

## Influence of training loadings on the state program of children's and youth sports schools in Ukraine on psycho-physiological indicators of 10-12-year-old football players

LEBEDEV SERGEY, ABDULA ANATOLY, BEZYASICHNY BORIS, KOVAL SVYATOSLAV, KHUDYAKOVA VICTORIA

<sup>1</sup>The Department of Football and Hockey of the Kharkiv State Academy of Physical Culture, UKRAINE

Published online: December 30, 2017

(Accepted for publication December 10, 2017)

DOI:10.7752/jpes.2017.04293

### Abstract:

The practice of sports activities shows that even with a competent science-based program of the training process, not all young athletes can achieve a high level of athletic skill, which influence on their further sporting destiny. Objective: The study was conducted on the basis of the Arsenal children's football club in Kharkiv, which was attended by 24 players of 10-12 years old. The tests of psycho-physiological preparedness were carried out four times before the start of the first circle (08.28.2016), after the first round (November 23, 2016), before the start of the second round (27.03.2017) and after the completion of the second round (05.06.2017 .) the football championship of the city of Kharkov. Results: With the age psycho-physiological indicators are significantly improved in assessing the ability to predict the situation on the field: between 10 and 11-year-olds - by 0.16 points ( $t = 3.57$ ;  $p < 0.001$ ) and between 11 and 12 by 0.27 points ( $t = 2.99$ ;  $p < 0.05$ ). The operational memory of 11-year-old young players were improved by 0.79 points relative to 10-year-olds ( $t = 2.30$ ;  $p < 0.05$ ), and in 12 years by 1.09 points to 11-years athletes ( $t = 4.12$ ;  $p < 0.05$ ; 0.001). Changes in tapping test values from 10 to 12 years old were obtained ( $t = 3.15$ ;  $p < 0.01$ ), which is explained by higher physical activity (both by number of occupations and volume of loading). Conclusions. The developed system of special exercises of the children's and youth sports school has positively influenced the development of high-speed qualities of young footballers. The authenticity of differences with the age can be explained by the positive effect of training loads on the body of young football players after pedagogical observation. We believe that planning high-speed training is an integral part of planning a training process for young players at the stage of preliminary basic training.

**Key words:** young footballers, psycho -physiological properties, tests.

### Introduction

**Relevance of the research.** Functional state of the nervous system and its parameters are the main background for motor activity [1, 3,5]. It is known that in the game types of sport, which are characterized by a high level of psychoemotional stress and concentration of attention, the psychophysiological status of the athlete plays an important role in the organization of adaptive response [6,9].

The skill of a footballer is determined by the sum of many qualities that provide a high level of endurance, coordination of movements, accuracy, operative thinking [8]. With the same qualifications, the level of physical qualities, technical and tactical readiness is superior to an athlete with a high level of mental readiness and its personal characteristics of a person [1].

**Analysis of the latest publications.** The practice of sports activities shows that even with a competent science-based program of the training process, not all young athletes can achieve a high level of athletic skill, there is a natural withdrawal of athletes [2].

Some youngsters stop playing sports, others stop at the level of physical education, mass sports, and only a small part of athletes achieves the results of the high class, due to the fact that the level of modern sports requires athletes with special abilities for the effective performance of competitive activities [7].

Decision-making on footballers depends on the effectiveness of information processing and its use for performing special motor activity [5]. Thus, the success of the tactical activity of football players is largely determined by the high level of development of their main features of consideration [3,10]. Thus, it is important to determine the impact of the game of football on the psycho-physiological state of young players.

**Purpose of the study was:** to determine the dynamics of psycho-physiological qualities under the influence of classes according to the program of the Youth School.

## Material & methods

### Participants

The research was conducted on the basis of the Arsenal children's football club in Kharkiv, which was attended by 24 football players of 10-12 years old. The tests of psycho-physiological preparedness were carried out four times before the start of the first round (08.28.2016), after the first round (November 23, 2016), before the start of the second round (27.03.2017) and after the completion of the second round (05.06.2017.) the football championship of the city of Kharkov. Procedure. The assessment of the psycho-physiological condition was carried out in the complex computer psycho-diagnostic complex "Effecton Studio 2006" [4].

