Control of physical and technical readiness of football players at the stage of specialized basic training

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Abstract

Purpose: to determine at the beginning of the preparatory period the initial level of physical and technical preparedness of football players born in 2006 of different youth teams in Kharkiv.

Material & Methods: the study was conducted in August 2021. The contingent of the examined - athletes in the amount of 56 football players of the Children's and Youth Football Club (FC) "Arsenal" in Kharkiv and the Youth Sports School No. 7 in Kharkiv, whose average age was 14,6 years. Technical and physical indicators were determined that characterize the level of readiness of football players for the beginning of the competitive season. The following methods were used in the study: analysis of scientific and methodological literature, pedagogical testing, methods of mathematical statistics.

Results: the work established statistically significant differences between technical indicators: in the test, running 30 m (with the ball) ($p<0,05$; $t=2,18$), throw-in ($p<0,05$; 2,88); in terms of physical preparedness, statistically significant changes were found in the tests "Illinois" ($p<0,05$; $t=2,72$), shuttle run 7x30 m ($p<0,05$; $t=2,48$), at the same time, the players of the FC "Arsenal" overcome the distance faster ($p<0,05$; $t_1=2,10$; $t_2=2,05$; $t_3=2,06$; $t_7=2,15$) on the first, second, third and seventh segments than the players of the Youth Sports School No. 7. In the endurance test of the shuttle run 5x30 m, the players of the FC "Arsenal" run faster ($p<0,05$; $t=2,12$) than the players of the Youth Sports School No. 7, while in the first and third segments the players of the Youth Sports School No. 7 are slower ($p<0,05$; $t_1=2,75$; $t_3=2,05$) overcome the distance than the players of the FC "Arsenal".

Conclusions: analysis of special literature shows that the modern scientific and methodological base in the analysis of technical and physical preparedness in football has not been sufficiently studied in order to ensure the effective preparation of young men for the highest sports achievements. As a result of the study, statistically significant differences were established in the indicators of physical and technical readiness between the football players of the FC "Arsenal" and the Youth Sports School No. 7 in Kharkiv. It was determined that football players born in 2006 have a low level of functional performance.

Анотація

Сергій Лебедєв, Сергій Журид, Святослав Коваль, Віктор Шаленко. Контроль фізичної та технічної підготовленості футболістів на етапі спеціалізованої базової підготовки. Мета: визначити на початку підготовчого періоду вихідний рівень фізичної та технічної підготовленості футболістів 2006 р.н. різних дитячо-юнацьких команд м. Харкова. **Матеріал і методи:** дослідження проводилося в серпні 2021 року. Контингент обстежуваних - спортсмени у кількості 56 футболістів ДЮФК (дитячо-юнацький футбольний клуб) «Арсенал» м. Харкова та ДЮСШ (дитячо-юнацька спортивна школа) № 7 м. Харкова, вік яких становив у середньому 14,6 років. Були визначені технічні та фізичні показники, які характеризують рівень підготовленості футболістів до початку змагального

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сезону. У дослідженні були використані такі методи: аналіз науково-методичної літератури, педагогічне тестування, методи математичної статистики. **Результати:** у роботі встановлені статистично достовірні відмінності між технічними показниками: в тесті біг 30 м (з м'ячем) ($p<0,05$; $t=2,18$), вкидання м'яча з-за бічної лінії ($p<0,05$; 2,88); у показниках з фізичної підготовленості статистично достовірні зміни були виявлені у тестах «Іллінойс» ($p<0,05$; $t=2,72$), човниковий біг 7х30 м ($p<0,05$; $t=2,48$), при цьому гравці ДЮФК «Арсенал» долають відстань швидше ($p<0,05$; $t_1=2,10$; $t_2=2,05$; $t_3=2,06$; $t_7=2,15$) на першому, другому, третьому та сьомому відрізках ніж гравці ДЮСШ № 7. У тесті на витривалість човниковий біг 5х30 м гравці ДЮФК «Арсенал» швидше ($p<0,05$; $t=2,12$) пробігають, ніж гравці ДЮСШ № 7, при цьому на першому та третьому відрізках гравці ДЮСШ № 7 повільніше ($p<0,05$; $t_1=2,75$; $t_3=2,05$) долають відстань, ніж футболісти ДЮФК «Арсенал». **Висновки:** аналіз спеціальної літератури свідчить, що сучасна науково-методична база в аналізі технічної та фізичної підготовленості у футболі є недостатньо вивченою для того, щоб забезпечити ефективну підготовку юнаків до вищих спортивних досягнень. У результаті дослідження встановлено статистично достовірні відмінності у показниках з фізичної та технічної підготовленості між ДЮФК «Арсенал» та ДЮСШ № 7 м. Харкова. Визначено, що футболісти 2006 року народження мають низький рівень функціональної працездатності.

