



Evaluation of Aerobic Workability and Functional State of Football Players After Physical Load

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ABSTRACT

The effect of aerobic capacity and cardiovascular status on players after training has been studied. Aerobic performance indicators of the body of the studied players were moderate. There are also individual differences between the level of functional indicators in most players and the response of the cardiovascular system to the load

Keywords:

Football Players, Oxygen Consumption, Aerobic Capacity, Anaerobic Metabolism Threshold.

Relevance of the topic. The problem of the optimal functioning of the body in conditions of high muscle activity continues to be the leading task of sports medicine. This problem is particular relevance in the field of assessing the functional capabilities of the athlete's body when adapting to a specific physical load [1]. In this regard, the natural development has received an idea of the functional fitness of the body of athletes, which determines physical performance. [2].

One of the most important indicators of the state of sports performance is the functional state of the cardiovascular and respiratory systems. The influence of physical loads of different intensity on the human body is reflected primarily in the cardiovascular and respiratory systems, since this system ensures

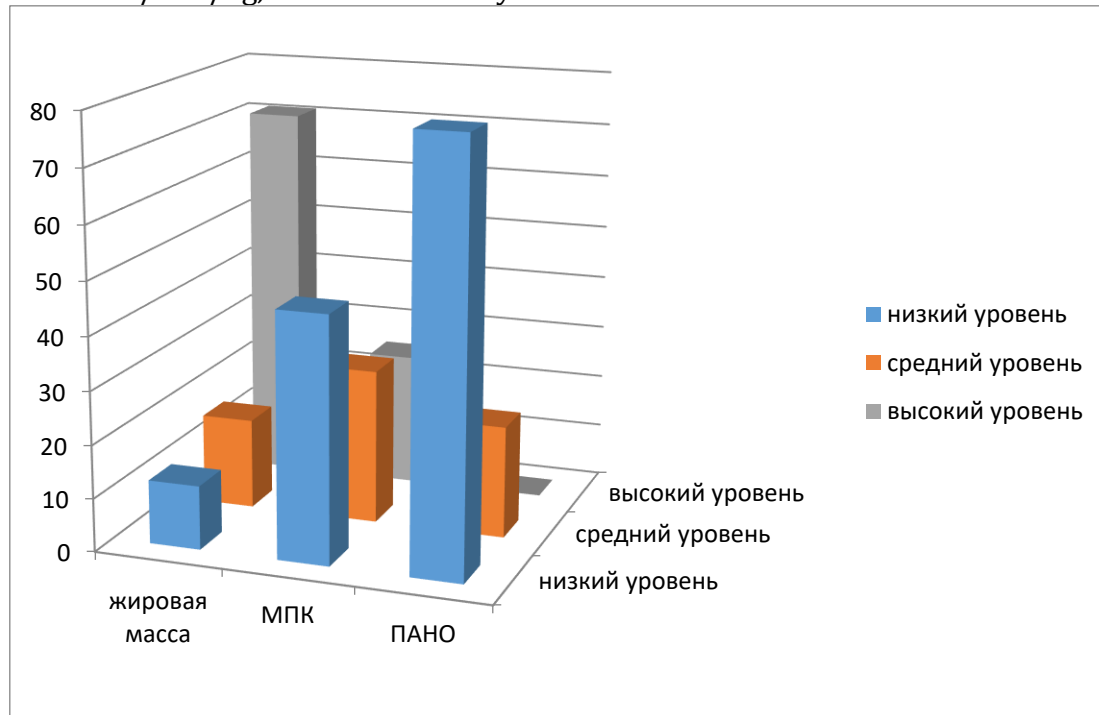
the adaptation of the body to various influences and reflects the dynamics of recovery processes [3].

Purpose and methods of work. Bicycle ergometric test PWC170 allows you to evaluate the aerobic capacity of the cardiovascular and respiratory systems of the body of athletes. In connection with the foregoing, the purpose of this work is to assess the aerobic performance and functional state of athletes after performing physical activity. The level of physical performance of football players was determined by the indicator of maximum oxygen consumption (MOC) or $\dot{V}O_{2max}$ - this is the highest oxygen consumption achieved in the process of dynamic exercise, which involves large muscle groups. The determination of aerobic performance

indicators was carried out by analyzing the dynamics of ventilation parameters and heart rate values. 24 football players of the Olympic team took part in the research.

