

## **Prevention of traumas in physical education classes and the first aid**

**Bakiko Ihor\***,

*Department of Physical Education and Sport, National University of Ukraine on Physical Education and Sport, Ukraine*

**\*Corresponding author:** Bakiko Ihor, Department of Physical Education and Sport, National University of Ukraine on Physical Education and Sport, Ukraine

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### **Abstract**

The article highlights the main causes of traumas, measures of their prevention, pathological conditions, and methods of providing pre-medical assistance. Scientific research and practice of physical education have proved that regular physical exercise promotes good health, improvement of the basic systems of the organism. However, the performance of motor actions should take place according to certain rules. Failure to comply with these rules leads to a variety of injuries that affect the entire human body. Traumas during physical education for students have been and remain a major problem. Trauma causes loss of working time for first aid and subsequent medical treatment and rehabilitation of victims, which is a loss of the educational process. Therefore, injury prevention is the best way to combat traumas

**Keywords:** Students; Trauma; Physical exercises; High school

### **Introduction**

Physical education classes promote positive effect on the young people and significantly improve their physical performance. Recently, unfortunately, there is a significant increase of injuries during physical exercises. Experience of work shows that the use of preventive means, rational construction of classes and correct dosage of loading enables to minimize these negative effects and significantly improves the health effect of studies (Vyshnevskiy V. A., 2002) [1].

### **Methods of Investigation**

Theoretical: analysis of scientific literature on pedagogics, psychology, physical education, medicine; summarizing the results of the experiment.

### **Results of Investigation**

For the successful implementation of prophylaxis measures of injury, we should know the causes and conditions of injury and be able to provide timely first aid. The most characteristic causes of injuries among students can be conditionally divided into two groups (external and internal factors).

The group of external factors of injuries includes:

- shortcomings in the organization (irrationally compiled schedule, overload of sports grounds, access to participation in sports and mass events of students who do not have sufficient training, etc.) and methodology of classes (absence of an individual approach to students, inobservance of gradual increase of load, defective warming-up or lack of it);
- defects in the material and technical provision of classes (the poor state of places for lessons, equipment, facilities, etc.);
- failure to comply with hygiene standards (lighting, ventilation, temperature control during training in the gym, absence or incorrect selection of sport uniform footwear); unfavorable

meteorological conditions (high or low air temperature, precipitation, etc.) during playing outdoors;

- failure to comply with medical testing (untimely division of students into groups according to medical requirements, access to lessons without medical examination).

The group of internal factors of injuries includes:

- lack of preparedness to perform physical activities (eg, due to a long break in the classroom or recent disease that leads to a reduction in the functional state of the body);
- state of fatigue (and, as a consequence impairment of coordination), the deterioration of protective responses and decreased attention, leading to disruption of movements technique.

Thus, prevention of trauma during exercise in high school is primarily in removing the causes that provoke injuries. For example, it is necessary to build classes correctly, pay attention to rational warming-up, whose mission is not only to warm up the muscles, joints, ligaments, but to prepare the whole body of students for further physical activity. It should be remembered that the effect of warming is not long, we must not delay transition to the main load of the period. It is important to observe an individual approach to students, eliminate overload and overstrain. We should not forget about the implementation of sanitary and hygienic requirements ( Muravev V.A., Sozinova N.A., 2001) [2].

Let us consider the most typical kinds of traumas that students can get in the process of exercise and advice on how they can be avoided.

Most of the injuries of students are abrasions, bruises. These injuries, as our experience shows, are the most common during athletics classes and sports games. Fairly widespread are myalgia, disease of tendons (athletics, cross training), stretching and tearing of ligaments shin and foot and knee joints. Sprains and fractures (sports games, exercises) are also possible.

Students have abrasions most often. To prevent the development of potential complications it is required to provide prompt and correct treatment of these injuries. How to do this? First wash the surface of the wound and surrounding area with water (preferably boiled), then debride a wound with the 3-percent solution of hydrogen peroxide.

Quite often when renewing physical education after a long break or performing new exercises (in 1 - 2 days) the students can have muscle pain (myalgia). They result from inconsistencies of muscle load to condition of muscles. With rational dosage of stress within 5 - 7 days muscle pain gradually subsides. To reduce the pain, assist relaxation and speedy recovery of muscles, apply a warm bath and self massage (Fishkin A., 2008) [3].

