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FEATURES OF DAMAGE TO THE SHOULDER JOINT IN VOLLEYBALL PLAYERS

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Abstract
The article discusses the features of injuries to the shoulder joint in volleyball players.

Keywords: volleyball, shoulder, damage, feature, injury, shock, muscle.

ОСОБЕННОСТИ ПОВРЕЖДЕНИЙ ПЛЕЧЕВОГО СУСТАВА У ВОЛЕЙБОЛИСТОВ

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Аннотация
в статье рассматриваются особенности повреждений плечевого сустава у волейболистов.

Ключевые слова: волейбол, плечо, повреждение, особенность, травма, шок, мышца.

Trauma (from the Latin Trauma - damage) is a sudden simultaneous impact on the human body of external factors that cause local disturbances in the anatomical integrity of tissues and physiological functions, accompanied by general reactions of the body.

Depending on the traumatic factor, injuries are distinguished between mechanical (fractures, bruises), thermal (burns, frostbite), chemical, radiation, combined, and electrical injuries. Injuries occupy third place in the structure of overall morbidity (12.7%), behind influenza, acute respiratory infections and cardiovascular diseases. This trend is confirmed by the data, where the first place (20.7%) is occupied by diseases of the circulatory system, the second (19.7%) by respiratory diseases and the third (13.1%) by injuries and poisoning. In men, injuries occur twice as often as in women, and in men of working age they occupy first place in the structure of overall morbidity. Between 5.5 and 10% of trauma patients require hospitalization. Injuries and diseases of the organs of support and movement occupy the second place among the causes of temporary disability and the third place among the causes of disability.

All injuries can be classified, in particular, based on environmental factors, thus: Domestic injuries (acquired at home, or, for example, in the yard). Transport injuries (caused by means of transport, or received during the trip). Industrial injuries (received during work at work). Sports injuries (acquired during training or competition).

 Military injuries (received during combat operations from exposure to destructive weapons). Agricultural injuries (received during field work or on the farm). Childhood injuries (received by persons under 14 years of age). If the injury was received in connection with the victim's professional activities, then it is considered an occupational injury. In addition, injuries can be classified according to the nature of the impact received as follows: Physical injuries (resulting from burns or hypothermia). Mechanical injuries (caused by a tool or other material object). Biological injuries (caused by exposure to bacteria or their toxins). Chemical injuries (resulting from the harmful effects of acids, alkalis or toxic substances).
 Mental trauma (appears due to constant pressure on the psyche and nervous system through fear, threats or all kinds of phobias). According to the severity of the injury, injuries are classified as: Severe - severe blood loss, hip fractures, concussion. Medium – finger fractures, dislocations. Lungs – sprains or lacerations. Injuries are divided into isolated, multiple, combined and combined.

Isolated injury - damage to one organ or segment of a limb (for example, liver rupture, hip fracture, forearm fracture). Multiple trauma is a series of similar injuries to the limbs, torso, and head (for example, simultaneous fractures of two or more limb segments or multiple wounds).

Combined injury - damage to the musculoskeletal system and internal organs (for example, a hip fracture and intestinal rupture, a shoulder fracture and brain contusion, a pelvic fracture and liver rupture). Combined injury - from the effects of mechanical and non-mechanical damage: chemical, thermal, radiation (for example, wounds and radioactive damage, fractures of the bones of the upper limb and burns of the torso).

The anatomical concept of "shoulder" is somewhat at odds with the everyday understanding of this part of the body. According to anatomical nomenclature, the shoulder is considered to be the upper part of the free upper limb, which starts from the shoulder joint and ends at the elbow. The area that is commonly referred to as the "shoulder" in anatomy is called the shoulder girdle or the girdle of the upper limbs. The shoulder girdle connects the free upper limb with the body and, due to the peculiarities of its structure, increases the range of movements of the upper limb. In this work, we will analyze both of these anatomical structures and, as always, we will analyze all levels: the bones of the shoulder girdle and shoulder, the ligaments and joints of the shoulder region and the muscles of the shoulder girdle and shoulder. The shoulder joint is a complex and elegant part of the musculoskeletal system of our body. Thanks to its special structure, we can make a wide variety of movements with our hands. However, due to the high mobility of the bones that form the shoulder joint, this connection is not stable enough. This results in an increased incidence of certain traumatic shoulder injuries.

