Effective, accessible and easy-to-use technologies for the integral development of motor and cognitive abilities of young football players in the modern realities of Ukraine: a review article

Zhanneta KozinaABCD, Oleksiy VasyutinBCD, Valery GaninCD, Ruslan MartynenkoAD, Dmytro OrobchenkoBCD, Bohdan BorodinAD, Maksym ZhylinBC

H.S. Skovoroda Kharkiv National Pedagogical University, Ukraine

Authors’ Contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection

* - Correspondent author

DOI: https://doi.org/10.58962/HT.2023.1.4.6-16

How to site


Abstract

Background and purpose
The current level of football development requires the combined development of physical fitness and various cognitive aspects. That is why the development and application of technologies that combine the development of motor skills and various aspects of cognition are needed. Purpose: on the basis of the analysis of modern scientific literature, to determine the most effective, accessible, easy-to-use technologies for the integral development of motor and cognitive abilities of young football players in the modern realities of Ukraine.

Material and methods
Internet platforms Scopus, Web of Science, PubMed were used to select articles for analysis of the effectiveness of various technologies for the combined development of motor and cognitive abilities of young football players. The benefits were for issues of categories Q1-Q3 for 2020-2023. Also, preference was given to randomized control studies in which a reliable effect of the applied technologies on both motor and cognitive abilities was found at a significance level of less than 0.05. Based on the articles selected in this way, an analysis of the technologies of integral development of cognitive and motor skills of young football players was carried out. The technologies had to meet the following criteria: efficiency, integrality of impact, accessibility.

Results
As a result of the search for literary sources on the topic of the integral influence on the motor and cognitive abilities of young football players, 4360 sources were selected using the keyword “football”, from which, after clarification, the keywords “physical fitness”, “motor abilities”, “psychophysiological capabilities” were selected. “nervous system”, “cognitive abilities”, “intelligence” 143 sources were selected, from which 30 sources were identified for analysis. Of these sources, 6 reflect the relationship between psychophysiological and intellectual aspects of cognitive abilities and motor readiness, 4 sources reflect the development of the aspect of movement perception, and 20 articles are devoted to technologies and methods for the development of motor readiness with a combined effect on various aspects of cognitive abilities.

Conclusions
The analysis of literary sources according to the parameters of effectiveness, accessibility and ease of application of technologies for the integral development of motor and cognitive abilities allowed us to highlight the following: 1 – the technology of using balls of different sizes to develop the accuracy of movements in combination with performing exercises with balls from various sports and by exercises with balls to develop attention, speed of mental processes, reaction and ability to concentrate; 2 – the technology of developing “feeling of the ball” to combine the impact on the aspect of perception in cognitive abilities and accuracy of movements; 3 - the technology of using plyometric exercises in water for the integral development of the ability to control the body in space and speed-power abilities. The use of football as a means of integral influence on the development of cognitive and motor abilities was also highlighted separately.

Keywords
Football, motor skills, physical fitness, cognitive abilities, perception, attention

© Kozina ZL, Vasyutin OO, Ganin VY, Martynenko RO, Orobchenko DO, Borodin BA, Zhylin ME, 2023

https://doi.org/10.58962/HT.2023.1.4.6-16
Анотація
Жаннета Козіна, Олексій Васютін, Валерій Ганін, Руслан Мартиненко, Дмитро Оробченко, Богдан Бородін, Максим Жилін. Ефективні, доступні і прості у застосуванні технології інтегрального розвитку рухових і когнітивних здібностей юних футболістів в сучасних реаліях України: оглядова стаття

Обґрунтуванням і мета
Сучасний рівень розвитку футболу передбачає необхідність поєднаного розвитку фізичної підготовленості і різних аспектів когнітивності. Саме тому потрібна розробка і застосування технологій, які поєднують в собі розвиток і рухових здібностей, і різних аспектів когнітивності. Мета: на основі аналізу сучасної наукової літератури визначити найбільш ефективні, доступні, прості у застосуванні технології інтегрального розвитку рухових і когнітивних здібностей юних футболістів в сучасних реаліях України.

Матеріал і методи
Для відбору статей для проведення аналізу щодо ефективності різних технологій поєднаного розвитку рухових і когнітивних здібностей юних футболістів було застосовано інтернет – платформи Scopus, Web of Science, PubMed. Переваги були для видань категорій Q1-Q3 за 2020-2023 роки. Також переваги надавались рандомізованим контрольним дослідженням, в яких було виявлено достовірний вплив застосованих технологій і на рухові, і на когнітивні здібності, на рівні значимості менше 0,05. За відбранями таким чином статтями проводився аналіз технологій інтегрального розвитку когнітивних і рухових здібностей юних футболістів. Технології повинні були відповідати наступним критеріям: ефективність, інтегральне вплив, доступність.

