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Biomechanics and physical training in football, Fatigue and the recovery process.

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Annotatsiya: *Football biomechanics is a scientific study of football player movements, which serves to optimize technique and physical capabilities. This field is aimed at analyzing football player movements, increasing efficiency, and preventing injuries.Football players perform movements such as running, passing, dribbling, kicking, jumping, and turning. The optimal method of each movement is determined and technically correct execution is ensured. This plays an especially important role in developing the technical skills of football players.Different muscle groups work during football. During running and jumping, the leg muscles are actively involved, and when passing the ball, the hip and trunk muscles are actively involved. With the help of biomechanics, it is determined which joints are under excessive load and recommendations are given to prevent excessive fatigue. In a football game, the ball can be hit in different ways: with the inside, with the outside, direct and directional kicks. Biomechanics determines the optimal position of the legs and body during a kick, which helps to increase the accuracy and power of the kick.The speed of football players and the style of movement during the game have a great influence on the result. With the help of biomechanical studies, how football players move during sprints and the technique of maintaining balance are studied. This is especially important for quick decision-making and effective movement in offensive or defensive tactics.Injury prevention is one of the main directions of football biomechanics. Muscles and joints can be damaged due to incorrect movements, overload or incorrect technique. Through biomechanics, these problems can be identified and special exercises and techniques are developed to prevent them.*

Kalit so'zlar: *Football biomechanics, movement analysis, physical performance, injury prevention, running mechanics, kicking technique, muscle activation, joint loading, balance and coordination, sprint speed, energy efficiency, tactical movement, sports science, motion optimization, biomechanical assessment.*

Introduction

The mechanical movements of a person studied in sports biomechanics are carried out under the influence of external mechanical forces (weight, friction, etc.) and muscle traction. Muscle traction is controlled by the central nervous system and is determined by physiological processes. Therefore, in order to fully understand the nature of living movements, it is necessary not only to study the mechanics of movements themselves, but also to consider their biological aspects. It is precisely their biological aspects that determine the reasons for the organization of mechanical forces. It is important to know that there are no separate laws of mechanics for the living world. The more living systems differ from abstract, absolutely rigid bodies, the more complex the movements of living organisms are compared to the movements of absolutely rigid bodies. Motor activity is carried out with the help of voluntary active movements, which are called and controlled by the work of muscles. A person begins to act voluntarily, according to his perception, changes them and stops them after achieving his goal. According to N.A. Bershtein, a person normally performs not just movements, but practical actions. A person’s practical

actions always have a goal and a certain content. Newton asked the question: “How does the movement of objects follow perception?”, that is, achieve the set goal. However, to date, the mechanics of goal-directed (voluntary) human movements are being developed based on the goal of the actions. In football, bio-physical fitness and the process of fatigue and recovery are one of the factors affecting the quality of the players themselves. The use of additional software and its implementation.

Methodology

Biomechanics helps to optimize the technique of running, jumping, turning and kicking by analyzing the movements of players. Maintaining body position, correct distribution and change of movement during play and recovery are related to biomechanics. For example, when hitting the ball, the game position is affected by the force of the movement, the impact and movement of the movement. , By improving the running technique, they can gain speed and, as a result, an advantage.

Physical fitness is one of the main things that players need to achieve maximum performance. Players should focus on special training for strength, speed, food processing. Endurance training, such as aerobic and anaerobic training, helps players to reduce fatigue during games. Increasing maximum strength helps players to run faster and make powerful shots. Understanding and managing fatigue in players is an important part of physical training. Fatigue can slow players down later in the game, increase reaction times, and increase the risk of injury. Fatigue is caused primarily by the depletion of muscle energy reserves and an increase in lactate levels in the body. To prevent this process, it is important to eat right, avoid dehydration, and perform the right exercises.

The recovery process helps players recover from fatigue faster and perform consistently during the game. It is important to follow a proper recovery plan after training and matches. This process includes active recovery, massage, stretching, proper nutrition, and sleep. Ice therapy and rehabilitation exercises can also help players recover from injuries faster. Special regenerative techniques, such as cryotherapy and hyperbaric oxygen therapy, are widely used in modern football to speed up the recovery process.