Introduction

An analysis of recent publications suggests that the quality of scientific research in football has increased significantly in recent years. This is due to the expansion of opportunities for communication between specialists both in person and online within the framework of various scientific conferences, meetings, and practical seminars. Many leading experts addressed the issues of pedagogical control and continue to study its diversity and peculiarities of conducting and correctness in use (Stula, 1995; Bangsbo et al., 2012; Platonov, 2017; Bromley et al., 2021).

Young et al. (2011) note in their work that in order to increase the effectiveness of the training process, it is necessary to study the organized control over the ongoing changes in the state of the athlete's body. Paul et al. (2016) argue that control provides for a mandatory determination of the effectiveness of training work, makes it possible to justify the selection of appropriate training tools based on the information received about the nature of the work performed and adaptive changes in the athlete's body under the influence of increased training loads.

Leading experts Godik et al. (2010), Seluianov et al. (2012), Guba et al. (2015) believe that the essence of control is to compare the results of an activity with its goal (task) in order to assess the preparedness of an athlete and, in the process of further training work, make changes either to the goals or subsequent elements of the activity.

Control over the training process of football players should be of an integral nature, that is, taking into account all the factors influencing the sports result. In a broad sense of control, it should cover the pedagogical, biomedical and psychological aspects of the training process (Buchheit et al., 2010; Sporis et al., 2010; Platonov, 2017; Solomonko et al., 2021).

The essence of control is the assessment of the state of the athlete's body, the technique of motor actions, training loads and sports results. The full implementation of the listed volume of control actions requires the use of numerous research methods, special equipment and the involvement of a wide range of specialists (Rampinini et al., 2007; Godik et al., 2010; Guba et al., 2010; Rumpf et al., 2016; Hicheur et al., 2017).

Pedagogical testing tools are used to study the level of manifestation of technical and physical preparedness parameters (Ivanchenko, 2008; Buchheit et al., 2012; Guba et al., 2014; Hicheur et al., 2019). One of the most effective means of assessing training activity is pedagogical tests, which allow you to determine the dynamics of the development of technical and physical qualities of a football player. (Lberto et al., 2013; Perevoznik, 2014; Paul et al., 2016; Lebedev, 2017).

Purpose of the study is to determine at the beginning of the preparatory period the initial level of physical and technical readiness of football players born in 2006 of various youth teams in Kharkiv.

Material and Methods of the research

Participants

The study involved 56 football players (boys) born in 2006, who were involved in football sections. The subjects were divided into 2 groups of 28 people in each: the first group was the FC "Arsenal", the second group was the Youth Sports School No. 7, who trained according to the traditional methodology developed by the Football Federation of Ukraine (Nicolaenko et al., 1995). The total number of hours per year was 960 (GPP 20%, SPP 40%, auxiliary 40%).

All participants gave consent to participate in the study.

At the time of the study, all participants were healthy and had permission from a doctor to practice football.

During the observation process, the initial level of preparedness of football players born in 2006 after a long rest in July 2021 (31 days) was determined.

Methods

The following methods were used in the study: analysis of scientific and methodological literature, pedagogical testing, methods of mathematical statistics.

Theoretical (analysis, comparison, generalization, systematization, theoretical modeling) were carried out in order to generalize the experience of scientists involved in the study of the problem of gender approach in education and upbringing, modern approaches to the development and improvement of the system of physical education.