Результати

Висновки
Аналіз літературних джерел за параметрами ефективності, доступності та простоти в застосуванні технологій інтегрального розвитку рухових і когнітивних можливостей дозволив виділити наступні: 1 – технологія застосування м’ячів різного розміру для розвитку точності рухів у поєднанні з виконанням вправ з м’ячами з різних видів спорту та за вправами з м’ячами на розвиток уваги, швидкості розумових процесів, реакції та здатності до концентрації; 2 – технологія розвитку «почуття м’яча» для поєднання впливу на аспект сприйняття в когнітивних здібностях і точності рухів; 3 – технологія застосування пліометричних вправ у воді для інтегрального розвитку вміння керувати тілом в просторі та швидкісно-силових здібностей. Також окремо було виділено застосування футболу як засоби інтегрального впливу на розвиток когнітивних і рухових здібностей.

Ключові слова
Футбол, рухові здібності, фізична підготовленість, когнітивні можливості, сприйняття, увага


Introduction

Football requires high-level development of physical qualities, technical skills and cognitive abilities [1–3]. After all, during the game, a football player needs to make instant decisions in constantly changing circumstances. A football player needs to assess the situation regarding the location of partners and opponents on the field in a fraction of a second, predict the development of further events, and choose the most successful one among a large number of possible actions. Tactical interactions with your partners require spatial thinking, the ability to sense the intentions of your opponents, predict their actions, and choose the right ways of interacting with your partners. That is why, on the one hand, the training of young football players requires an integrated approach to the physical, technical and tactical training of players. And tactical training requires the development of cognitive abilities. On the other hand, football in itself is a means of comprehensive development of motor and cognitive abilities. This is evidenced by the studies of various authors [4–6].

As an example, we can cite the work of Pavlovic, Siryi [6]. The authors rightly point out that the development of both intelligence and physical qualities is important for children. But where can a child find time for various activities? Among teachers of theoretical subjects, there is also an opinion that playing sports, in particular, football, does not contribute to the development of intelligence. The authors proved that football lessons, especially accompanied by various quizzes and celebrations of football knowledge, have a good effect not only on the development of physical qualities, but also on the development of intellectual abilities. In this way, the popular opinion that football players cannot study well was refuted.

Studies [1–5] show that there is a relationship between indicators of motor and cognitive development of football players. That is, players who are distinguished by a better level of physical fitness and technical skill also have better indicators of the development of psychophysiological abilities, in particular, the ability to switch attention, to concentrate, short-term memory, speed of choice reaction, etc. [7–9]. It should be noted that cognitive abilities have different aspects of manifestation: intellectual, psychophysiological, emotional, sensory and others. The intellectual aspect involves the level of development of short-term memory, concentration and attention switching [7, 8]. The psychophysiological aspect involves the development of the speed of a simple and complex reaction, registered both in the standard mode and in modes with feedback (the faster the reaction, the faster the next signal appears), the accuracy of perception of time intervals [9–13]. The sensory aspect involves accuracy in differentiating efforts, controlling movements in space, spatial and target accuracy, as well as such specific feelings as “feeling the ball”, “feeling the field”, “feeling partners”, “feeling opponents”, etc. [9, 14–16].

Based on the above, it can be noted that the current level of football development requires the combined development of physical fitness and various cognitive aspects. But solving this problem has certain difficulties in the organization of the training process. After all, the volume and intensity of loads cannot increase indefinitely [17–19]. This especially applies to young football players, whose body is still growing, and therefore spends energy on plastic processes [17, 18]. That is why the development and application of technologies that combine the development of motor skills and various aspects of cognition are needed.

These provisions relate to the development of football throughout the world. But for Ukraine at the current stage, technologies that, in addition to efficiency, are also convenient, affordable, and quite simple to use are of particular relevance. The accessibility of the technology is determined by the equipment it provides: it should not be too bulky and should be affordable to secondary schools and children’s and youth sports schools. After all, Ukraine is currently in a difficult economic situation due to the war, the consequences of which will be difficult to eliminate, and it will take a long time. Ease of use implies that any football coach and secondary school teacher could understand it and use it in their practice [18, 20–24]. The technology could also be used by young football players in independent work [25–30].

Purpose: on the basis of the analysis of modern scientific literature, to determine the most effective, accessible, easy-to-use technologies for the integral development of motor and cognitive abilities of young football players in the modern realities of Ukraine.

Material and methods

Selection criteria

Internet platforms Scopus, Web of Science, PubMed were used to select articles for analysis of the effectiveness of various technologies for the combined development of motor and cognitive abilities of young football players. Articles were searched using the keywords “football”, “football players”, “physical fitness”, “motor skills.”
“psychophysiological capabilities”, “nervous system”, “cognitive capabilities”, “intelligence”, “sport”. Initially, the word “football” or “sport”. If the word “sport” was entered for the initial search, then clarification was carried out using the word “football”.

At the next stage, the words: “physical fitness”, “motor skills”, “psychophysiological capabilities”, “nervous system”, “cognitive capabilities”, “intelligence” were introduced one by one for clarification. For the selection of articles, the preferences were for publications of categories Q1-Q3 for the years 2020-2023. Also, preference was given to randomized control studies in which a reliable effect of the applied technologies on both motor and cognitive abilities was found at a significance level of less than 0.05.

