms. It will allow you to save your strength for longer. Bending your elbows during closed-chest massage is equal to doing push-ups. If you consider doing 30–60 pushes per minute for at least 30 minutes even if you fail, then doing 2000 push up is impossible even for olympic champion in gymnastics.

Remember! Closed-chest massage can be performed on kids only with one arm.

Rule number five

You can start pushing on chest only after breastbone returns into its position. If you don't wait for it, then your next push turns into a powerful hit.

Remember! You can't stop doing closed-chest massage in case of rib fractures. You can only lower the frequency of push to let thorax return into its initial position but you must keep the depth of your pushes.

Rule number seven

Optimal ratio of pushes on chest and mouth-to-mouth inhalations is 30:2, no matter how many people take part in reanimation. Active inhalation happens during every push, and passive exhalation happens during every return. That way new portions of air get into lungs, allowing for blood oxygenation.

Remember! Closed-chest heart massage must be prioritized over artificial respiration during resuscitation.

UNACCEPTABLE!

Stopping closed-chest heart massage even without signs of its efficiency before signs of biological death appear.

Artificial respiration and issues with your own security

Remember! You must think about your own security before doing artificial respiration.

If sufferer without vital signs poses hazard of infecting you with infectious or venereal diseases (you just don't know the sufferer), or contents and scent from his mouth cause disgust, and you don't have plastic protective mask, then there is no need to go against your self-preservation instinct and to

start doing mouth-to-mouth. In this case you can limit yourself to just doing closed-chest heart massage.

We have already noted in previous chapter that active exhalation happens during every push on thorax, and passive inhalation happens when chest returns into its position.

That way new portions of air get into lungs oxygenating blood. You should also consider that latest Guinness record on staying underwater without air equipment exceeds 20 minutes.

Remember! Body's internal stock of oxygen is enough to sustain vital signs of brain cortex for 15-20 minutes after cardiac attack if closed-chest massage is performed.

The purpose of artificial respiration is exactly the opposite. Sufferer in clinical death needs carbon dioxide more than oxygen, because carbon dioxide is needed for inspiratory center stimulation.

Remember! If disgust doesn't let you do mouth-to-mouth then you should keep on doing closed-chest massage thus preserving chances for rescue.

Another problem that often comes up during artificial respiration is freeing the airways. Sufferer might have tongue impaction. You need to throw back sufferer's head so back side of throat moves away from tongue.

Remember! Throwing sufferer's head back is the easiest and efficient way of freeing airways for artificial respiration.

Rules of inhalation during mouth-to-mouth artificial respiration

Remember! Artificial respiration raises reanimation efficiency, but if you can't bear you disgust then just keep doing closed-chest heart massage and don't lose your chance to save a life.

Rule number one

Grip with your right hand chin in such manner that you could unclench sufferer's teeth.

Remember! No need to spread sufferer's jaws, because air can go through teeth. Unclenching lips is enough.

Rule number two

Clench nose with your left hand.

Remember! Air is going to come out during inhalation if you don't clench sufferer's nose.

Rule number three

Throw sufferer's head back and keep it in that position until the end of inhalation.

Remember! Most frequent reason of failure is that head wasn't thrown back enough. In this case you should change head's position and try again.

Rule number four

Cuddle up to sufferer's lips and exhale into him. If you feel cheek inflation then artificial respiration is inefficient.

However, witnesses and assistants can easily see chest rising during every efficient artificial inhalation.

Rule number five

If first inhalation attempt wasn't successful you should increase head throw back angle, clench nose and try again.

Rule number six

If second inhalation attempt wasn't successful you should push sufferer's chest 30 times, turn sufferer on his stomach and clean his oral cavity. Push sufferer's chest 30 times, and after that make one artificial inhalation.

UNACCEPTABLE!

Doing 3 artificial inhalations in a row due to a very long pause in closed-chest massage pushes.

When artificial respiration is hazardous for rescuer's health and there is no protective mask at hand?

Do closed-chest heart massage – unrespiratory reanimation until emergency services arrival or delivery of protective mask.

Instructions for protective mask usage during artificial ventilation

Remember! Artificial respiration can only be done through special protective mask when contacting with contents of sufferer's oral cavity is hazardous. All other items, including napkins and nose-rags that are suitable for artificial respiration, can't provide sufficient level of protection from contents of sufferer's oral cavity and pose hazard to health and life of rescuer.

Rule number one

Put mask in your right hand in a way that lets most of your palm be unobstructed

Rule number two

Grip sufferer's chin with your right palm and throw back his head while holding the mask on sufferers face.

Rule number three

Press mask down to the face. Put your lips on protective valve and exhale.

Remember! Plastic sealed mask with protection valve is the only reliable mean of protection for rescuer from contamination and gas poisoning during artificial ventilation.

What should I do?

When mouth-to-mouth poses threat for rescuer's health and there is no protection mask at hand?