### Procedure

The assessment of psycho-physiological condition was carried out in the complex of the computer psycho-diagnostics complex "Effecton Studio 2006" [4]. Tests were shown the runners on the computer in the form of different visual and sound incentives, to which the sportsman reacted pressing of keys on the keyboard (the program counts the average time of reaction and the mean-square deviation): simple motor response to a visual irritant (the test "Tir" - response to a fast change of color (2 attempts)); simple motor response to an acoustical irritant (the test "Duel"- response to a sound irritant (2 attempts)).

#### Psychological tests:

Protocol of Tepping Test. The methods are designed to detect the maximum frequency of movement for 10s and the high-speed stamina manipulations. Test results are a by-side indicator of human's high-speed capabilities (human frequency) [7].

Protocol of Time of Simple Reaction and Optional Response. The method is designed to detect the time of simple reactions to the visual and auditory signal and the response of choice to the visual signal. Test results are indicators of athletes' high-speed capabilities. On the computer monitor, a geometric figure appears at different corners of the screen, the task of the examinee: quickly to respond (by pressing the "Enter" button) on the appearance of the figure - for estimating the simple reaction. For evaluation of the response to the choice, the examinee should respond (by pressing the "Enter") only if the given figure appears on the screen monitor [7,8].

Protocol of the test for the "sense" of time. The technique is intended to detect the accuracy of reproduction of time intervals (5 s). At the beginning of the study, the sound interval (5s) is set by the computer, after which an attempt is given to the subject. After the first beep, he counts the required interval and presses the "Enter" button. Probability is examined for prediction of the game situation in the game [8].

Protocol of the evaluation of the memory in the game situation. It is determined by the method of the designated tactical situation on a card with its subsequent reproduction on a blank sheet, a specially made form. The card is given to the football player for 2 seconds. Estimate for RAM is determined by the number and nature of the permissible errors. Among the significant errors is the deliver on an unnecessary character by the player, its absence or improper reproduction, in addition, one gross error is equivalent to the presence of three small ones [8].

The score for each attempt is displayed on a scale:

a) the absence of gross errors, 1-2 - insignificant = 5, b) one rough error = 4, c) two - = 3, g) three - = 2, e) four and more = 1. Total are the three consecutively increasing complexity of the task. The estimates obtained are averaged [8]. Estimation of the possibility of probable forecasting by Kuznetsov A. A. 2010 (Table 1).

Table 1. Signs of ability for probable prediction in football by Kuznetsov A.A., 2010

Kind of activity, exercises	During the attacks	Points	During the defensive actions	Points
Competitions: calendar, unofficial, educational games, mini-football	Frequent selection (in each game several times) of a promising position for the organization and development of an attack, a rapid transition from defense to attack	0,2	Frequent interception of a ball (by foot, head) from an opponent ( play in advance). Partner's stand by at the most important moment in the most dangerous zones	0,2
	An instant choice of a promising position to complete an attack by a twin strike the ball that bounced from the goalkeeper; ahead of the players of the defending team, by acute cross passed close to the goal; interception of a ball addressed to the goalkeeper by a defender of the defending team	0,2	Provocating an opponent on any action and gaining from this benefit.	0,2
Outdoor games such as Hunters and Ducks, Pyatnashki	Hitting by a ball in an opponent after a cheat action, attempts, a pause before a throw	0,05	Cheating actions, sudden stops, acceleration when trying to hit the opponent with a ball.	0,05
	In false moves, a run away football player pretends to believe a fake and instantly reacts to the actual action	0,05	False movements by the trunk in one direction and a quick exit to another.	0,05

\* - As a result of all tests, everyone can score a max of 1 point. The number of scored points characterizes the level of this ability.

*Statistical data processing*

Methods of mathematical statistics are used in accordance with known recommendations with the use of computer programs "EXCEL" and "SPSS" [13]. The Descriptive statistics indicators (average arithmetic, standard deviation, and mean value error) were determined [2]. To determine the relationship between the indicators, the Pearson correlation coefficients were calculated and correlation structures were designed [2].

