RISK FACTORS AND PREVENTIVE MEASURES OF THE INJURY PATTERNS IN FEMALE VOLLEYBALL

FACTORII DE RISC ȘI MĂSURILE DE PREVENIRE A TRAUMELOR ÎN VOLEIUL FEMININ

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Summare. *This article provides information on risk factors, injury frequency, and injury prevention measures in women's volleyball. Injury data in young female volleyball players are not clearly studied. Volleyball appeared in 1895, culminating in an exponential growth over the decades, with one of the highest participation rates. In addition, the collective game has categories that vary according to age and level of competition. Regardless of level and age, during practice, volleyball players perform rapid movements such as jumping, landing, and changing the direction, with demanding motor and sensory skills necessary to avoid injuries. The injuries that occur can easily remove athletes from training and competitions, with unjustified consequences, which makes it necessary to understand and study their risks, frequency, and location in women's volleyball.*

Keywords: *Volleyball, injuries, female, prevention, rehabilitation, protective equipment.*

Injuries in volleyball are a serious problem that affects both professional athletes and fans of this sport. Every year, hundreds of thousands of players around the world suffer from various injuries that can affect their health and ability to continue playing volleyball. One of the most common injury in volleyball is ankle sprain. This happens when ankle ligaments stretch or tear, often due to a sudden change of direction or an awkward landing after a jump. Sprains of the ankle joint can be very painful, and it may take several weeks of rest to heal. In order to prevent injuries in volleyball, players must be attentive to their technique and strive to make it more effective and safe. They should also be aware of the proper use of equipment and how to prepare their body for physical exertion. It is important to remember that there are numerous factors that can affect the likelihood of injury, and players must be prepared for them.

One of the key aspects of injury prevention in volleyball is proper preparation and training. Players should strive to gradually increase the intensity of training and continu-

ously improve their physical fitness. In addition, regular medical examinations and consultations with doctors can help identify potential problems and prevent injuries before they occur. In general, injuries in volleyball are a serious problem that can lead to serious consequences for the health and sports career of the players. However, with the help of proper training, equipment and techniques of the game, as well as constant monitoring and care these injuries may be prevented.

Object of study: Female volleyball.

Subject of study: Common injuries in women's volleyball.

Purpose of the study: To identify the injury risk factors and their prevention.

Research methods: Analysis and generalization of data from the scientific-methodical literature; study of statistical data; observation; photography; graphics; questionnaire.

Organization of the research: The study of the injury occurrence in female volleyball was conducted in a virtual library on the page of the World Volleyball Federation, as well as conducting a survey; the periods of the formative study were 2023-2024.

The results of the study: Were investigated several aspects as a form of interpretation of the results of the study: 1. Types of injuries in female volleyball. 2. Risks of injury factors in volleyball.3. Methods of prevention. 4. Research. 5. Conclusions.

Types of injuries in volleyball

Volleyball is a game played by two opposing sides, with six players on each team, where the players use mostly their hands to throw the ball over the net and try to force the ball to land on the side of the opposing team's court. Over 800 million people worldwide play volleyball, making it one of the most popular sports in the world. Volleyball comes with certain risks, as players suffer common injuries; these include injuries to the ankles, shoulders, feet and knee. The term "sports injury" in the broadest sense refers to the types of injuries that most often occur during sports or physical exercise. Some sports injuries are the result of accidents; others arise from poor training practices, unsuitable equipment, lack of physical fitness, or insufficient warm-up and stretching. There is a list of the most common volleyball injuries: Ankle injuries; Patellar tendinitis; Knees; Hand damage; Shoulder pain; Bruises; Finger injuries; Rotator cuff tears; Lower back pain; Labral tears; Concussions; Torn fingernails; Anterior Cruciate Ligament (ACL) injuries. ***Ankle***: Sprains are the most frequent type. When most are not severe, those that are can result in fractures and ligament/tendon injuries that may require surgery. (Fig. 2) ***Knee***: "Jumper's knee" is when the tendons around the kneecap become irritate by small micro-tear, consulting in knee pain and stiffness. (Fig. 5) ***Shoulder***: The high-stress motions of spiking and serving done by competitive players can result in injuries to the tendons and ligaments that support the shoulder. (Fig. 4) ***Fingers:*** Players can suffer jammed, dislocated, and fractured fingers from contact with the ball, the net, and even their teammates. Long-term issues can include pain and deformity. (Fig. 3) ***Lower Back:*** Lower back pain is common among volleyball players because of muscle or ligament strain. (fig. 1)



