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PHYSICAL WORK CAPACITY AND MEDICAL-PEDAGOGICAL SUPERVISION IN SPORTS

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Abstract. This article examines the concept of physical work capacity and its evaluation in sports medicine, with a focus on medical-pedagogical supervision, indications and contraindications for physical activity, and medical support for restorative physical culture. Special attention is given to the Harvard Step Test as a method of determining work capacity, the role of training intensity, and the physiological curve as a concept for understanding adaptation. The paper also discusses the diagnosis of fatigue and overtraining, emphasizing the importance of preventive measures in maintaining athlete health and performance. By integrating insights from physiology, sports medicine, and pedagogy, the article highlights the necessity of systematic monitoring and individualized approaches in physical culture and sport.

Keywords: physical work capacity, medical-pedagogical supervision, Harvard Step Test, training intensity, physiological curve, fatigue, overtraining, restorative physical culture.

Introduction

Physical work capacity is one of the central categories in sports physiology and medicine. It reflects the ability of the human body to perform muscular work over a certain period of time without excessive fatigue and with the capacity for recovery [1]. For athletes, maintaining and improving work capacity is essential for achieving high performance, while for the general population it is a key factor in health and quality of life.

Medical-pedagogical supervision (MPS) plays a crucial role in ensuring that physical training is both safe and effective. It combines medical and pedagogical approaches to monitor the influence of physical loads on the body, to detect early signs of maladaptation, and to optimize training processes [2]. Alongside supervision, the identification of indications and contraindications for physical activity is vital for preventing health risks.

This article aims to provide a comprehensive overview of physical work capacity, methods of its evaluation, the role of medical-pedagogical supervision, and the diagnostic approaches to fatigue and overtraining.

Physical work capacity and its determination

Physical work capacity is determined by the interaction of cardiovascular, respiratory, muscular, and nervous systems. It is influenced by genetic factors, training level, nutrition, and psychological state [3].

One of the most widely used methods for assessing work capacity is the Harvard Step Test, which evaluates cardiovascular endurance by measuring heart rate recovery after a standardized stepping exercise [4]. The test provides an index of physical fitness and is applicable in both sports and clinical practice.

Other methods include ergometric testing, VO_2 max measurement, and lactate threshold analysis, which provide more detailed insights into aerobic and anaerobic capacities [5].

Medical-Pedagogical Supervision (MPS)

Medical-pedagogical supervision is a system of joint observation by physicians and coaches aimed at evaluating the effects of training on the athlete's body [6]. It includes:

- Monitoring of training conditions and methods.
- Assessment of functional readiness and adaptation.
- Early detection of fatigue, overtraining, or pathological changes.
- Recommendations for optimizing training loads and recovery.

MPS is conducted at different levels: operational (during training), current (after training sessions), and stage-based (over longer training cycles) [7]. This system ensures that training remains within safe physiological limits and contributes to long-term athlete development.

Indications and contraindications for physical activity

Engagement in physical culture and sport requires careful consideration of health status. Indications include the promotion of cardiovascular health, musculoskeletal development, and psychological well-being. Contraindications may involve acute infections, cardiovascular diseases, uncontrolled hypertension, severe musculoskeletal injuries, and certain chronic conditions [8].

Medical clearance is therefore essential before participation in intensive training or competition.

Medical support of restorative physical culture

Restorative physical culture refers to the use of physical exercises for rehabilitation and recovery. Medical support in this area includes the selection of appropriate exercises, monitoring of physiological responses, and integration with physiotherapy and pharmacological methods when necessary [9]. This approach is widely applied in post-injury rehabilitation, prevention of overtraining, and general health promotion.

Training intensity and the physiological curve

The intensity of physical training is a decisive factor in adaptation. Excessive intensity may lead to overtraining, while insufficient intensity fails to stimulate progress. The concept of the physiological curve illustrates the relationship between load, adaptation, and recovery [10]. Properly structured training follows this curve, allowing for supercompensation and performance improvement.

Diagnosis of fatigue and overtraining

Fatigue is a natural consequence of physical work, but chronic fatigue and overtraining represent maladaptive states that can impair performance and health. Diagnosis involves both subjective indicators (loss of motivation, sleep disturbances, irritability) and objective measures (heart rate variability, biochemical markers, decreased performance in functional tests) [11].

Medical-pedagogical supervision is essential for early detection of these conditions, enabling timely adjustments in training and recovery strategies.

Conclusion

Physical work capacity is a fundamental determinant of athletic performance and overall health. Its evaluation through methods such as the Harvard Step Test provides valuable insights into cardiovascular and functional readiness. Medical-pedagogical supervision ensures that training loads are appropriate, safe, and effective, while the identification of indications and contraindications prevents health risks.

Restorative physical culture, supported by medical oversight, plays a crucial role in rehabilitation and recovery. The concepts of training intensity and the physiological curve highlight the importance of balancing load and recovery to achieve optimal adaptation. Finally, the diagnosis of fatigue and overtraining underscores the need for continuous monitoring and preventive measures.

Together, these elements form an integrated system of sports medicine and pedagogy that safeguards health, enhances performance, and promotes sustainable participation in physical culture and sport [12].

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