Properly constructed physical education classes are beneficial to the musculoskeletal system, gradually reconstructing, strengthening and improving it. But in case of overload different diseases may appear. One of them is sub acute or aseptic inflammation of the periosteum - periostitis, resulting from repeated overloads and micro traumas.

Often there is periostitis of the tibia. The first sign of it is the appearance of pain in the lower third of the bone after running on solid ground. When the loading is bigger, pain increases.

We should stop running classes and reduce the intensity of the load during walking. Prophylactic measures are to use footwear that provides adequate cushioning (preferably sneakers). In the gym you need to put foam insole. Walking, running on thin sole, as well as tight footwear or new shoes can lead to chronic inflammation of the periosteum, not only tibia and calcaneus and the subsequent emergence of inflammation in the area of the bony outgrowths.

### **Injuries and diseases of the foot and ankle**

If a student has flat foot, then it is necessary to use orthopedic insoles. It is necessary to perform massage and special gymnastic exercises for the legs. This will help strengthen the copula-muscular system of the foot.

As specific exercises to strengthen the muscles that hold the arch of the foot, we can recommend such as rotation, flexion and extension of feet, grasp the ball with plantar surface of the foot, jumps, walking on toes, on the outer surface of the foot, walking and running barefoot on the sand, crawl swimming style.

Pain that occurs during prolonged loading on the foot (especially when forcing them) may also be related to the development of inflammation of tendons of the foot, the tendon sheath and surrounding tissue. Often these injuries affect the achilles tendon. The pain may occur after intensive training conducted on solid surfaces, as well as the functional disability of the foot. Thus, there is pain in the area of achilles tendon, skin redness and swelling around it. Acute inflammation sometimes becomes chronic, the cause of which can also be permanent strain and frequent minor injuries of both the tendon and surrounding tissues.

Key activities for the prevention of injuries and diseases of tendons of the foot are the proper selection of shoes for training, use of additional insoles. It is not recommended to perform running exercises on solid ground.

During training on poorly prepared track, playground (presence of potholes, stones, etc.), as well as long run on rough territory, the students can turn ankle. This injury is often limited to stretching the ligament apparatus of foot ankle joint (there

are, however, more serious consequences - torn ligaments, broken ankle). When the sprain occurs, a sharp pain and swelling is observed in the area of foot ankle joint resulting in it's and surrounding tissues visible bleeding. The function of joints is limited.

### **Injuries to the knee joint**

Quite a vulnerable link in the musculoskeletal system is knee joint. Ligaments may be stretched, strained and torn. Injuries are accompanied by pain in the joints, bleeding leading to limitation of movement in the joint.

First aid for injuries of ligaments is imposing of tight bandages and cold (ice pack for 30 minutes) to the area of damage. Only these measures largely prevent the further development of internal hemorrhage. Training is only allowed to restore after the disappearance of pain and swelling, with full restoration of function of the joint. Immediately after recovery sessions it is recommended to bandage the joint area with elastic bandage.

### **Cramps**

Sometimes during strenuous exercises or after them (within some hours) in leg muscles there can be cramps. The most common cause of them is muscle fatigue which results in lack of preparedness to the implementation of physical activity, weakness, fatigue.

Preventive measures are the use of rational exercise, their gradually and correct increasing, a requirement for warming up before classes (special attention should be paid to warming the muscles in cold weather).

If during exercise leg muscles suddenly cramp, you should stop the exercise and should not make any sudden movements. During cramps in the calf muscles, you need to bend the leg at the knee, lift it and gently massage the muscle with arm. Remember that reason of a cramp can be nerve stimulation, lack of self-confidence arising before performing a particular exercise.

### **First aid at bleeding**

The most common cause of bleeding is vascular injury. Depending on the type of damaged blood vessel we can distinguish arterial, venous, capillary, mixed bleeding. The most dangerous is arterial bleeding.

A distinctive feature of arterial bleeding is pulsating stream of bright red blood. When major arteries are injured death can occur within a few minutes.

When there are venous bleeding blood pours evenly, slowly, its color is dark red. This type of bleeding is less dangerous than arterial bleeding.

During capillary bleeding blood appears on the damaged surface of small drops. Usually, this bleeding stops itself.