Pedagogical testing: the assessment of technical indicators was accompanied by the following tests: PA (passing accuracy), 30 m run (with the ball), throw-in, hitting the ball for accuracy (rotational kick); assessment of physical indicators was carried out using such tests: manifestations of speed-strength qualities - standing long jump, jump up; speed qualities - running 30 m from a place; to improve the effectiveness of testing and given the small sample, we included 2 variants of the test for speed endurance: shuttle run 7x30 m, shuttle run 5x30 m, in addition, the "Illinois" test was used, which made it possible to determine the indicators of dexterity, the essence of the test was that the athlete needs to quickly turn around at different angles and change the direction of movement while running (Figure 1).

Registration of test results was carried out using the innovative technology of the SmartSpeed PRO testing system, which made it possible to obtain reliable results during the

study.

The SmartSpeed PRO system is a timing system with limitless training simulation possibilities and unique research capabilities, SMARTSPEED PRO allows you to fully explore and improve the performance of athletes (Figure 2).

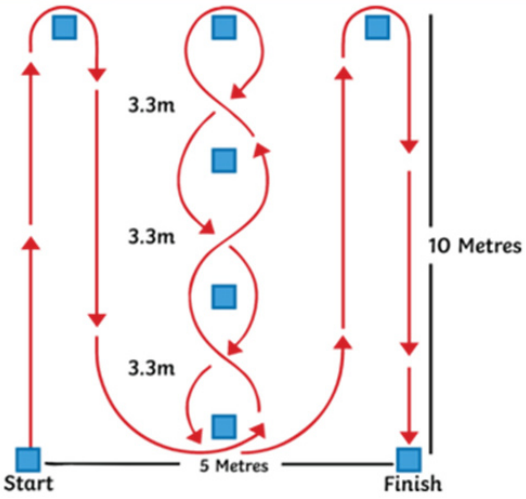

Figure 1. Test "Illinois" (Hicheur et al., 2017)

On the field, 6 lines of wireless gates were installed, which automatically controlled the time of the distance run with a tablet computer.

Figure 2. Temporary registration desk (Sporis et al., 2010)

Procedure

Data for the study of physical and technical readiness were determined from pedagogical testing conducted in the conditions of direct training of football players.

Testing of participants was carried out at the beginning of the preliminary period by specialists of the UAF (Ukrainian Football Association) on the natural surface of the football field. The obtained data were entered on a computer with their subsequent analysis using the methods of mathematical statistics.

Statistical analysis

The processing of the research results by the methods of mathematical statistics are used in accordance with the well-known recommendations using the computer program "EXCEL" (Antomonov, 2006; Ivanchenko, 2008).

The following indicators were calculated:

- $\bar{X}$ – arithmetic mean;
- m – representativeness error of the arithmetic mean;
- t - reliability of the difference between the average values (according to Student's criterion), determined by the formula:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{m_1^2 + m_2^2}}$$

The significance of differences between different indicators of the studied groups was considered significant at a five percent significance level ($p<0,05$), which was recognized as quite reliable in biological studies. (Antomonov, 2006; Togobitckaia et al., 2009).

Connection of work with scientific programs, plans, themes. The work is carried out in accordance with the Initiative theme of research work in the field of physical culture and sports of the Kharkiv State Academy of Physical Culture for 2019-2023 on the topic "Improvement of the educational and training process in sports games", state registration number 0116U101644.

Results of the research

To determine the level of preparedness of football players born in 2006, an ascertaining experiment was conducted, in which 56 boys from two football schools in Kharkiv took part.

The analysis of the indicators of technical readiness between the FC "Arsenal" and the Youth Sports School No. 7 indicates that the studied indicators are statistically different ($p<0,05$) (Table 1).

Thus, the players of FC "Arsenal" faster ($p<0,05$; $t=2,18$) perform the 30 m run test (with the ball) compared to the players of the Youth Sports School No. 7, throw-in ($p<0,05$; 2,88) (Table 1). In other technical indicators, the changes were not significant and unreliable. There are no significant differences in the PA test (passing accuracy) and hitting the ball for accuracy (rotational kick) ($p<0,05$).

The conducted analysis of physical preparedness revealed that the indicators of football players of FC "Arsenal" and Youth Sports School No. 7 also have differences. Thus, the players of FC "Arsenal" perform the Illinois test faster ($p<0,05$; $t=2,72$) compared to the players of the Youth Sports School No. 7, shuttle run 7x30 ($p<0,05$; $t=2,48$) (Table 1).