Figure 1. Lower back injury

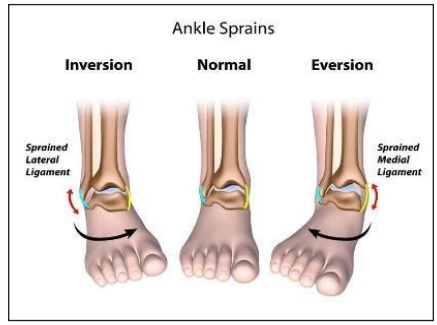


Figure 2. Ankle sprains

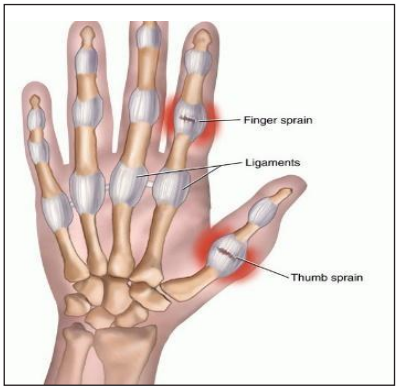


Figure 3. Fingers' injury

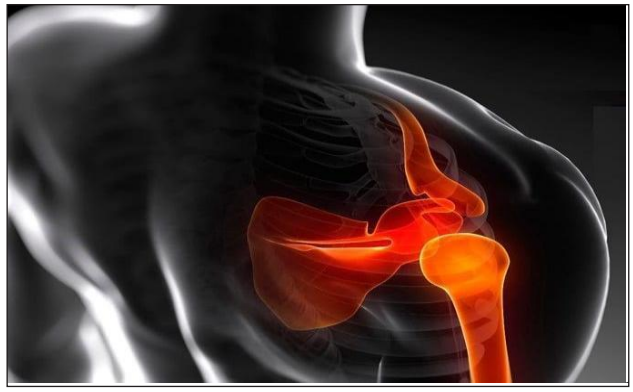


Figure 4. Shoulder injury

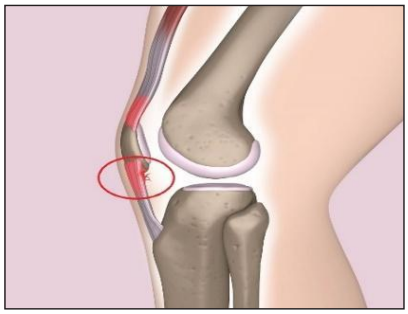




Figure 5. Knee injuries

There are a variety of factors from which ACL injuries are attributed. These could be biomechanical or non-biomechanical factors. Non-biomechanical factors include anatomical, hormonal and environmental and are non-modifiable. Biomechanical aspect on the other hand is more important that it directly influence the stress placed on the ACL during a game and should be understood by players and instructors so as to prevent

serious injuries in volleyball and other sports. These factors include joint motion, joint forces, muscle activation, and muscle strength.

Risks of injury factors in volleyball

There are intrinsic and extrinsic risk factors for injury. Intrinsic factors are a child's individual musculoskeletal issues, which can include skeletal immaturity (bones and joints that are still developing) or muscle weakness. Extrinsic factors are the environment in which an athlete performs, which can include the level of competition: how much, how hard and how long play lasts. *Other common risk factors for volleyball injuries include: Serving and spiking* are two repetitive activities that are done while attempting to generate a great deal of force. The combination of repetitions and force can result in injuring the rotator cuff muscles of the shoulder. *Blocking, setting, and digging* are all activities that have been found to increase the risk of finger injuries.

Most injuries occur when the ball strikes the fingertip. If the player is unable to bend an *injured finger* is necessary to be consulted a sports health professional. The repetitive, *forceful jumping* involved in spiking and blocking can result in patellar tendinitis, which is an inflammation of the tendon that connects the kneecap (patella) to the leg (tibia). *Anterior cruciate ligament (ACL) knee injuries* occur when a player lands awkwardly from a jump. If an ACL injury is suspected, it is necessary to consult a sports health professional. The repetitive nature of arching the back during serving can result in *low back pain.* If low back pain develops then s sports health professional needs to be consulted to develop a plan of care that will allow the athlete to return to full participation. *Spondylolysis* is a stress fracture at the pars interarticularis of a lower lumbar vertebra (the fifth lumbar vertebra is the most common). When a player hyperextends the low back when hitting or when "back setting," there is considerable shear forces placed on this portion of the vertebra. When performed repetitively, a stress fracture can develop. Adolescents are especially vulnerable to this injury because their vertebrae are still weak at the pars. On examination, the athlete experiences pain to the side of a lower lumbar vertebra upon extension.

