Psychological Adaptation to Physical Activity

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Abstract
Adaptation (from the Latin for "to adapt") - adaptation of organism, personality, their systems to the nature of the individual effects or to changed conditions of life in General. The concept of adaptation originated in the XIX century and was used mainly in biology. Then this concept is applied not only to various aspects of living organisms, but also to the individual and even the collective behavior. Now the issue of adaptation has attracted the attention of specialists in different fields: engineers and teachers, sociologists and psychologists. The concept of adaptation is a General science that is used by representatives of various sciences and promotes the synthesis and integration of knowledge related to the study of its various objects. This concept is widely entered the field of sports training and competition activities. It will be in theory and methodology of sports, sports physiology and morphology, biochemistry, kinesiology, psychology. William cannon was the one who coined the term "homeostasis" in the scientific lexicon to determine the constancy of the internal environment. The preservation homeostasis is achieved at the expense of the process of adaptation in the process of interaction of the organism and the environment. Based on "homeostatic" ideas of F.B. Berezin notes that the process of adaptation is realized whenever there are significant changes in the system "organism - environment", and provides the formation of a new homeostatic state that allows you to achieve maximum efficiency of physiological functions and behavioral reactions.

Keywords: Adaptation; Training; Psychology; Exercise

Introduction
Manifestations of adaptation in sports are extremely diverse. Training is an adaptation to physical activity of various intensities, coordination complexity, intensity and duration, the use of a large arsenal of exercises to develop physical qualities, improvement of technical and tactical skills, mental functions [1,2]. In addition, in sports in connection with adaptation to extreme, unusual, altered conditions, the formation of basic adaptive reactions is associated with the creation of a new functioning of the basic systems of the body and the creation of homeostasis, which, in the absence of strong irritants, persists for a long time, which can characterize the end of the adaptation process, or the transition to maladaptation [3,4]. In this regard, the study and analysis of the psychological aspects of the problem of adaptation affecting the biological, psychophysiological,
social and other laws that manifest themselves in different sports are relevant and not yet fully studied. The goal is to identify the psychological aspects of adaptation to physical stress in altered living conditions and various conditions of activity of athletes.

**Adaptation to muscle activity and functional reserves of the body**

**The concept of adaptation to various environmental factors:** Adaptation is a set of physiological reactions that ensure the adaptation of the structure and functions of an organism or its organ to changes in the environment (to general, industrial or social conditions, including physical culture and sport) [5].

Under the influence of significant factors in the body there are non-specific psychophysiological manifestations of adaptive activity, called "stress". A number of protective reactions of the body aimed at eliminating stress are called the “general adaptation syndrome”, which is nonspecific (the body reacts similarly to various stimuli). The concept of "general adaptation syndrome" was proposed by Canadian scientist Hans Selye in 1936. He identified three stages in it [6].

The first stage (“anxiety reaction”) develops 6 hours after stress, and all the body's defense forces are mobilized, which lasts up to 1-2 days. No organism can be stressed for a long time, and if it survives, a resistance stage appears, that is, adaptation to a difficult situation [7].

If the stress effect persists, a third stage-stage of exhaustion may occur, in which the secretion of glucocorticoids decreases. With severe and constant stress, such exposure can lead to illness or death. The influence of extreme factors on the body causes it to have high energy costs and the predominance of the processes of catabolism over the processes of anabolism, while adaptation of the body is achieved "very high price" [8,9].

A sharp change in environmental conditions that threatens the body causes its complex adaptive reaction. The main regulation system of the latter is the hypothalamic-pituitary-adrenal system, its activity redistributes the activity of the visceral systems of the body, which ensures the elimination of homeostatic shift or its premature termination [10,11].

**Urgent and long-term adaptation**

Most adaptive reactions of the body are carried out in two stages. The initial stage is an urgent, but not always perfect adaptation, implemented on the basis of previously formed physiological mechanisms, and the function of organs and systems occurs at the limit of the physiological capabilities of the body, with almost complete mobilization of all reserves, but the optimal adaptive effect is not provided [12,13].

