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**ASSESSMENT OF INFORMATIVITY OF SPRINT TESTS IN THE
FORMATION OF SPECIAL PSYCHOPHYSICAL SKILLS OF YOUNG
SOCCER PLAYERS**

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Annotation. The article presents the results of studies aimed at studying the informative potential of soccer sprint tests developed by J. Bangsbo (1994) in comparison with a modified version of these tests. The aim of the study was to determine the informativity of the sprint tests under consideration in relation to the manifestation of specific and non-specific components in the formation of special psychophysical skills of young soccer players.

It is revealed that the traditional sprint test is quite informative to characterize the non-specific component of special psychophysical skills, and the modified test characterizes the specific components of the formation of the skills examined in this study.

Introduction. One of the primary tasks of preparing the reserve team for professional soccer is the increase of not only the motor but also the psychophysical potential of young players, on basis of which lies the development of physical and mental abilities [1, 2]. Consequently, the role of psychophysical proficiency of young soccer players is significantly increasing. In this research, the formation of special psychophysical skills of a soccer player was based on a theory of organic relationship of a certain development degree of specific and non-specific components of voluntary movements [3] (Fig. 1).

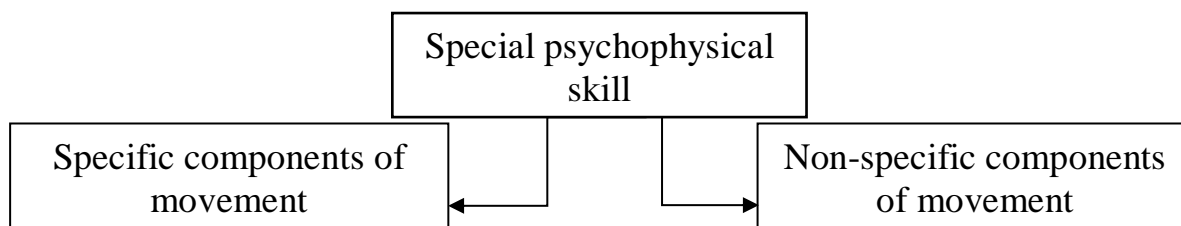


Fig. 1. The structure of special psychophysical skill of soccer players

It is known that strict requirements to the high speed of movement in modern soccer are explained by dynamicity and consistency of the game [4]. Soccer players are obliged to make emergency decisions, make a fast switch from one action to another, react instantly and so on during the whole match. Those activities regulated by the central nervous system specify strict requirements for endurance and stability of psychomotor functions, strength and balance of nervous processes. Moreover, neuromuscular and energy characteristics of movement are related to the development of separate motor abilities, which make up the integral motor actions of soccer players.

It is important to note that psychophysical skills of young soccer players are manifested through the in-game arrhythmia (sequence of high-speed segments and periods of low-intensity actions with and without the ball), performance of acceleration and sprints by soccer players during recovery of different degrees, in a certain tempo and rhythm of movement. Such actions primarily include moments of struggle for the ball and position on almost every section of the soccer field. Those parts of increased activity of soccer players, who perform such in-game actions, are 4-5 seconds long according to studies [5]. They are followed by parts of relative inactivity, which are 30 to 60-70 seconds long. Therefore, the irregular nature of soccer match can be characterized as a constant sequence of short high-intensity actions of soccer players followed by relative low-intensity inactivity that requires a lot for psychophysical skills of soccer players, which is an ability to perform movement at the appropriate tempo and rhythm according to the in-game context and the player's state at the given time of the match.

Methods and organization. There was an attempt to assess functional and mental characteristics of movement based on a dynamicity of record of indicators, which show a formation of specific and non-specific components of special psychophysical motor skills of young soccer players.

The most accessible and informative when it comes to the assessment of examined skills of soccer players is the interval running test 7x30 meters developed by J. Bangsbo [6] and presented in works of M. Aguiar, C. Abrantes, V. Maças, N. Leite, J. Sampaio and S. Ibáñez [7, 8]. It includes passing a 30-meter slalom segment sevenfold, running around cones and returning to the start position during the given rest interval. Such parameters as maximum and minimum time of passing the segment, difference between those two indicators and total time of the test were assessed. Conditions of this test performance consider an interval running with the highest speed possible and a set rest interval 24 seconds long. While deciding how

much is needed for the rest interval, researchers apparently considered the minimum rest time between high-intensity activities of soccer players of different roles, excluding the goalkeeper. It was concluded by preliminary studies [9] that in suggested conditions an assessment of degree of development of neuromuscular and oxygen transport system of soccer player's body is possible, because the amount of lactate in subjects after the test performance was high (11,45-15,78 mmol/l⁻¹). It is known that the peak values of this indicator in elite players is approximately 11,88 mmol/l⁻¹. That is why the test was used in this research to assess the development of non-specific components of psychophysical skills of soccer players, that is the activity of the appropriate functional systems of the body.