**Results**

The analysis of the test results presented in Table 2 indicates improvements for the psychophysiological indicators with the age of younger players.

Table 2. Comparative analysis of psychophysiological properties of football players of 10-12 years during training ( $n_1 = n_2 = n_3 = 24$ )

№ 3/p	Indicator	Age of athletes, years:		
		10 $X_1 \pm m_1$	11 $X_2 \pm m_2$	12 $X_3 \pm m_3$
1.	Reaction to the visual stimulus, p	0,394±0,14	0,314±0,11	0,289±0,12
2.	Reaction to sound stimulus, p	0,413±0,25	0,324±0,12	0,271±0,11
3.	Selective reaction, p	0,565±0,040	0,512±0,041	0,497±0,043
4.	Reaction to a moving object, p	0,371±0,5	0,341±0,4	0,328 ±0,4
5.	Tepping test (10 s), number	22,4±1,25	24,3±0,85	27,3±1,28
6.	A sense of time (5 s), p	0,31±0,012	0,29±0,015	0,26±0,011
7.	RAM, points	2,32±0,27	3,11±0,21	4,2±0,16
8.	Prediction, points	0,37±0,04	0,53±0,02	0,62±0,03

Changes in the rate of response to the audible and visual signal, the response to the choice and to the moving object are positive, but they are insignificant and unreliable ( $p > 0.05$ ) (Fig. 1).

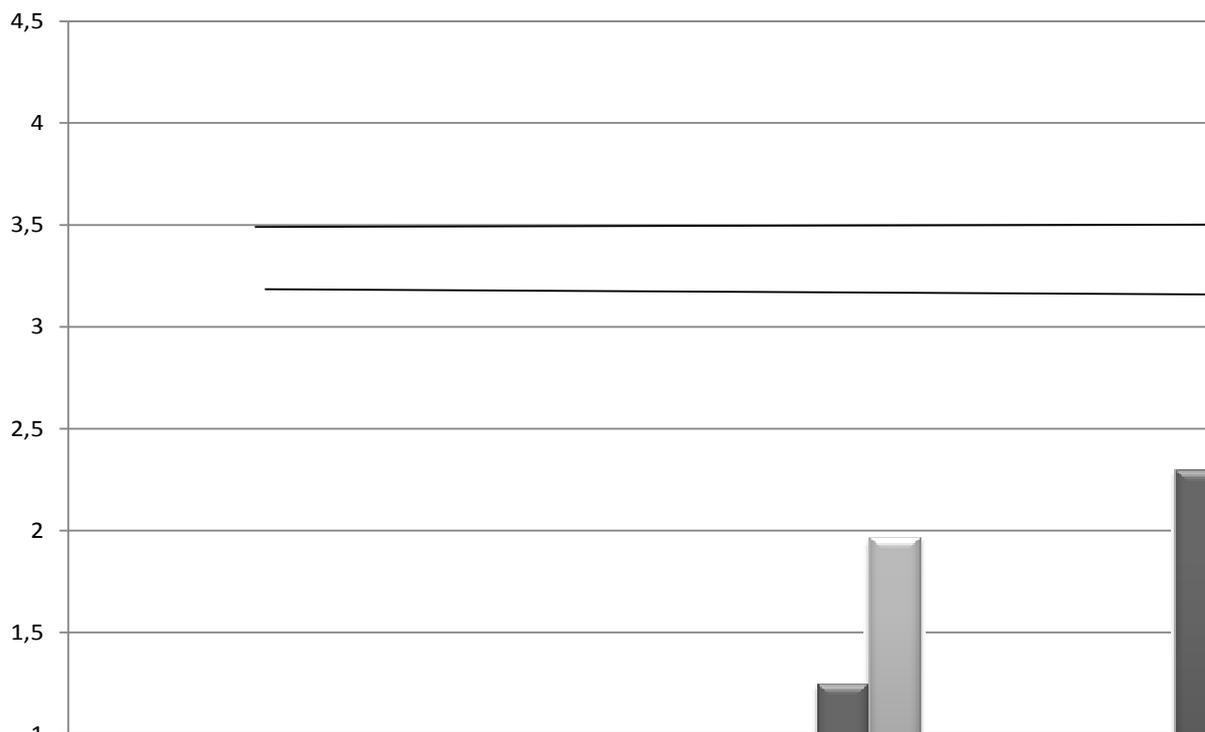


Fig. 1. Numerical values of t-criterion and probable levels (p) of indicators of special physical fitness of young football players of 10-12 years old ( $n_1 = n_2 = n_3 = 24$ )