At the second stage, long-term (ideal) adaptation to a long-term stimulus occurs gradually on the basis of repeated implementation of urgent adaptation. The transition from urgent to long-term adaptation occurs during the formation of adaptive morphological and physiological changes based on the activation of the synthesis of nucleic acids and proteins in the cells of those organs and systems where dysfunctions occurred under the influence of extreme factors on the human body. The development of structural changes is called the systemic structural footprint. Even with a single influence of irritating environmental factors on the human body, there are similar traces that lead to changes in vegetative functions. These changes are accompanied by a restructuring of regulatory mechanisms and form an “autonomic memory” in the body, which is based on a peculiar relationship between the individual elements of the tissue, vascular, endocrine, and immune systems [14,15].

The process of individual adaptation occurs due to the formation of a number of changes in the body, which are often in the nature of prepatalogical or even pathological reactions. These changes represent a kind of “adaptation price” as a result of general stress or tension of individual physiological systems [16]. When a person adapts to environmental factors in the north,
pathological changes can occur in his body in the highlands or hot climates. For example, in the northern regions of the visiting population, there is a decrease in muscle performance, increased blood pressure and other changes [15,17].

Adaptation disorder is a separate concept in science, as maladaptation. After the termination of the factors causing adaptation to the organism, a gradual decrease occurs with the return of the previous functions adapted to the traditional norm that is, called physiological degradation, for example, adaptation, relative biological efficiency [18].

**Mechanisms of adaptation to physical activity**

Systematic physical exercises and training lead to adaptation of the body to physical activity based on morphological and functional changes. Short-term adaptation occurs at the limit of the body's capabilities, based on existing, previously established physiological mechanisms. It manifests itself through the inclusion of an additional part of the motor units and the generalized inclusion of a large number of muscle groups, insufficient coordination of movements, an increase in lactic acid in the blood, an increase in protein degradation in skeletal muscles, disadvantageous mobilization of the functional reserves of the respiratory and circulatory organs (increase in heart rate, respiratory rate) [19,20].

Long-term adaptation develops on the basis of the repeated implementation of urgent adaptation and is accompanied by a restructuring of the humoral apparatus (function efficiency and increasing its power), activation of protein synthesis, growth of cell structures and increased cell functionality. As a result of these processes, moderate hypertrophy, increased vascularization, an increase in the mass of cellular oxygen transfer systems, and the number of mitochondria are observed [21]. With long-term adaptation, hormones (catecholamines and glucocorticoids) play a leading role in the mechanism of energy metabolism of carbohydrates into fat, which leads to a decrease in adipose tissue. At the same time, the capacity and throughput of the blood vessels of the heart increases [22].

Adaptation is manifested through the mobilization of functional reserves, among which A.S. Mozhuvin (1980) understands the hidden possibilities of evolution and ontogenesis, to improve the functions of organs and physiological systems of the body, to allow himself unusually large work and dramatic changes in the internal environment of the body to adapt [23,24].

Physiological reserves can be classified:

1. In accordance with the level of implementation - cellular, tissue, organ, systemic and organismic [25];
2. From the point of view of capacity, reserves are mobilized in the process of maximum, submaximal, large and moderate capacity [26,27];
3. The physical qualities that they provide (reserves of strength, speed and endurance) [28,29];
4. In the order of recording, according to the reserves of the first, second and third round of recording [30,31].

The reserves of the first stage are included in daily activities and training, the reserves of the second stage with intensive training, and during the competitions, the reserves of the third stage are mobilized by the body only in the struggle for life [32]. It should also be noted that the mechanism of urgent mobilization of reserves of the second stage is emotions and willpower. Under the influence of sports training, the ability to mobilize the reserve abilities of the body is activated. The main condition for the adaptation of athletes to physical activity is the relative constancy of the internal environment of the body, and for this it is necessary that adaptive shifts during sports training do not go beyond the reserve capabilities of the body [33].