Therefore, the results shown in Table 2 indicate that the players of FC "Arsenal" in the first, second, third and seventh segments overcome the distance faster ($p<0,05$; $t_1=2,10$; $t_2=2,05$; $t_3=2,06$; $t_7=2,15$) than the football players of the Youth Sports School No. 7.

In the test for endurance shuttle run 5x30 m, the players of FC "Arsenal" show much better results ($p<0,05$; $t=2,12$) than the players of the Youth Sports School No. 7 (Table 1).

According to the data of Table 3, the endurance indicators in the 5x30 m shuttle run test, the players of FC "Arsenal" in the first and third segments cover the distance faster ($p<0,05$; $t_1=2,75$; $t_3=2,05$) than the players of the Youth Sports School No. 7 (Table 3).

It was found that in the jump test, the players of FC "Arsenal" had higher indicators ($p<0,05$; $t=2,06$) compared to the players of the Youth Sports School No. 7 (Table 1). In the test of standing long jump and 30 m run from a place, the differences between the studied groups are insignificant and do not have significant differences between them.

The functional readiness of football players was determined using the Rufier functional test. It was determined that,

Table 1

Comparative analysis of technical and physical indicators of preparedness of young football players born in 2006

№ i/o	Tests	FC "Arsenal", Kharkiv (n=28) $\bar{X}_{1\pm}m_1$	Youth Sports School No. 7 Kharkiv (n=28) $\bar{X}_{2\pm}m_2$	t	p
	Technical indicators				
1	PA (passing accuracy), s	14,68±2,03	16,72±2,13	0,69	>0,05
2	Run 30 m (with ball), s	4,95±0,23	5,31±0,32	2,18	**<0,05**
3	Throw-in, m	21,9±0,47	20,1±0,41	2,88	**<0,05**
4	Hitting the ball for accuracy (rotational kick), number of hits	4,3±0,81	3,4±0,75	0,81	>0,05
	Physical indicators				
1	Illinois, s	16,38±0,54	18,33±0,47	2,72	**<0,05**
2	Shuttle run 7x30 m	44,48±2,44	52,54±2,14	2,48	**<0,05**
3	Shuttle run 5x30 m	31,58±1,67	36,24±1,31	2,12	**<0,05**
4	Standing long jump, m	2,03±0,15	2,12±0,17	0,39	>0,05
5	Running 30 m from a place, s	4,61±0,20	4,67±0,27	0,17	>0,05
6	Jump up	49,5±1,3	44,8±1,88	2,06	**<0,05**

Table 2

Results of the run of 30 m segments by football players during the control standard of the shuttle run 7x30 m

Indicators		FC "Arsenal", Kharkiv (n=28) $\bar{X}_{1\pm}m_1$	Youth Sports School No. 7 Kharkiv (n=28) $\bar{X}_{2\pm}m_2$	t	P
Test "shuttle run 7x30 m"	t1 30, m	5,52±0,31	6,55±0,38	2,10	**<0,05**
	t2 30, m	6,05±0,35	7,27±0,48	2,05	**<0,05**
	t3 30, m	6,48±0,34	7,61±0,43	2,06	**<0,05**
	t4 30, m	6,56±0,35	7,52±0,44	1,70	>0,05
	t5 30, m	6,67±0,36	7,62±0,45	1,65	>0,05
	t6 30, m	6,71±0,37	7,74±0,42	1,84	>0,05
	t7 30, m	6,79±0,34	7,97±0,43	2,15	**<0,05**

Table 3

Results of the run of 30 m segments by football players during the control standard of the shuttle run 5x30 m

Indicators		FC "Arsenal", Kharkiv (n=28) $\bar{X}_{1\pm}m_1$	Youth Sports School No. 7 Kharkiv (n=28) $\bar{X}_{2\pm}m_2$	t	p
Test "shuttle run 5x30 m"	t1 30, m	5,51±0,24	6,68±0,35	2,75	**<0,05**
	t2 30, m	6,36±0,38	7,16±0,43	1,39	>0,05
	t3 30, m	6,40±0,35	7,51±0,41	2,05	**<0,05**
	t4 30, m	6,56±0,33	7,53±0,44	1,76	>0,05
	t5 30, m	6,67±0,36	7,58±0,43	1,62	>0,05

