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ASSESSMENT OF THE FUNCTIONAL FITNESS OF HIGHLY QUALIFIED ATHLETES USING NEW METHODS OF EXPRESS DIAGNOSTICS

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Summary. The study of the functional readiness of highly qualified athletes at various stages of the preparatory period was conducted using the exclusive computer program «Sport-Express». Different levels of efficiency of the training programs used by athletes as well as the high representativeness of a new methodological approach to the rapid assessment of the functional fitness of the body of highly qualified athletes' are presented.

Key words: functional fitness; athletes; assessment methods; express diagnostics

One of the main goals of any training process in a particular sport is achieving an optimal level of physical fitness by athletes, which provides for the maximum possible results achievement in sports [1, 2, 9]. According to a number of experts in the field of physical education and sports, the very concept of «peak of physical fitness» provides for a certain

development of technical, tactical, functional and other capabilities of athletes [3, 4, 5]. At the same time, it is generally recognized that it is the level of functional fitness that largely predetermines the level of results in sports [6, 7, 10]. Unfortunately, the analysis of literary data on this issue among athletes – basketball players gave reason to state insufficient development of the issue of accounting the level of the functional fitness of basketball players at various stages of their educational and training process as well as of modern methodological approaches to diagnostics of this integral indicator of the overall state of body fitness.

The relevance and decisive practical significance of the mentioned problem served as prerequisites for this study.

As part of the study, we performed a study of highly qualified basketball players at the preparatory stage of the training process. The study involved athletes of the major league basketball team in Zaporizhzhia city (Ukraine) having player's roles of defender, center and forward. The age of the athletes was 28, 20 and 30 years old, respectively.

Based on the chosen research scheme, we assessed the level of general endurance (GE, points), speed endurance (SE, points), speed-power endurance (SPE, points), efficiency of the energy supply system for muscular activity (ESSE, points), reserve capacity (RC, points) of the body and the overall level of functional fitness (FF, points) in all abovementioned basketball players at the beginning, in the middle and at the end of the preparatory period using the author's computer program «Sport-Express» [8].

According to the algorithm of the study, we made the overall conclusion about the functional fitness of the athletes' body in accordance with the following functional classes: «low», «below average», «average», «above average» and «high».

At the initial stage of the study corresponding to the beginning of the period of basketball players' preparation for the competition season, we conducted the first control biomedical testing of the functional fitness of their bodies.

According to the data presented in Table 1, at the beginning of the preparatory period, the basketball player-defender had an average level of speed endurance (60,93 points) and reserve capacity of the body (65,52 points), but above average in general endurance (70,25 points), speed-power endurance (67,51 points) and efficiency of the energy supply system for muscular activity (78,42 points). According to the presented data, the overall level of functional fitness of the body of this basketball player was considered to be an average one at the beginning of the study (68,86 points).

Less optimal performance was registered in other examined basketball players. So, in

the basketball player-center, only the values of the energy supply system efficiency (50,95 points) corresponded to the average level, while general endurance (40,70 points), speed endurance (37,60 points), speed-power endurance (37,57 points), reserve capacity (39,37 points) of this basketball player corresponded to the functional class below average. In general, the basketball player-center at the beginning of the study had a below average level of general functional fitness of the body.

Table 1. Values of a points-based assessment of functional fitness of highly qualified basketball players at the beginning of the pre-season training period

Athletic abilities, points	Player's roles of basketball players		
	defender	center	forward
general endurance	70,25 above average	40,70 below average	48,44 below average
speed endurance	60,93 average	37,60 below average	41,14 below average
speed-power endurance	67,51 above average	37,57 below average	49,73 below average
efficiency of the energy supply system	78,42 above average	50,95 average	51,07 average
reserve capacity	65,52 average	39,37 below average	43,24 below average
level of functional fitness	**68,86 average**	**41,44 below average**	**47,11 below average**

It is interesting that almost identical data were obtained when examining the basketball player-forward. In this athlete, general endurance (48,44 points), speed endurance (41,14 points), speed-power endurance (49,73 points) and reserve capacity of the body (43,24 points) at below average level were recorded. The values of the energy supply system efficiency (51,07 points) corresponded to the average functional class, and the overall level of functional fitness of the body of this athlete was found below average.

According to the chosen scheme we conducted the repeated testing of the athletes – study participants in the middle and at the end of the preparatory period.

It was found that in the middle of the preparatory period as well as at the beginning of

the study, the basketball player-defender had an above average level only in respect of general endurance (at this stage – 77,16 points) and speed-power endurance (73,65 points), while speed endurance (66,28 points) and reserve capacity (100,12 points) were no longer average but above average, and the energy supply system efficiency was no longer above average but high (Table 2).