Conditions for the test performance were altered for the assessment of specific components of psychophysical skills of soccer players. The rest interval was set for up to 60 seconds to allow the subject to begin a next run within the given time segment. Considering the test results received in pilot researches [10] it was concluded that the increased rest interval, which is typical for a soccer game, allows running a distance with a lesser difference in time of passing the segment sevenfold than in time of performance of the traditional test set with strict requirements. Thus, conditions for individual program of test performance were created. The idea of changing performance conditions was connected to obtaining information about the ability of a young soccer player to regulate tempo and rhythm of their performance independently during the whole period of work in order to achieve high results in all examined parameters of the test assessment.

It is known that logical structure of a motor action determined by contents of an emerged problem chooses its solution on some level of motion synthesis [11]. In this case, motor content of an action is a result of interacting between the problem and individual possibilities of its solution. Therefore, in the modified test results were evaluated from the standpoint of the assessment of mental abilities of young soccer players, which were examined as specific components of special psychophysical skills. The term "mental abilities" in the examined context of psychophysical proficiency is presented as more accurate because it includes such important individual characteristics as intellectual abilities, correlates with emotional and logical intellect, thinking, imagination, sense of rhythm. All those qualitative manifestations of mental abilities form the basis of the development of special psychophysical skills of soccer players.

The longitudinal research involved 14 young soccer players, starting from the age of 16, who were participants of an experimental training program aimed at teaching special psychophysical skills for three years.

The efficiency of the experimental program was evaluated according to the results of both tests as a part of stage control. The analysis of results dynamics

suggested a comparison of indicators in seven control points, which estimate the time of an end of every circannian cycle stage. In order to create an additional motivation those tests were performed by two soccer players simultaneously. The received results were ranked and presented to young soccer players as protocols.

Results and discussion. Results of testing of non-specific components of special psychophysical skills based on indicators dynamics in traditional 7x30 m shuttle run test are presented in Table 1.

Table 1

Dynamics of results of longitudinal research of young soccer players 16-18 years old in the traditional 7x30 m shuttle run test, (M±m), (n=14)

Parameters	max, (sec)	min, (sec)	R, (sec)	Σ, (sec)
1	6,37±0,04	6,82±0,05	0,45±0,05	191,2±0,7
2	6,27±0,04	6,67±0,05	0,40±0,05	190,3±0,5
W, (%)	1,6	2,2	12,5	0,5
3	6,15±0,04	6,57±0,04	0,40±0,05	189,1±0,4
W, (%)	1,9	1,5	0	0,1
4	6,07±0,04	6,50±0,06	0,43±0,08	189,1±0,4
W, (%)	13,1	1,1	7,5	0
5	5,19±0,07***	5,58±0,04***	0,39±0,06	182,0±0,3***
W, (%)	15,6	15,3	10,0	3,8
6	5,04±0,07	5,42±0,05*	0,39±0,05	180,9±0,3*
W, (%)	2,9	2,9	0	0,6
7	5,06±0,06	5,42±0,06	0,36±0,04	180,7±0,4
W, (%)	0,4	0	7,5	0,1

Note: 1-7 – control points of measurements; max – best time; min – worst time; R – difference between the best and the worst time; Σ - total test performance time; W – indicators growth; * - reliability of differences with $P \leq 0,05$ to the results of previous testing; ** - reliability of differences with $P \leq 0,01$ to the results of previous testing; *** - reliability of differences with $P \leq 0,001$ to the results of previous testing.

As it can be seen on the Table 1, it is obvious that the most significant growth rate of indicators is discovered during the fifth control measurement, which coincides with the end of the second year of training. The significant rate of indicators, characterizing capabilities of functional systems of young soccer players' body, was revealed, which was confirmed by an alteration of minimum time of a single run on a distance and shown naturally on the total time of test performance.