Methods of prevention

There are ways to prevent injuries such as stretching, proper hydration, conditioning, and more. In addition, kneepads are necessary to help avoid knee injuries and ankle braces are often used as a way to stabilize the ankles when jumping. The most common volleyball associated injuries are found in the ankles, fingers, shoulders, knees, and the back. These include rotator cuff tendonitis, ACL tear, patellar tendonitis, ligament tears or dislocation in fingers, ankle sprains, and low back pain associated with stress or a herniated disk. Treatment for these injuries includes physical therapy, strength training, and occasionally surgery or a brace. If the surgery is the time to return to play may vary depending on the severity of the injury. For a torn ACL, recovery to return is anywhere from six to nine months. Often volleyball injuries are due to poor form when blocking

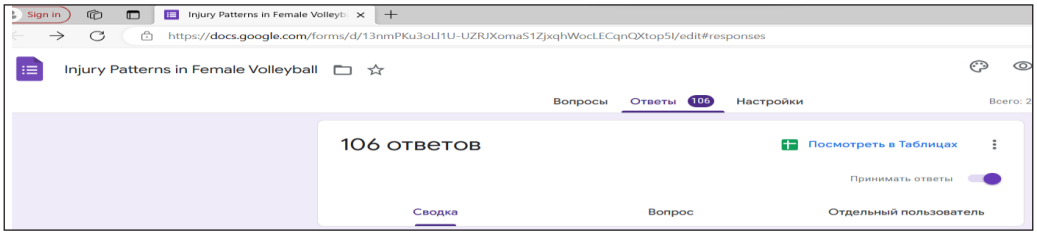
and receiving a serve or a hit. Certainly, there are times where the injuries cannot be prevented and are simply accidental. To avoid injuries, conditioning and stretching are very important as well as correctly executing each play. Interval training is helpful for conditioning as opposed to long-distance running, to help the body adjust to the typical rhythm of high-level volleyball. Examples include: Plyometric (jumping exercises); Ladder drills; Shuffling; Shuttle drills; Core Strength Training; Bridges; Planks; Medicine ball squats; Leg Strength Training; Lunges; Squats; Tuck jumps; Flexibility Training. *Shoulder:* external rotation, joint stability and lateral flexibility; *Knee:* high knees and hugs, sumo squats, baby skips; *Legs:* quad stretch, straight leg run, volleyball shuffle; Minimize time on hard surfaces, especially during jump training; Eat lots of proteins, vegetables, calcium, magnesium and vitamin D; Equipment is also very important, as it helps to prevent injuries during volleyball. *Kneepads* protect against injury when you are hard at work digging or diving on a hard court. *Ankle retainers* or taping help prevent ankle dislocation. *Wear high-quality volleyball shoes* that provide cushioning and reliable support for the ankle and arch of the foot. *Padded protective trousers* from hip to knee help protect against bumps, bruises and burns from the floor. (fig. 6, 7)