Table 2. Values of a points-based assessment of the functional fitness of the highly qualified basketball player-defender at various stages of the preparatory period

Athletic abilities, points	Stages of the preparatory period		
	at the beginning	in the middle	at the end
general endurance	70,25 above average	77,16 above average	97,87 high
speed endurance	60,93 average	66,28 above average	82,35 high
speed-power endurance	67,51 above average	73,65 above average	92,09 high
efficiency of the energy supply system	78,42 above average	100,12 high	109,50 high
reserve capacity	65,52 average	100,12 high	91,62 high
level of functional fitness	**68,86 average**	**79,09 above average**	**94,98 high**

The result of such transformations was a pronounced improvement of the overall level of functional fitness of this athlete by the middle of the preparatory period, which at this stage of the educational and training process was considered to be not as average but as above average (79,09 points).

It is important to note the fact that by the time of the final period of pre-season training, the basketball player-defender had a high level of all indicators of the functional fitness of the body. Thus, the value of his general endurance made 97,87 points, speed endurance – 82,35 points, speed-power endurance – 92,09 points, the energy supply system efficiency – 109,50 points, reserve capacity – 91,62 points, and the overall level of the fitness or the functional fitness – 94,98 points.

The given data testify to a rather rational organization of training sessions of the basketball player-defender during the pre-season training, which contributed not only to maintaining the initial level of his functional fitness but also to a gradual increase in this level to maximum values.

We performed a similar analysis of the dynamics of the level of the functional fitness of other basketball players in the process of pre-season training.

Table 3 shows the results obtained at all examinations of the basketball player-center. Based on these results, this athlete had a slightly different character of changes in the parameters studied in this paper as compared to the basketball player-forward. As can be seen from the data obtained, in the middle of the study, almost all studied parameters corresponded to the initial level i.e. below average: general endurance – 48,52 points, speed endurance – 43,53 points, speed-power endurance – 44,49 points, energy supply system efficiency – 53,44 points, reserve capacity – 44,34 points and the overall level of functional fitness – 47,17 points.

Only by the end of the preparatory period, we registered an increase in the level of general endurance (71,97 points), the energy supply system efficiency (80,92 points) and reserve capacity (66,98 points) of this player to the above average level, speed endurance (61,75 points) and speed-power endurance (65,29 points) – up to the average level, and the overall level of functional fitness only up to the above average level (69,65 points).

Obviously, the organization of training sessions for the basketball player-center in the preparatory period cannot be considered as optimal, and the nature of changes in the studied parameters allows us to speak about its predominantly aerobic character.

Table 3. Values of a points-based assessment of the functional fitness of the highly qualified basketball player-center at various stages of the preparatory period

Athletic abilities, points	Stages of the preparatory period		
	at the beginning	in the middle	at the end
general endurance	40,70 below average	48,52 below average	71,97 above average
speed endurance	37,60 below average	43,53 below average	61,75 average
speed-power endurance	37,57 below average	44,49 below average	65,29 average
efficiency of the energy supply system	50,95 average	53,44 average	80,92 above average
reserve capacity	39,37 below average	44,34 below average	66,98 above average
level of functional fitness	**41,44 below average**	**47,17 below average**	**69,65 above average**

We noted somewhat different, but also less optimal nature of changes in the studied indicators of the functional fitness of the basketball player-forward (Table 4) as compared to the basketball player-defender.

According to the data, by the middle of the preparatory period, the basketball player-forward showed an increase in general endurance (59,78 points), speed endurance (50,60 points), speed-power endurance (59,00 points), reserve capacity (58,16 points) and the overall level of functional fitness (60,64 points) up to the average level, and by the end of the preparatory period – to the above average level (except for the energy supply system efficiency, which by the end of the training period was considered as high).

The ambiguity of the obtained data, their rather contradictory nature also does not allow us to speak about the optimality of the training sessions of this athlete in the preparatory period and about the achievement of the required level of physical fitness in such sports activity as basketball.

Table 4. Values of point assessment of the functional fitness of the highly qualified basketball player-forward at various stages of the preparatory period

Athletic abilities, points	Stages of the preparatory period		
	at the beginning	in the middle	at the end
general endurance	48,44 below average	59,78 average	77,90 above average
speed endurance	41,14 below average	50,60 average	66,77 above average
speed-power endurance	49,73 below average	59,00 average	72,62 above average
efficiency of the energy supply system	51,07 average	74,41 average	101,35 high
reserve capacity	43,24 below average	58,16 average	78,07 above average
level of functional fitness	**47,11 below average**	**60,64 average**	**79,44 above average**

Conclusion. In general, the presented data convincingly indicate that only the rational organization of the training process of basketball players during their preparation for the season, providing for a harmonious combination of aerobic and anaerobic training, and not enthusiasm for the development of general endurance of athletes, contributes to the achievement of the highest level of functional fitness of the body. Only one of the basketball players – study participants, namely the basketball player – defender managed to achieve such level, while his teammates featured the predominant development of general endurance.

In addition, the above results of the examination of highly qualified basketball players made it possible to state the high representativeness of the computer program «Sport-Express» for diagnosing the functional fitness of the body and its indisputable application perspective in the system of medical and pedagogical control over the functional state of highly qualified athletes.

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