Athletes are a category of people who are constantly at risk of receiving certain injuries. Therefore, sports injuries to the shoulder are not uncommon and treatment should begin immediately. This is especially true for power sports. In addition to performing work and household duties, an athlete must withstand the great physical stress of modern sports, which places enormous demands on the stability of the joints, their mobility, and muscle strength. This means that there is a significant difference between the concepts of "healthy" for a healthy person and for an athlete. The effectiveness of combating injuries in sports largely depends on

the coordination of the work of doctors, coaches and the athletes themselves. At the same time, the trainer has the main function in implementing practical measures to prevent injuries and carrying out special rehabilitation measures after injuries and illnesses. To solve these problems, they need to know the main manifestations, causes and conditions under which various injuries occur, and understand the features of special rehabilitation for athletes. In addition, coaches must be able to provide first aid correctly, since the outcome of treatment and the time frame for restoring athletic performance largely depend on its skillful provision.
Injuries are classified by type (bruise, sprain, fracture, etc.). Of interest is the percentage of various injuries and chronic diseases of the musculoskeletal system (caused by microtraumas) requiring long-term inpatient or outpatient treatment. Among acute injuries, the largest percentage consists of injuries to the meniscus of the knee joint and the capsular-ligamentous apparatus of the joints. There are different types of injuries - bruises, sprains, dislocations, fractures and fractures are considered an injury. Injuries are classified by type, severity and location. Of particular interest is their percentage depending on the type of sports activity

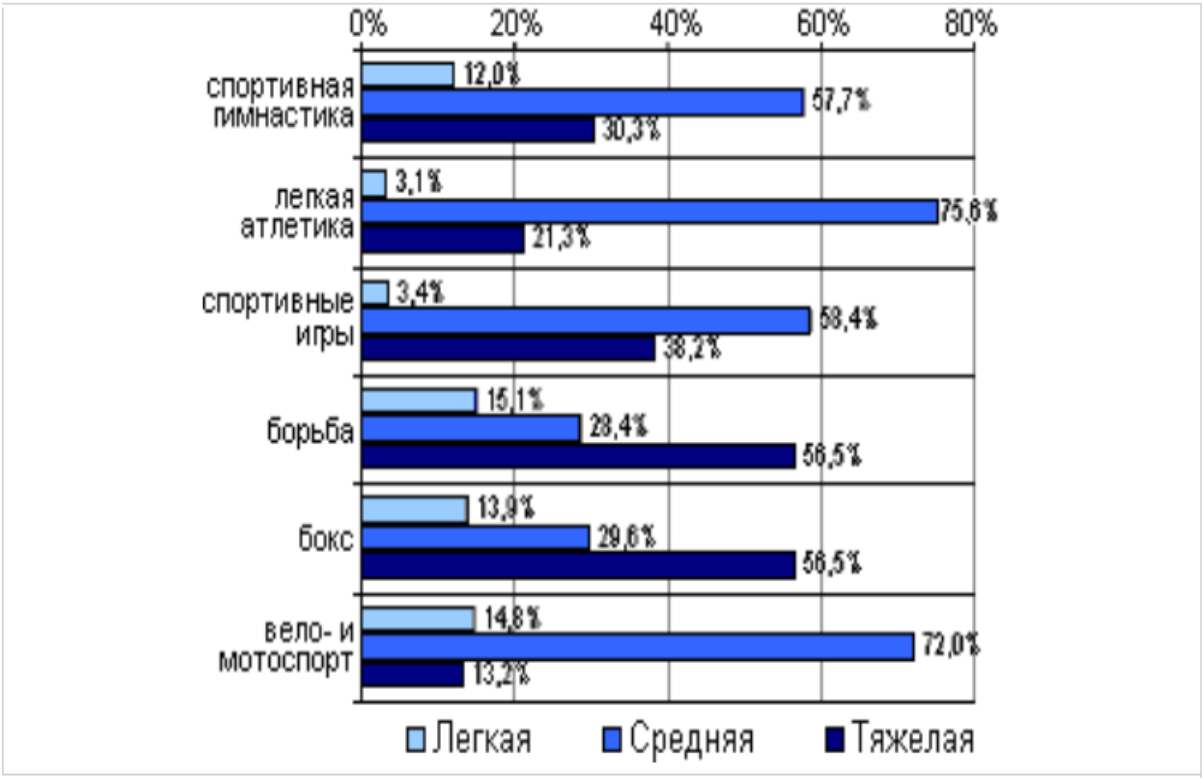

Рис. 1. Распределение травм по степени тяжести в некоторых видах спорта

Among chronic diseases, joint diseases come first (deforming arthrosis, diseases of fatty bodies and chronic microtraumatization of ligaments, meniscopathies, bursitis, etc.). Chronic diseases of muscles, tendons (along their length and at the place of attachment to the bone), diseases of the periosteum, spine, including osteochondrosis, spondylosis and spondyloarthrosis, are also often found in athletes. According to the location of injuries in athletes, in general, injuries to the lower extremities are most often observed (on average about 50%), especially to the joints (mainly the knee and ankle). Shoulder injuries among volleyball players are in second place.