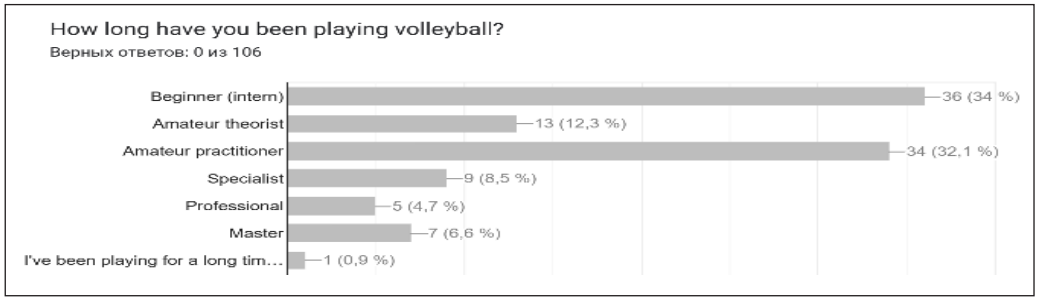


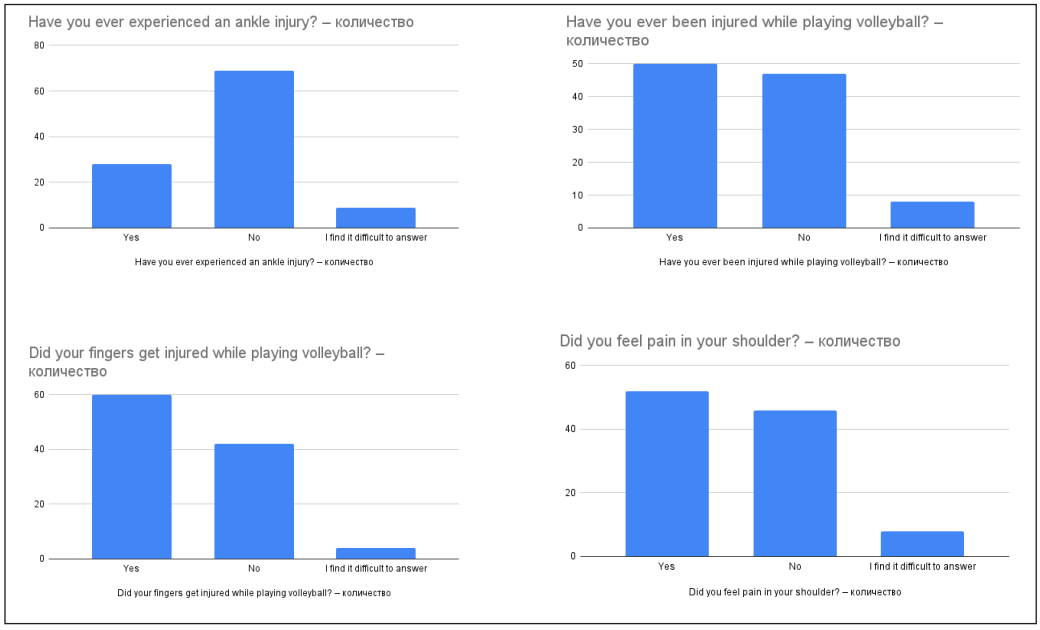
Figures 6, 7. Protective equipment

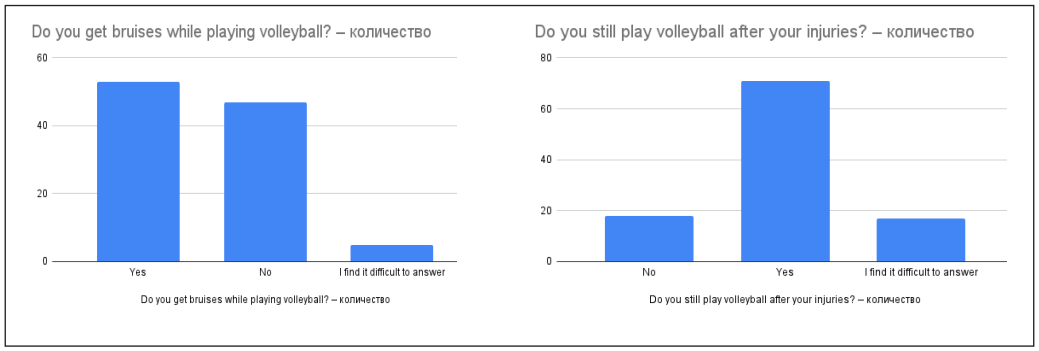
Research results:

To determine the frequency of injuries in female volleyball, a survey was conducted in which 106 girls/women have participated:









Based on the study, it should be noticed that most players, regardless of age and experience, were injured. It is important to note that despite the injuries most of the players continued to practice volleyball. 36 % of the percent are beginners who are most often

injured due to improper exercise technique. 32 % of the practitioners of this sport are also injured. Knowledge of technology, equipment still leads to unexpected injuries.

CONCLUSIONS:

The prevalence and frequency of injuries among young volleyball players were high. In addition, the most commonly affected areas were the ankle, upper limb (wrist, hand and fingers) and knee. Finally, factors associated with the occurrence of trauma include age and experience. In conclusion, injuries are a common occurrence in volleyball, but there are steps that can be taken to prevent them. Proper warm-up and cooling down, using the right technique, wearing protective equipment, leading a healthy lifestyle and understanding the importance of gradual progression are all important for injury prevention. Volleyball players should also be aware of the various types of injuries that can occur, such as knee, shoulder, hand and finger injuries, as well as ankle sprains, and take measures to prevent them. Special equipment such as kneepads, ankle braces, shoes, gloves and elbow pads can also play a crucial role in preventing injury in volleyball. This equipment helps to protect various parts of the body and reduce the risk of injury.

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