Results and discussion. It can be seen from Graph 1 that the average VO_2 is 58.1 ml/min/kg, the best result was recorded by the midfielder - 66.4 ml/min/kg, and the worst by

the goalkeeper - 53.3 ml/min/kg. These data indicate that at this stage of the study, the level of IPC in the vast majority of football players does not meet modern requirements. It is known that football players during the game 60-80% of the time work in the mode of 80-100% of the value of the maximum oxygen consumption (MOC).



Graph 1. Functional indicators of football players of the Olympic team.

The average value of oxygen consumption in football players ranges from 3.3 to 4.5 l / min. In our studies, it was found that the IPC for the extreme and central defenders averaged 59.0 ml / kg / min, for the extreme midfielders 59.6 ml / kg / min, for the central midfielders 57.4, for the forwards 59.2 ml / kg / min and for goalkeepers 54.3 ml / kg / min. It can be seen that the MPC for defenders, midfielders and attackers was practically the same, only for goalkeepers the MPC indicators were significantly lower, but this factor is not decisive for them.

A comparative analysis of the MPC of foreign and domestic football players showed [4] that its variability is very significant - for foreign players, the minimum indicators are 64.8 ml / kg / min, the maximum - 70.6 ml / kg / min. Therefore, experts propose to evaluate the

level of functional readiness of football players on the basis of qualities and abilities that are more important for them.

One of such an important characteristic of the oxygen supply of the load is the anaerobic exchange threshold (ANOT) - the power of the load during work of increasing intensity, at which anaerobic energy supply processes detected by laboratory methods begin [4].

ANOR - the threshold of anaerobic metabolism reveals the ratio of aerobic and anaerobic mechanisms of energy supply. Usually, PANO is determined by the beginning of a sharp, steep change (kink) in a number of physiological curves on the graph of the dependence of these indicators on the power of the load performed. Analysis of ANSP allows you to purposefully determine the zones of intensity of training loads. The best guideline

for determining the zones of intensity of the load is the individual anaerobic threshold of the athlete - heart rate at the level of TAN, when the concentration of lactic acid approaches 4 mmol/l and other signs of its achievement are noted.

The graphs show the measurement data of the level of ANSP in 24 football players of the Olympic team. It can be seen that the average for the team is 50.6 ml/min/kg, the best result was noted for the midfielders - 57.1 ml/min/kg, and the worst result for the goalkeeper - 48.0 ml/min/kg. The average speed of the ANSP was 13.5 km/h, the maximum speed was 15.5 km/h. The value of TANM averaged 87.8%, the best indicator was noted by the midfielders 94%, the worst by the goalkeeper 83%.

However, it should be noted that with the existing number of team samples, the reliability of the observed differences in this indicator among players of different game roles is relatively low. A similar comparison made between players of different roles, in terms of oxygen consumption at the level of the anaerobic exchange threshold, closely reproduces the picture indicated for MPC indicators: the highest indicators of aerobic efficiency were noted in football players performing the functions of forwards.

The high aerobic potential of the cardiovascular and respiratory systems is an important indicator of the functional capabilities of the body of football players who need to maintain a high running speed for 90 minutes of the game.

Thus, the monitoring of functional readiness made it possible to establish that the footballers of the national team had inter-individual differences, both in terms of body composition and functional indicators (Figure 1).

The analysis of fat mass showed that only in 3 football players (12%) the indicators met the required standards, in 21 athletes (88%) it exceeded the model values. It was found that only 6 (25%) football players had a high level of IPC, 7 (29%) had an average level and 11 (46%) had a low level. These data indicate an insufficiently high level of development of the

cardiovascular and respiratory systems in almost half of the team's players.

Analysis of the ANSP indicator also revealed that 19 (79%) football players have a low level and 5 (21%) football players have an average level. It is known that the value of the anaerobic threshold for highly qualified athletes is approximately equal to 90% of HR max. However, in reality, the level of anaerobic threshold can vary significantly between athletes, depending on their specialization and level of training. In an amateur athlete, the anaerobic threshold level can be 75% HR max, and in a highly skilled athlete it can be 95% HR max.

Conclusion. These data indicate that under conditions of intense game activity, players with a low TAN score develop fatigue from a lower load level than football players with a high level. Monitoring of functional readiness made it possible to establish that the football players of the national team had inter-individual differences, both in terms of body composition and functional indicators.

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