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The causes of shoulder injuries in volleyball are inadequate use of muscle groups. When performing a release motion in volleyball, the goal is to drive the ball into the opponent's court with maximum force. The speed of the ball after impact depends on the amount of force applied and the duration of contact between the ball and the hand. To apply maximum force, the hand must move at maximum speed. With good striking technique, the speed of the hand is ensured mainly by the muscles - the flexors of the hip joint and the flexors of the torso (Fig. 2a).

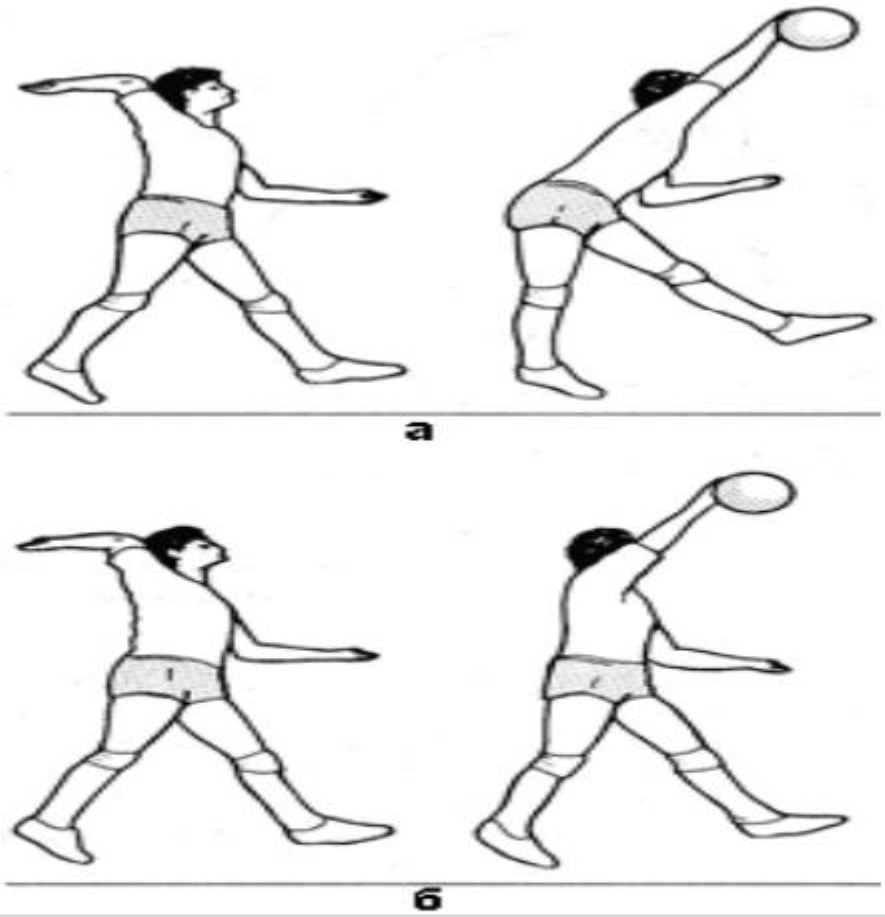

Рис. 2. Выполнение «гасящего» удара в волейболе.
а) – правильная техника с акцентом на сгибание тазобедренного сустава и туловища;
б) – неправильная техника с акцентом на выпрямление плечевого сустава.

Using your hip and trunk flexors minimizes stress on your shoulder and arm muscles and allows you to control your hand movements prior to contact with the ball. Poor engagement of the hip and trunk muscles is usually compensated by excessive shoulder motion, which involves intense activity of the shoulder muscles (Fig. 2b). This likely places excessive stress on the shoulder muscles and other structures, which can lead to rotator cuff damage.

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Abnormal joint movements. Movements of the arm above the head, for example when performing a “damping” blow in volleyball, are carried out due to movement in three joints: the shoulder, acromioclavicular and sternoclavicular. By restricting movement in the last two joints, hyperabduction of the shoulder joint must occur to achieve the desired overhead position of the arm. In this case, the supporting structures of the shoulder joint are most likely pressed against the acromion process and ligaments, which leads to damage to the rotator cuff and the occurrence of “impingement syndrome.”