Result and Discussion

Mental preparation also plays a major role as an important part of physical preparation. Improving the self-confidence of players, developing their ability to manage stress and concentrate significantly affects results. Coaches and sports psychologists increase the psychological stability of players by teaching them to act effectively under pressure. Breathing exercises, visualization techniques and motivational training play an important role in strengthening the mental state of players. In addition, the diet of athletes also has a significant impact on their physical and mental state. Players should have a balanced diet of carbohydrates, proteins and fats. While carbohydrates are a source of energy, proteins are necessary for muscle recovery and development. Vitamin and mineral deficiencies can negatively affect the endurance of players. Maintaining water balance is also important, as dehydration can reduce the reflexes and physical activity of players.

The muscle groups of football players and their role in movement are also very important. In particular, the muscles of the lower body, including the thighs, calves and legs, are important for running, jumping and kicking. On the other hand, the core muscles provide stability to the body and play a major role in maintaining balance. The upper body muscles are also important in fighting for the ball and pressing.Modern technologies are widely used to improve the biomechanics and physical training of football players. For example, video analysis and motion sensors are used to evaluate and improve the effectiveness of football players' movements. Innovations in sportswear and footwear ensure their

comfort during the game and help prevent injuries. Through virtual reality technologies, football players have the opportunity to better understand the game mentally and develop their tactical approaches.

Thus, by analyzing and optimizing the movements of football players based on biomechanics, increasing physical fitness, combating fatigue and using effective recovery methods, their results can be significantly improved. Proper management of these factors will help players achieve long-term success and protect them from injury. Fast recovery from injuries is important to speed up the return to play for players and prevent future injuries. After an injury, the body needs to be given enough rest and the rehabilitation process should be properly organized. In the initial stage, movement should be limited and the injured area should not be overloaded.

Ice and heat therapy are one of the effective methods in the recovery process. Applying ice prevents inflammation and swelling, while heat relaxes the muscles and improves blood circulation. In addition, with the help of physiotherapy and special exercises, muscle strength is restored and the range of motion is improved.

Massage and myofascial release can reduce muscle tension and speed up the recovery process. Proper nutrition also plays a big role. Protein helps repair injured tissues, while omega-3 fatty acids reduce inflammation. Vitamins and minerals, especially vitamins C and D, play an important role in speeding up the recovery process.

Adequate sleep helps the body recover, and reducing stress improves overall health. Underwater therapy can help speed up recovery without putting too much strain on the joints. Physiological treatments such as electrotherapy and laser therapy can also improve muscle stimulation and speed up the recovery process.

Fast and effective recovery from injuries requires an individual approach. It is important for players to follow a specific rehabilitation program under physical training and medical supervision.

Conclusion

For football players, biomechanics and physical fitness, as well as the fatigue and recovery process, are key factors in improving their performance and overall performance. Biomechanics helps players optimize their movements, improve their running technique, increase their impact power, and reduce the risk of injury. Physical fitness, on the other hand, allows players to perform at a high level by developing speed, endurance, strength, and balance.

Fatigue is a significant factor resulting from physical exertion and can reduce a player’s ability to move during a game. Proper training, nutrition, hydration, and rest are essential to managing and preventing fatigue. Recovery is the process of speeding up the body’s return to normal after training and games. Active recovery, stretching, massage, cryotherapy, and other regenerative techniques are used to effectively manage this process.

Mental preparation is just as important as physical preparation, and it has a positive impact on players’ performance by increasing their self-confidence, managing stress and pressure, and developing their concentration skills. Modern technology plays a major role in analyzing players’ movements, improving the quality of their play, and reducing the risk of injury. In general, it is important for players to use biomechanics, physical and mental preparation, fatigue management, and recovery processes in a comprehensive manner to achieve high-level results. These aspects are crucial for ensuring the long-term success of players and improving their level of play.

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