To stop a considerable bleeding, we can use the following manipulations:

- raise relatively to the body the part of the body, which bleeds;
- press the bleeding vessel (to stop capillary bleeding enough to impose a regular bandage, venous bleeding, and bleeding from small arteries can be stopped by means of tight bandages);
- bleeding from large arteries is stopped, pressing the artery to the neighboring bone with one, two, or four fingers fist above the wound. This method is convenient only for preliminary stopping of bleeding for a short time until the tourniquet is put. Concussion is a rare injury, but as the result it may have serious complications. Traumatic brain injuries are divided into con-

cussions, bruises and compression of the brain. These injuries are serious and often life-threatening. Let us consider a concussion. According to the clinical picture they are divided into light, moderate and heavy. When concussion is of mild weakness we can observe confusion, headache, dizziness, nausea (sometimes vomiting), tinnitus, blackout, pallor, cold sweat, sluggish speech. In a number of cases with mild concussion faint can not be observed, but the person still feels dizzy. When concussion is of medium scale, fainting may take from 5 minutes to an hour or more. Symptoms of concussion are expressed sharply: marked vomiting, severe weakness, lethargy reactions to external stimuli. We can note memory disorder.

Concussion of heavy degree is accompanied by a more prolonged fainting (from several hours to several days), distinct repeated vomiting, and difficult breathing. In addition, there is low blood pressure, pupils are dilated and poorly respond (or do not respond) to light.

A high percentage of the adverse effects of traumatic brain injuries can be reduced if the victim will be given timely first aid. If the victim has open injuries, we need to process the skin around the wound with tincture of iodine, and then wrap the wound with a sterile bandage and gently put the patient on a stretcher in the supine position on the side or stomach (the foot on the bottom is bend in the knee and hip joints) by providing him free access of air. If there is vomiting, then such provision will prevent from entering of vomit masses to the airway that can threaten asphyxia if the victim is unconscious. Then you must put on the head of victim cold, and call for ambulance.

### Acute pathological conditions

During exercising may develop a variety of acute pathological conditions. The teacher must be able to provide the following first aid.

In case of heat and sunstroke he should move the victim to a cool place and lay on his back so that his head is above the trunk. Then undo the clothing that compresses and put ice pack on the head or a towel soaked in cold water. For excitation of breathing a teacher can give to smell ammonia (cotton wool soaked in it a few times is hold to the nose of the victim). You cannot lift the bottle of ammonia direct to the nose.

### Traumatic shock

The main role in its occurrence is played by the pain and bleeding. These reasons should be the first to eliminate. You should stop the bleeding, make fixing immobilization bandage (or tire) and give pain killers. The victim should be delivered as soon as possible to traumatology.

Emergency care during cardiac and breathing arrest (resuscitation). In some cases of acute pathological conditions disorder of vital functions is expressed so dramatically that cardiac and breathing arrest comes. The main features of cardiac arrest - no pulse in the arteries and the reaction of the pupil to light (pupil is dilated).

If you have symptoms of cardiac and breathing arrest it is necessary, without losing a second, to start resuscitation performance. The most effective is external (indirect) cardiac massage and artificial respiration by insufflator air into the upper airway of the victim. The victim is laid with his back on a hard surface; the one who assists kneels at the side of the victim and puts the palm of one hand on the lower third of the sternum, two fingers above the xiphoid process. Fingers are at right angle to the center line of the body of the victim. The palm of the other hand, which increases pressure, is superimposed on the first hand in the transverse direction. Pressing should be carried out only by top of the palm (it is important that no other part of the palm or fingers do not touch the chest). Rescuer does vertical pushes on the sternum so that it bends 4 - 5 cm. The victim's heart is compressed between the sternum and the spine. Frequency of clicks is 60 - 80 pushes per minute.

Cardiac massage should be performed simultaneously with artificial respiration. The most effective artificial respiration means is "mouth to mouth".

Before beginning artificial respiration, you need to put the victim on his back in a horizontal position, reject the head (for better access to airways and its permeability). Palm of one hand is under the neck of the victim, which is raised up by the rescue, palm of the other hand is on the forehead of the victim (with this hand the rescuer removes head back simultaneously clutching his nose with two fingers). Having breathed rescuer covers mouth of the victim with his own mouth and vigorously breathes air then brings his head from victim's face. Exhalation is done independently through the elasticity of lung tissue. With proper air injection expansion of the chest will be observed. Each time you insufflate air is 1 second, pauses are 2-3 seconds. Frequency of air injection is 18-20 times per minute (Fishkin A. V., 2008) [4].

### Conclusion

We have analyzed the main causes of traumas and their prevention measures and discussed most typical injuries and pathological conditions, and providing first aid. It is quite possible to avoid injury, it is only necessary carefully to foresee all precautions.

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