Indicators of difference between minimum and maximum running time had more steady dynamics, improving gradually during all three years.

It can be concluded that the improvement of results of this test is related primarily to the maturation of neuromuscular system of the body of young soccer players, where the obvious tendency (+13,1%) was already noted in the middle of

the second year of the experimental program. The improvement was also noted in results of the sixth control testing according to indicators of maximum time of a single run. Almost all indicators were stabilized near the end of the experiment. Dynamics of results of indicators of the differences between minimum and maximum time was characterized as uneven. According to this knowledge, it can be suggested that the maturation of oxygen transport systems of the body responsible for a long high-intensity test performance, related to the fast oxygen transportation to working muscles has a long-term nature.

Results of stage testing of young soccer players in modified 7x30 m shuttle run test during three years of experiment are presented in Table 2.

Analyzing the received data in Table 2, strongly pronounced positive dynamics of the results can be noted according to the parameters of maximum time of passing the distance and total test time, beginning immediately after the implementation of the experimental program.

Table 2

Dynamics of longitudinal research of young soccer players 16-18 years old in the modified 7x30 m test, ($M \pm m$), (n=14)

Parameters	max, (sec)	min, (sec)	R, (sec)	Σ , (sec)
1	6,36 \pm 0,04	6,52 \pm 0,04	0,16 \pm 0,01	270,1 \pm 1,8
2	6,26 \pm 0,03	6,38 \pm 0,03*	0,12 \pm 0,01	261,3 \pm 1,8*
W, (%)	1,6	2,2	28,6	3,3
3	6,15 \pm 0,04	6,26 \pm 0,03*	0,10 \pm 0,01	253,5 \pm 1,7*
W, (%)	1,8	1,9	18,2	3,0
4	6,07 \pm 0,04	6,13 \pm 0,04*	0,06 \pm 0,01**	242,5 \pm 1,4**
W, (%)	13,1	2,0	50,0	4,4
5	5,2 \pm 0,06***	5,34 \pm 0,05***	0,12 \pm 0,02**	233,9 \pm 1,6**
W, (%)	15,7	13,9	66,7	3,7
6	5,05 \pm 0,06	5,17 \pm 0,05*	0,12 \pm 0,02	228,4 \pm 1,7*
W, (%)	2,9	3,2	0	2,4
7	5,03 \pm 0,06	5,08 \pm 0,05	0,05 \pm 0,01**	218,5 \pm 1,8**
W, (%)	0,4	1,8	77,8	4,4

Note: 1-7 – control points of measurements; max – best time; min – worst time; R – difference between the best and the worst time; Σ - total test performance time; W – indicators growth; * - reliability of differences with $P \leq 0,05$ to the results of previous testing; ** - reliability of differences with $P \leq 0,01$ to the results of previous testing; *** - reliability of differences with $P \leq 0,001$ to the results of previous testing.

One of the main differences of the previous test can also be a significant improvement of indicators of difference between maximum and minimum running time, which was shown in the fourth control test. It is also necessary to note an improvement of those results and indicators of total time up to the last control measurement, which serves as an evidence of one more qualitative increase in the formation of the special psychophysical skill. Increase of total time of the modified

test performance can be mainly connected to an improvement of maximum running time and the difference between maximum and minimum values.

Conclusion. Therefore, according to the results of concluded studies, it can be said that the formation of specific and non-specific components of psychophysical skills is uneven and heterochronous. If the maturation of functional systems of the body, which was assessed based on the traditional test results, was uneven, then significant improvements on higher levels of movement regulations based on the modified test results were uniform. In conditions of self-regulation of movement tempo and rhythm, young soccer players showed the best results dynamics in comparison with results gained in conditions of a set recovery time (rest intervals between repeats).

Thus, the working hypothesis of this research is confirmed with received results of examined tests, which characterize appropriate manifestations of non-specific and specific components of psychophysical skills of young soccer players:

- The traditional test gives an unbiased information about the role of non-specific component of psychophysical skills responsible for the adaptation to compulsory performance conditions, where the current functional abilities of the body are crucial;

- The modified test allows to evaluate to a greater extent an involvement of the specific component of psychophysical skills, because conditions of its performance are related to a greater extent to the manifestation of mental abilities responsible for self-regulation of load intensity.

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