Thus, the improvement of the reaction speed on the visual stimulus between the 10- and 11-year-old players is 0.089 s ( $t = 0.44$ ;  $p > 0.05$ ), between 11-12-year-olders - 0.025 s ( $t = 0.15$ ;  $p > 0.05$ ) (Fig. 1).

The difference in the rate of response to the sound stimulus between 10 and 11 year olds is 0.08 s ( $t = 0.54$ ;  $p > 0.05$ ), between 11-12 years - 0.025 s ( $t = 0.32$ ;  $p > 0.05$ ) (Fig. 1). In the indicators of the reaction rate with the choice, the difference between 10 and 11-year-old players is 0.053 s ( $t = 0.92$ ;  $p > 0.05$ ), between 11-12-year-olders - 0.015 s ( $t = 0.25$ ;  $p > 0.05$ ). In the indicators of the reaction rate with the choice, the difference between 10 and 11-year-old players is 0.03 s ( $t = 0.46$ ;  $p > 0.05$ ), between 11-12-year-olders - 0.013 s ( $t = 0.22$ ;

$p > 0.05$ ) (Fig. 1). In the indicators of the sense of time between 10 and 11-year-old players, the difference is 0.02 s ( $t = 0.12$ ;  $p > 0.05$ ), and between 11-12-year-olds - 0.03 s ( $t = 0.18$ ;  $p > 0.05$ ) (Fig. 1). The true difference in the tapping test between 10, 11 and 11-12 year olders is also uncertain ( $p > 0.05$ ), while at the time of the entire study period (from 10 to 12 years) there were significant shifts ( $t = 3.15$ ;  $p < 0.01$ ) (Table 3).

Table 3. Matrix of statistical reliability of tapping test indicators for football players of 10-12 years old ( $n_1 = n_2 = n_3 = 24$ )

Bik	10		11		12	
	t	p	t	p	t	P
10	*		<b>1,25</b>	<b>&gt;0,05</b>	<b>3,18</b>	<b>&lt;0,01</b>
11	-	-	*		<b>1,97</b>	<b>&gt;0,05</b>
12	-	-	-	-	*	

The operational memory of the 11-year-old young players is improved by 0.79 points relative to 10-year-olds ( $t = 2.3$ ;  $p < 0.05$ ), and the following year (12 years) by 1.09 points ( $t = 4.12$ ;  $p < 0.001$ ) (Table 4).

Table 4. Matrix of statistical reliability of indicators of operational memory and ability to predict by players of 10-12 years old ( $n_1 = n_2 = n_3 = 24$ )

Age	10		11		12	
	t	p	t	p	t	P
10	*		<b>1-2,30</b>	<b>1-&lt;0,05</b>	<b>1-5,99</b>	<b>1-&lt;0,001</b>
			<b>2-3,57</b>	<b>2-&lt;0,001</b>	<b>2-6,93</b>	<b>2-&lt;0,001</b>
11	-	-	*		<b>1-4,12</b>	<b>1-&lt;0,001</b>
					<b>2-2,99</b>	<b>2-&lt;0,05</b>
12	-	-	-	-	*	

1 - RAM, 2 - the ability to predict.

In assessing the ability to predict the situation on the field, the features of the performance of young footballers has significantly improved: between 10 and 11- years- old athletes - by 0.16 points ( $t = 3.57$ ;  $p < 0.001$ ) and between 11 and 12-year olders by 0.27 points ( $t = 2.99$ ;  $p < 0.05$ ), which is explained by higher physical activity (both by the number of occupations and the volume of loading).