Keep doing closed-chest heart massage – unrespiratory reanimation until medics arrive or protective mask is delivered.

What should I do?

If airtight roller deflated?

Throw away the mask.

Rules of resuscitating for more than 10–15 minutes

Remember! Average aged man can reanimate for 4–5 minutes at most, with an assistant-up to 10 minutes, emergency services will arrive in 15–20 minutes at best.

It is recommended to use efforts of 3 people for keeping brain cortex alive. Rescuers have to switch every 2–3 minutes so it makes it possible to keep reanimating for more than one hour Picture 6–6.

Correct position for a long period group CPR

Long term CPR – need to follow certain safety requirements:

1. Avoid head collision.
2. Rationally use people's strength (physically weak assistant needs to be put closer to sufferer's legs, he should coordinate actions of whole team).
3. Harnessing untrained man into reanimation process. Trusting holding sufferer's legs first and using him in reanimation process later.
4. Providing medics with room for work on the opposite side of the sufferer.

Rule number one

First participant: makes artificial inhalation. Checks pupil reaction and pulse in carotid artery and informs his partners about sufferer's condition: "Pupil reaction!", or "Pulse wave during massage!", or "Self-sustainable pulse!".

Pulse wave in carotid artery should be felt during every efficient chest push. In order to distinguish pulse wave from self-sustainable pulse you have to stop doing closed-chest massage for 10–15 seconds. In case second inhalation in a row is unsuccessful, it is necessary to start doing closed-chest massage.

Rule number two

Second participant: performs closed-chest massage and orders: "Inhale!". Monitors ventilation efficiency by judging chest expansion and states: "Inhale through!" or "No inhale!". Chest should rise for 2–3 cm. Pulse wave in carotid artery should be felt during every efficient chest push.

Remember! Pause between two massage pushes can't exceed 10–15 seconds. If rescuer lingers before artificial inhalation, then you should keep doing closed-chest massage.

Rule number three

Third participant: raises sufferer's legs to improve blood circulation towards heart. Recovers his stamina and prepares to replace the second participant. Coordinates actions of his teammates. Something should be put under sufferer's legs to improve blood flow towards heart. If there is no such possibility, you shouldn't waste time one trying to do it harming the reanimation process.

Rule number four

Participants switch place every 2 minutes of resuscitation.

Remember! If you neglect this rule, there is a good chance that first participant faints.

What should I do? In order to extract air from stomach that is collect after 10–15 minutes of resuscitation?

Once in 10–15 minutes of reanimation you should turn sufferer on his stomach and press on his tongue root. After that put him into the initial position and do 30 chest pushes. Only after that you can proceed to artificial respiration inhalations.

What should I do? If there is no way to get a third participant?

Put something (some item or twisted clothes) under sufferer's legs.

What should I do? If early signs of biological death appear: dried cornea and pupil deformation?

You should stop reanimation and cover the body with fabric, if there is no casualty's relatives or friends nearby. You should keep reanimating until ambulance arrives, if there are sufferer's relatives among bystanders.

Knowing such simple rules allows to be prepared for first aid and to save sufferers life in case of accident. Certainly, such skills require certain training, especially for school teachers [3; 4]. This limitations and rules listed during the training allow rescuer to avoid unnecessary mistakes in real practice and save somebodies life.

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Оказание первой помощи – туризм

Аннотация. Обучение навыкам оказания первой помощи востребовано не только в туристических клубах, но и для специальностей, связанных с проведением полевых работ. Существуют различные подходы к обучению навыкам оказания первой помощи, наиболее эффективный по мнению авторов очный с применением спортивного азарта – лайфрестлинг. Статья посвящена вопросам обучения навыкам оказания первой помощи в туристических походах и при проведении полевых работ, в местах, где медицинская помощь не всегда может быть оперативно доступна. Время прибытия скорой помощи в некоторых удаленных регионах России может быть значительным, несмотря на официальные требования, поэтому присутствие человека, обученного навыкам оказания первой помощи, может быть чрезвычайно полезно для сохранения жизни пострадавшего. Наиболее правильно если все участники похода / туристической группы обучены навыкам оказания первой помощи, это позволит сохранить жизнь пострадавшего до прибытия скорой помощи. В тоже время один человек обученный навыкам оказания первой помощи необходим в туристической, либо полевой группе. В данной статье представлены подходы по оказанию первой помощи, при необходимости совершения немедленных действий для спасения пострадавшего и действий группы по оказанию первой помощи. Описана практика проведения сердечно-легочной реанимации и нанесения прекардиального удара. Описана целесообразность проведения тех или иных действий для оказания первой помощи, представлены ограничения. Применение данных правил при обучении может помочь спасти жизнь пострадавшего не только в полевых условиях.

Ключевые слова: первая помощь; туризм; требования законодательства; клиническая смерть; кома; прекардиальный удар; обучение первой помощи; пострадавший; прибытие скорой помощи; сельские поселения; школьный туризм; полевые работы

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