Hand raising technique. Performing a serve and a “damping” blow in volleyball includes all phases of throwing - lifting, acceleration and tracking. Professor D. Oka et al found that there are two types of lifting movements. In one case, the shoulder is raised first by a forward flexion movement; in the second, it is held below the acromion and retracted back into horizontal flexion before elevation. Since the first option is much more reminiscent of the “pinching” symptom, it is advisable to use the second option for performing a serve in volleyball. Hitting the ball with the hand during serve and attack appears to cause a sharp eccentric overload of the rotator cuff.

The causes of shoulder injury arise from violations of a methodological or organizational nature.

Methodological reasons:

- □ Non-compliance with the principles of sports training: continuity, cyclicity, gradual increase in loads.
- □ Training against the background of under-recovery.
- □ Performing backbreaking, unfamiliar, difficult exercises.
- □ Training without warm-up or insufficient warm-up.
- □ Lack of concentration among athletes.
- Organizational reasons:
- □ Qualification of the trainer.

□ Formation of groups without taking into account gender, age, physical fitness.

- Lack of insurance, performing exercises “strong on weak”, etc. □ Large number of people training in a group.
- Conducting training sessions without a trainer, at low air temperatures.
- Admission of athletes to training without prior medical supervision; premature start of training after illness or injury; poor hygiene of the body and feet.
- Violation of the rules for maintaining classrooms (poor lighting, insufficient ventilation, poor-quality surface of the site, irrational arrangement of inventory and equipment, etc.).

- Violation of sports discipline and regime.

□ Non-optimal competition calendar without taking into account the recovery time of volleyball players, travel time, changes in time and climate zones.

Next, we need to consider the types of sports injuries to the shoulder. A fairly rare, but extremely dangerous sports injury to the shoulder girdle is a bone fracture. A variety of this injury is a fracture of the clavicle, proximal humerus, or fracture of the scapula. To treat this

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type of injury, it is necessary to apply a plaster cast or use the metal-steosynthesis method. Most often in the life of athletes, especially those involved in bodybuilding and powerlifting, dislocations, tears of the shoulder muscles and sprains occur. Also, these sports are characterized by such injuries as bursitis. The symptom of this injury is not only severe pain, but also swelling of the joint capsule area. This disease manifests itself when the shoulder joint is under sufficiently large loads.

Also among various injuries, tendenitis stands out. This is an inflammation of the tendons that surround the shoulder joint. This inflammation occurs as a result of friction between tendons and bones. In some cases, simple biceps tendonitis may occur - this is an inflammation of the inner part of the shoulder up to the elbow area. Upon palpation and movement, the athlete will feel sharp pain in the shoulder area. Rotator cuff injuries are a fairly common injury in volleyball. In addition to the rotator cuff tendons, the supraspinatus “outlet” includes the subacromial bursa and is bordered above by the medial and coracoacromial ligament. If these structures are damaged or swollen, a “pinching syndrome” (impingement syndrome) may occur in this area, which will be secondary to these injuries. If there is swelling or muscle hypertrophy in the supraspinatus “exit” in an athlete, subsequent repetition of movements above the head leads to increased swelling and the development of reactive inflammation. This can lead to bone impingement, and continuous repetition can cause a rotator cuff tear. The supraspinatus tendon is most often damaged, as it is located between the humerus and the acromion of the scapula (Fig. 3).

Рис. 3. Повреждения вращательной манжеты плеча

3) A rotator cuff tear causes pain and weakness in the shoulder. In some cases, a partial tear of the rotator cuff occurs. In this case, pain occurs, but normal movement of the arm is possible. If the tear is significant, there will be more severe weakness in the shoulder. If the rotator cuff tendons are completely torn, the patient cannot move the arm away from the body. In most cases, after an injury, vaguely localized pain appears in the shoulder area. Some patients note

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that when moving their arm, a “clicking” sensation occurs in the shoulder. Most patients note that they cannot sleep on the side of the affected shoulder joint.

Suprascapular neuropathy itself is a fairly rare disease, but it is relatively common among volleyball players. Subscapular neuropathy consists of inflammation and decreased conductivity (up to complete non-conduction) of the suprascapular nerve, most often caused by its mechanical entrapment. The suprascapular nerve is a short branch of the brachial plexus and starts from the V and VI cervical roots. Passing laterally under the trapezius and omohyoid muscles, it enters from the anterior side into the notch of the upper edge of the scapula (suprascapular notch or notch) under the superior transverse ligament of the scapula (in 50% of cases), and thus ends up on the posterior side of the scapula, in the supraspinous fossa.

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