As a result of adaptation to physical activity, the maximum functional capabilities of the body as a whole and its individual systems (maximum oxygen consumption, pulmonary ventilation increases). In addition, the efficiency of physiological systems
and organs is increased (a trained person has fewer functional shifts in the performance of a standard load compared to an untrained one), mobilization of functions and their recovery are also faster in a sports person [34].

Adaptation is manifested by increased reserve ability, its value becomes more with regular training, but the implementation of these reserves in a certain type of muscle activity significantly depends on the genetic development program. Increasing the nonspecific resistance of the body to systematic physical exercises is a manifestation of the general biological characteristics of the body's adaptation to the action of environmental factors [23]. The gradual disappearance of adaptation to physical activity after the cessation of physical culture and sports indicates the reversibility of the long-term adaptation process. In this case, there is a leveling of the systemic structural trace (a decrease in the mass of skeletal muscles, the number of mitochondria, a decrease in the mass of the lungs and heart muscle). At the heart of this process is a decrease in protein synthesis. After the end of sports training, the repeated adaptation of the athlete’s body to normal conditions of life and activity should be called adaptation [35].

The “price of adaptation” to excessive physical exertion can take two different forms. Firstly, direct functional wear of the system, on which the main load during adaptation falls, for example, direct damage to the structures of the heart and skeletal muscles. Secondly, the phenomenon of negative cross-adaptation, that is, injuries in people who are adapted to a certain physical activity, are other functional systems and adaptive reactions that are not associated with this load (with a high degree of training, frost resistance and colds often decrease).

If the parameters of the studied functions (especially hemodynamics) in the first working days (7-10 days) fluctuate within ± 20% of the initial data, the adaptation process will be more complete and faster. Therefore, physical activity is a systemic reaction of the body to achieve high suitability and minimize physiological costs for it [36].

The effects of training are divided into urgent, deferred and cumulative. An urgent training effect is associated with changes that occur in the body directly during training and within 1-2 hours after work. The delayed training effect is manifested in the later stages of the body's recovery (3-24 hours or more). The cumulative effect is the result of summing the urgent and delayed effects of training and is based on long-term adjustment. It is expressed in selective changes in the functions of the visceral system of the body, reorganization of aerobic and anaerobic metabolism, increased protein synthesis, increased specific working capacity and coordination of movements [33].

**Psychosocial adaptation**

In modern sport, the main task is to increase the athlete’s functional resource by coordinating all body systems, including increasing the management of the psychological factor (stability and stability).

Training is the most targeted investment in a person, because only the skills necessary for a person to achieve certain goals are practiced in it. Training is an intensive training aimed at creating, developing and organizing certain skills necessary for certain personal tasks.

Types of training: mental images and rehearsals of the training process, mental imagotaining, psycho-training of strong-willed attention, meditation method, auto-training, hypnosis, ideomotor training. The organizational stage of the training is the orientation of the participants on the specifics of training as a teaching method; primary diagnosis of participants; identification and correction of participants' motivation. Discussion of organizational issues-duration of work, number of participants, individual or group work [37].

To overcome various objective and subjective difficulties arising in altered, often extreme conditions of activity and in the process of physical and mental stress in sports, it is necessary to solve the problems of psychological support and training of
athletes. Such training should be based primarily on the principle of gradual adaptation to the athlete's environment, the conditions and requirements for staying in them. For the purpose of such training, it is possible to offer a modified version of autogenic training in combination with the method of "environmental adaptation, which allows optimizing the adaptive abilities of athletes based on the regulation of the psycho-emotional state [38-40].

**Conclusion**

The concept of adaptation has turned into a general scientific one, which is used by representatives of various sciences and contributes to the synthesis and unification of knowledge related to the study of its various objects. Psychological adaptation, as well as a number of other adaptive processes and reactions plays a significant role in increasing efficiency in various working conditions. Of particular importance is the formation of adaptive reactions for training loads (physical and mental) in sports. The results obtained after the application of psycho-training show that after training, athletes reduce neuropsychic stress, reduce anxiety, eliminate unreasonable behavioral reactions and normalize the psycho-emotional state, which indicates an increase in the adaptive capabilities of athletes.

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