## Discussion

The results of our research continue the series of studies on the psycho-physiological preparedness of footballers of different qualifications [1] and age [6,7]. The obtained data confirm the opinion [5] that in many ways the growth of the results in both groups is related to the general physical development of children [4], which at this age are significantly added in height and weight indicators and have a set of necessary motor skills, and sometimes habits [8]. Our results confirm the importance of the development of high-speed qualities in this period [3], as the tendency for selection in big football is now traced in the choice of such players who are able to compete, who can successfully resist in personal challenge and win their so-called micro- games [2]. The analysis made it possible to determine that the training effect from the influence of exercises on the development of speed skills of the players depends [5], as shown by studies by a number of authors [6], on the correct definition of the volume and duration of performance of high-speed work [11]. The development of high-quality qualities from 10-12 years will allow young football players with adults to accurately perform tasks that require a high level of technical skill. In this age, the actual adaptation to the acquired technical skills begins [12].

## Conclusions

The developed system of special exercises in the program of children's and youth sports school has positively influenced the development of high-speed qualities of young footballers. The authenticity of differences with the age can be explained by the positive effect of training loads on the body of young football players after pedagogical observation. We consider that planning high-speed training is an integral part of programming a training process for young players at the stage of the preliminary basic training.

## Prospects of subsequent researches

The definition of psycho-physiological indicators respectively for each role of football players aged 10-12 years.

## Acknowledgements

The work is carried out in accordance with the initiative theme of research work in the field of physical culture and sports of Kharkov State Academy of Physical Culture for 2016-2021 on the topic "Psycho-sensory regulation of motor activity of athletes of situational sports."

## References

- Abdula A.B., Lebedev S.I. (2014). Features of the physiological reaction of the body of football players 10-12 years to perform exercises using various training methods. *Physical education of students*. № 1. 3-4.
- Antomonov M.Iu. (2006). *Matematicheskaia obrabotka i analiz medikobiologicheskikh dannykh* [Mathematical processing and analysis of biomedical data], 560.
- Babushkin G.D., Yakovykh Yu.V. (2007). Increase the effectiveness of competitive activities in sports games on the basis of development of noise immunity in athletes. *Actual issues of development of children's and youth football: 2nd region. scientific-practical. Conf. trainers, teachers, football instructors, heads of sports and sports institutions*. Omsk, 67-79.
- Mihuta I. Y. (2006). Psychological service in education effecton Studio. *Lipetsk: LEGI*, 298.
- Volkov L.V. (1997). The theory of sports selection: abilities, giftedness, talent. To: "Vezha", 128.
- Voronova V. I., Shutova S.E., Korneeko W.V. (2009). Psychological parameters of qualified players, affecting the success of their competitive activities. *Physical culture, education, health: intern. Sat. articles of scientific-practical. Conf. VLIFK, 12-13 December, Velikie Luki Institute of Physical Culture. Great Luke*, 50-58.
- Koval S.S., Lebedev S.I. 2017. Dynamics of changes in psychophysiological and physical indicators of 15-16 year old football players during the annual cycle. *Scientific journal of the National Pedagogical University named after MP Drahomanov. Series 15. View of the NPU named after MP Dragomanov, Issue 2 (83) 17, 72-78*.
- Kuznetsov A.A. (2010). Organizational-methodical structure of the educational process in the football school. II stage (11-12 years). *Olimpia, Man*, 44-49.
- Lisenchuk G. A. (2002). Technology assessment of potential opportunities for football players of childhood. *Science in the Olympic sport*, № 3-4, 45-48.
- Rodionov A.V. (2006). Problems of the psychology of sports / Theory and practice of physical culture. №6, 2-4.
- Ilyin E.P. (2006). Psychomotor organization of a person, St. Petersburg: Peter, pp. 288– 313.
- Rybachinsky V.P. (2000). Psychophysiological features of representatives of various sports during the preparation for participation in competitions. *Rostov-on-Don*. 147 p.
- Togobitskaya G. N., Shamardin G. N., Dolbysheva N. G. (2009). *Fundamentals of Mathematical Statistics and its Usage in the Processing of Data in the Field of Physical Culture and Sports (Methodology for Students, Masters and PhD Students in Physical Culture and Sports)*. Dnipropetrovsk: LLC"Veta", 63 p.