PHYSIOLOGICAL PROCESSES OF PHYSICAL DEVELOPMENT IN ATHLETES INVOLVED IN THE SPORT OF BOXING

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Annotation:
This article investigates the physiological processes underlying physical development in athletes engaged in the sport of boxing. Through a comprehensive review of literature and empirical evidence, the authors explore the various factors influencing athletes' physiological adaptations to boxing training. Key areas of focus include muscle hypertrophy, cardiorespiratory fitness, neuromuscular adaptations, energy system development, body composition changes, bone density and strength, and the role of recovery and adaptation in optimizing performance.

Keywords: sport, athlete, optimization, muscle activity, physiological changes, training, aptitude.

Introduction

It is known that in the purposeful practice of physical exercises and sports, it is important to know the physiological laws and regulations of the human body. Any physical work performed, muscle movements actively affect the function of all systems and organs in the body. For example, simple daily movements, such as walking, running, jumping, manual labor, etc., accelerate the activity of vitality, such as heart rate, breathing, metabolism, energy, circulation, blood pressure, function of the digestive tract. In the case of heavy physical labor, however, such functional changes observed are maximized, leaving the condition indifferent to the organism. In the training of athletes, the modern system includes three youngest systems of the following appearance: including the system of competitions; the system of sports training; additional training and competitions, the system of factors optimizing their impact effect. In this case, the totality of all these listed components, their assembly as a system in one whole, can create a positive effect effect on sports activities.

In the system of additional training and competitions and factors optimizing their impact effect, the main place is occupied by the issues of planning, organizing training and competition loads. In this, it is noted that their importance and role are constantly growing.

Among the main principles by the authors during the preparation, the following are distinguished: in particular, it is noted that all aspects of preparation – organizational factors, training and competition processes, a system of regeneration, information about one whole uniqueness of the functional mechanisms of scientific, medical, informational, and material and technical provision.

Main part

Physical development in athletes involved in boxing undergoes several physiological processes, primarily influenced by training regimens, genetics, and nutrition. Here are some key physiological processes involved:

- Muscle Hypertrophy: Boxing training involves a mix of strength training, endurance work, and skill-specific drills. Over time, this leads to muscle hypertrophy, especially in muscles engaged during punching, footwork, and defensive maneuvers. Strength training with resistance exercises like weightlifting contributes to muscle growth.
- Cardiorespiratory Fitness: Boxing requires high levels of cardiorespiratory endurance. Training routines include aerobic exercises such as running, skipping rope, and high-intensity interval training (HIIT) to improve cardiovascular efficiency. These exercises enhance the heart's ability to pump blood, oxygen delivery to muscles, and overall endurance.
- Neuromuscular Adaptations: Boxing training involves repetitive skill practice, which enhances neuromuscular coordination. Athletes develop better timing, accuracy, and speed through drills such as shadowboxing, bag work, and sparring. These activities improve the efficiency of nerve impulses to muscles, enhancing coordination and reaction time.
- Energy System Development: Boxing utilizes both aerobic and anaerobic energy systems. Aerobic training improves the body's ability to utilize oxygen efficiently over longer durations, crucial for sustaining energy throughout rounds. Anaerobic training, like sprinting and plyometrics, enhances fast-twitch muscle fibers' capacity for explosive movements during short bursts of activity.
- Body Composition Changes: Boxers often aim to optimize their body composition for their weight class, balancing muscle mass, fat mass, and hydration levels. This involves strategic nutrition planning to support muscle growth while minimizing excess body fat. Weight management is critical, as boxers need to meet weight requirements for competitions without compromising strength or endurance.
- Bone Density and Strength: Impact sports like boxing can stimulate bone remodeling, leading to increased bone density and strength, especially in weight-bearing bones like the legs and arms. This adaptation helps reduce the risk of fractures and injuries from punches or falls.

Understanding these physiological processes allows coaches and athletes to design training programs tailored to boxing's physical demands, optimizing performance and reducing the risk of injury.