Table 4

Results of functional testing according to the functional test of Rufier

Indicators	FC "Arsenal", Kharkiv (n=28)	Youth Sports School No. 7 Kharkiv (n=28)	t	p
Rufier test	14,46±3,10	15,78±2,85	0,31	>0,05

according to the results of Table 4, the performance indicators of the players of FC "Arsenal" and Youth Sports School No. 7 constitute a low level of performance in accordance with the standard indicators (Nikolaenko, 1995; Guba et al., 2015). This indicates that the level of functional readiness in both teams is at the same level, and all the players were in the same conditions.

Discussion

The analysis of special literature shows that the modern scientific and methodological base in the analysis of technical and physical preparedness in football has not been studied enough to ensure the effective preparation of boys for the highest sports achievements. Therefore, it is necessary to determine the initial level of functional, technical and physical indicators before the introduction of experimental methods and various implementations into the training and competitive processes of football players. In this regard, it is necessary to take into account what qualities you need to pay attention to in order to achieve a high sports result.

Summarizing the above, we emphasize that a long rest affected the level of the functional state of the players of both groups, resulting in a low level of functional readiness. At the same time, significant differences in technical and physical preparedness were revealed in the studied groups, which proves that the children of FC "Arsenal" maintained their sports shape on their own during the holidays, and the players of the Youth Sports School 7 paid less attention to this, as a result of which they received such differences.

The results of our study confirm the existing opinion that the problem of controlling the technical and physical preparedness of young athletes does not lose its relevance (Guba et al., 2010; Lebedev et al., 2017). Supplemented and refined the data of scientific studies on the technical (Guba et al., 2016) and physical (Perevoznik, 2014; Guba et al., 2015; Platonov, 2017) preparedness of football players.

The conducted study confirmed the results of the authors (Iordanskaia, 2011; Buchheit et al., 2012; Guba et al., 2014; Perevoznik, 2014; Lebedev et al., 2017) on the need to study changes in the technical and physical preparedness indicators of football players, and deepens the data of scientists on this issue.

Conclusions

Our research allowed:

1. To determine the differences between the studied groups in technical indicators: in the Illinois test ($p<0,05$; $t=2,72$), 30 m run (with a ball) ($p<0,05$; $t=2,18$), throw-in ($p<0,05$; $t=2,88$).

2. It has been established that statistically significant changes in physical preparedness indicators were detected in endurance tests of the shuttle run 7x30 m ($p<0,05$; $t=2,48$), while the players of FC "Arsenal" in the first, second, third and seventh segments reliably overcome the distance faster than the players of the Youth Sports School No. 7 ($p<0,05$; $t_1=2,10$; $t_2=2,05$; $t_3=2,06$; $t_7=2,15$). In the endurance test of the shuttle run 5x30 m, the players of FC "Arsenal" run faster ($p<0,05$; $t=2,12$) than the players of the Youth Sports School No. 7, while in the first and third segments the players of the Youth Sports School No. 7 are slower ($p<0,05$; $t_1=2,75$; $t_3=2,05$) overcome the distance than the players of FC "Arsenal".

3. In other indicators of technical readiness PA (passing accuracy), hitting the ball for accuracy and physical readiness standing long jump, 30 m run from a place between the studied groups, the differences were insignificant and unreliable.

4. It was found that the players of the studied groups have a low level of functional performance. This is due to the fact that the players were on a long rest (vacation) before the start of the preparatory period.

In further studies, it is planned to introduce an experimental methodology, taking into account the differences in the functional state, technical and physical preparedness of football players.

Author Contributions
Serhii Lebedev: data collection, input, statistics; Serhii Lebedev, Serhii Zhurid: interpretation of data, preparation of the manuscript, analysis, search of literature; Svyatoslav Koval: design, research planning; Serhii Zhurid, Svyatoslav Koval, Victor Shalenko: fundraising.

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Conflicts of Interest
The authors declare no conflict of interest.

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