



# The effect of rehabilitation procedures used during training on the state of the autonomic nervous system in professional basketball players

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## Abstract

**Objective of the study.** This study is aimed at analyzing the dynamics of the vegetative state in professional basketball players, depending on the use of various recovery methods in the training process.

**Methods and structure of the study.** The study was conducted on the basis of the Volga State University of Physical Culture, Sports and Tourism with the participation of 30 qualified basketball players. The vegetative status was assessed by analyzing the coefficient of vegetative tone, reflecting the balance of the sympathetic and parasympathetic nervous systems.

**Results and conclusions.** The results showed that at the beginning of the study, athletes in both groups showed signs of compensated fatigue, which may negatively affect the effectiveness of training at the beginning of the season. By the end of the study, in the experimental group where restorative measures were used, an improvement in the indicators of vegetative status to the level of optimal working capacity was noted, indicating that the load was adequate to the capabilities of athletes. In the control group, where no recovery measures were carried out, the indicators remained at the same level, which can lead to a cumulative effect of fatigue and a decrease in the effectiveness of the game by the end of the season. The data obtained indicate that the improvement of the vegetative coefficient is possible only with the systematic use of restorative measures in the training process.

**Keywords:** vegetative state, professional basketball players, recovery methods, training process, vegetative status, coefficient of vegetative tone, compensated fatigue, training effectiveness, rehabilitation measures, optimal performance.

**Introduction.** Currently, certain changes are taking place in college basketball, which radically change the attitude of coaches and players to the training process as a whole, and especially to the systematic implementation of rehabilitation measures. There are certain trends in modern student basketball that affect all aspects of player training: firstly, the competition of players in teams participating in official tournaments of the Student Basketball Association has significantly increased; secondly, competitions are held in the format of short-term rounds, where the number of games increases, the frequency of their holding increases, and the preparation periods for them decreasing; Thirdly, the players achievement of optimal athletic fitness and its preservation throughout the entire play-

ing season presupposes the use of accelerated training in the training process; fourthly, an increase in the time allocated for training sessions, an increase in the variability of the means used and an increase in the intensity of the load presupposes the mandatory implementation of rehabilitation measures [1, 2, 4].

Taking into account the above-mentioned trends in the development of student basketball, it becomes mandatory to systematically monitor the physical and mental state of players. One of the effective tools that can be used to evaluate and monitor these indicators is to determine the vegetative status of players. Vegetative status is a state of functions of the autonomic nervous system that controls important processes in the body, such as cardiac activity, respiration, etc. [5].



In the context of our research, the study of the vegetative status of student basketball players is an urgent problem that determines the quality and effectiveness of the construction and content of their training process, where rehabilitation measures are an obligatory part of it.

**Objective of the study.** This study is aimed at analyzing the dynamics of the vegetative state in professional basketball players, depending on the use of various recovery methods in the training process.

**Methods and structure of the study.** The study of the vegetative status is necessary to assess the effectiveness of the body's adaptation to stress and, accordingly, to determine their physical performance [3, 6].

The study of the vegetative status was carried out through the assessment of the coefficient of vegetatics, which is characterized by the presence of a certain vegetative tone. Using the method of M. Lusher, the subject was offered cards of different colors, which he had to arrange in order, depending on his preference for a particular color. A numerical indicator was assigned to the result of card manipulation, which was proposed by the Candidate of Medical Sciences. Shiposh, the final result, determined the vegetative tone with the predominance of the influences of the sympathetic (ergotropic tone) or parasympathetic (trophotropic tone) autonomic nervous system [7].

The study was conducted at the beginning and at the end of the pedagogical experiment. The study involved 30 basketball students, 15 athletes each in the experimental and control groups. The results of the study and their discussion. At the beginning of the study, the vegetative coefficient in the experimental group was  $0.54 \pm 0.12$  units, and in the control group it was  $0.55 \pm 0.11$  units, the results between the groups had no statistically significant differences ( $p > 0.05$ ). As can be seen from the results obtained, basketball players in both groups have a compensable state of fatigue (range from 0.51 to 0.91 units), such a state at the beginning of the season may affect their readiness for a productive training process. In this case, the restoration of working capacity can be carried out through a periodic controlled decrease in physical activity, players need to optimize their working rhythm and training regime, and pay special attention to quality rest.

Subsequently, during the entire sports season, the players in the control group independently applied the means of recovery available to them, but under the supervision of a coach. Recovery technology was spe-

cially developed and implemented for the basketball players of the experimental group, where the selection of various means used in the complex corresponded to the tasks being solved for a specific period and stage of the training process.

Repeated testing conducted at the end of the pedagogical experiment allowed us to establish statistically significant differences in this indicator between the groups ( $p < 0.05$ ). So, in the experimental group, the result of the coefficient of vegetatics was  $0.93 \pm 0.15$  cu, and in the control group it was  $0.70 \pm 0.24$  cu.

From the results obtained, it can be seen that the basketball players of the control groups still have a compensable state of fatigue (range from 0.51 to 0.91 units), and by the end of the season this can cumulatively affect the effectiveness and efficiency of their playing activities. Performance indicators, in the absence of systematic use of recovery tools, they can compensate only by reducing their physical activity.

In the experimental group, there is a positive change in the result of the coefficient of vegetatics to optimal working capacity (range from 0.91 to 1.9 units), in this case, the load performed corresponds to the capabilities of those involved, their general condition is cheerful, they show healthy activity and readiness for energy consumption.

Thus, the results we have obtained confirm the need for systemic rehabilitation measures in student basketball teams, and the technology we have developed for the integrated use of rehabilitation tools as a variant of such measures has confirmed its effectiveness and expediency.

**Conclusions.** The study of the vegetative status in our study was carried out through the assessment of the coefficient of vegetatics, which is characterized by the presence of a certain vegetative tone. So, if at the beginning of the study the coefficient of vegetatics in both groups was in the range from 0.51 to 0.91 units, i.e. compensated state of fatigue, then by the end of the study in the experimental group the result corresponded to the parameters of another range – from 0.92 to 1.9 units, i.e. optimal working capacity, the control group at the same time it remained in the initial range.

Currently, student basketball has all the characteristics of a high-performance sport (the volume and intensity of training and competitive loads), therefore, when organizing and conducting the training process in student basketball teams, it is necessary to systematically carry out rehabilitation measures, correlating



them with the tasks of a specific period and stage of preparation.

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