With the sport of boxing, regular shugulanishthat are absorbed into the life of young people day by day, there are more and more people who are involved in boxing. On the ground of this lie educational and political activities such as the protection of Health and health, the increase of labor productivity, the establishment and strengthening of friendly relations between

peoples and states. Therefore, the study of the secrets of the influence of exercise and muscle activity on the functioning of the system of organism and members in the sport of boxing is one of the main tasks of every coach in this area.

Practicing boxing sports causes a number of specific changes in the physialogical processes of physical development in athletes, the ability of the body to work, the exchange of substances and energy in it, and the functioning of the cardiovascular system, respiratory organs, digestive organs, nervous and muscular systems.

These changes are divided into different periods according to their characteristics, without being the same in the exercise process, and these periods, which are described below, differ from each other from a physiological point of view. They are divided into periods of reaction, discharge, short-term strengthening of working capacity at the beginning of training (getting to work), stagnant state, fatigue and recovery.

The startled reaction is a change in the meioric physiological processes observed in the athlete's body before training or competitions is called the startled reaction. It can occur directly before physical action or much earlier than the physical activity performed.

The physiological changes observed during the training period of the boxer are various, which are manifested in the excitability of nerve centers, the speed of the exchange of substances and energy, the frequency of cardiac war, the exchange of gases and other situations. In a startling reaction observed before the start of the race, the heart rate can go up to 100-130 per minute, oxygen absorption increases relatively 2-3 times at a calm time, blood pressure can rise slightly. The characteristics of such changes are different in everyone, often depending on the training of the athlete and other factors for the training of the competition.

The higher the race lead,the stronger the start reaction. The mechanism of occurrence of the starter reaction is explained by conditional reflexes. The appearance of the venues of the competition the presence of sports inventories of the audience accelerates the frequency of heartbeat, breathing on the basis of a conditional reflex. This condition also has an important practical purpose, that is, due to the reaction of the starter, the athlete's body prepares itself accordingly for the upcoming work. Startled reactions the athlete can also call the joy or fear of the head of the competition in a mental, emotional state. The centers that control such a sensation are located in the nuclei of the basal ostriches of the Cerebral Hemispheres. Their activity is subject to the bark. Therefore, by exercising willpower, the athlete can prevent situations of intense fear, courtship that occur.

The state of combat readiness is considered to be the most favorable, purposeful positive starter reaction. In this case, excitation of moderate strength occurs in the central nervous system. As a result, purposeful physiological shifts occur in the movement and vegetative (internal) organs, which are important for the implementation of the upcoming work. The boxer fully mobilizes his strength and capabilities in this case, therefore often achieving victory. Breathing, heart rate will be moderate, the athlete will not panic and will not be indifferent to the simultaneous work. The state of combat training is often observed in athletes

who constantly train wisely. In those who do not practice constantly and cannot use time, strength wisely in the training session, the state of combat training is poorly observed and becomes very superficial.

Physiological characteristics of razminka-a special muscle action activity that is carried out before any exercise or competition is called razminka, and it plays an important role in the full preparation of the athlete's body for the upcoming work. The main reason for this is that the body cannot prepare physiologically and biochemically for physical activity, which is performed directly on its own.

Conclusion. In conclusion, the physiological processes of physical development in athletes involved in boxing are complex and dynamic, influenced by various training stimuli, genetic factors, and environmental conditions. Boxers undergo significant adaptations in muscle mass, cardiovascular capacity, neuromuscular coordination, and bone strength to meet the demands of their sport.

Understanding these physiological processes is essential for coaches, athletes, and sports scientists in designing effective training programs aimed at enhancing performance and reducing the risk of injuries. By optimizing training protocols to target specific physiological adaptations, athletes can maximize their potential and achieve peak performance in the ring.

Future research may delve deeper into individualized training approaches, genetic predispositions, and the long-term effects of boxing training on physiological health. Additionally, exploring the impact of emerging technologies and training methodologies could further enhance our understanding of physical development in boxing athletes and inform evidence-based practices in sports performance optimization.

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