Based on the articles selected in this way, an analysis of the technologies of integral development of cognitive and motor skills of young football players was carried out. The technologies had to meet the following criteria: efficiency (the level of significance of the influence of technologies on the studied aspects had to be less than 0.05); integrality of influence (the technology proposed by the authors should have a reliable effect on both the cognitive and motor development of young football players), accessibility (the technology should not involve the use of equipment that was very expensive or very difficult to use), ease of use (the technology could be assimilated by a regular football coach and/or physical education teacher at school.

**Stages of selection**

First, the research topic was analyzed. If it met the purpose of our research, then the abstract of this article was analyzed. If the abstract met the purpose of our study, the text of the paper was analyzed. When analyzing the text of the work, attention was paid to the level of evidence of technologies in randomized control studies with a significance level of less than 0.05. Attention was also paid to the availability and ease of use of the technologies proposed in the articles. The availability of technologies was determined by the equipment that the technology provided. If it was too cumbersome, then such technology was discarded from further analysis. Also, the equipment proposed in the article should have been quite affordable for Ukrainian sports and secondary schools. Another criterion for the selection of technologies was its ease of use, that is, any football coach and secondary school teacher could understand it and use it in their practice. The technology could also be used by young football players in independent work.

**Results**

As a result of the search for literary sources on the topic of the integral influence on the motor and cognitive abilities of young football players, 4360 sources were selected using the keyword “football”, from which, after clarification, the keywords “physical fitness”, “motor abilities”, “psychophysiological capabilities” were selected. “nervous system”, “cognitive abilities”, “intelligence” 143 sources were selected, from which 30 sources were identified for analysis. Of these sources, 6 reflect the relationship between psychophysiological and intellectual aspects of cognitive abilities and motor readiness [1–6], 4 sources reflect the development of the aspect of movement perception [7–10], and 20 articles are devoted to technologies and methods for the development of motor readiness with combined influence on various aspects of cognitive abilities [11–30] (Table 1).

Further analysis of literary sources according to the parameters of effectiveness, accessibility and ease of application of technologies for the integral development of motor and cognitive abilities made it possible to highlight the following: 1 - the technology of using balls of different sizes for the development of accuracy of movements in combination with performing exercises with balls from various sports and for exercises with balls to develop attention, speed of mental processes, reaction and ability to concentrate; 2 – the technology of developing “feeling of the ball” to combine the impact on the aspect of perception in cognitive abilities and accuracy of movements; 3 - the technology of using plyometric exercises in water for the integral development of the ability to control the body in space and speed-power abilities. The use of football as a means of integral influence on the development of cognitive and motor abilities was also highlighted separately.

As a result of the search for literary sources on the topic of the integral influence on the motor and cognitive abilities of young football players, 4360 sources were selected using the keyword “football”, from which, after clarification, the keywords “physical fitness”, “motor abilities”, “psychophysiological capabilities” were selected. “nervous system”, “cognitive abilities”, “intelligence” 143 sources were selected, from which 30 sources were identified for analysis. Of these sources, 6 reflect the relationship between psychophysiological and intellectual aspects of cognitive abilities and motor readiness [1–6], 4 sources reflect the development of the aspect of movement perception [7–10], and 20 articles are devoted to technologies and methods for the development of motor readiness with combined influence on various aspects of cognitive abilities [11–30] (Table 1).

Further analysis of literary sources according to the parameters of effectiveness, accessibility and ease of application of technologies for the integral development of motor and cognitive abilities made it possible to highlight the following: 1 - the technology of using balls of different sizes for the development of accuracy of movements in combination with performing exercises with balls from various sports and for exercises with balls to develop attention, speed of mental processes, reaction and ability to concentrate; 2 – the technology of developing “feeling of the ball” to combine the impact on the aspect of perception in cognitive abilities and accuracy of movements; 3 - the technology of using plyometric exercises in water for the integral development of the ability to control the body in space and speed-power abilities. The use of football as a means of integral influence on the development of cognitive and motor abilities was also highlighted separately.

In the study of Kanishchev, et.all [17], a method of developing the accuracy of target movements was developed using special exercises with balls of different sizes and weights. The authors hypothesized that at the initial stage of learning, the activation of brain structures that are responsible for the accuracy of movements will have a complex effect on the effectiveness of any actions. And therefore, for the development of accuracy as a complex psychomotor quality, it will be effective to use a wide variety of exercises with objects. For football players, these are exercises with balls from various sports in combination with exercises for attention and balance. And this method will be more effective in comparison with the method that uses only football exercises, and will affect not only the results of accurate actions, but also psychophysiological indicators and indicators of technical and physical readiness.

The purpose of this study was to determine

**Results**

As a result of the search for literary sources on the topic of the integral influence on the motor and cognitive abilities of young football players, 4360 sources were selected using the keyword “football”, from which, after clarification, the keywords “physical fitness”, “motor abilities”, “psychophysiological capabilities” were selected. “nervous system”, “cognitive abilities”, “intelligence” 143 sources were selected, from which 30 sources were identified for analysis. Of these sources, 6 reflect the relationship between psychophysiological and intellectual aspects of cognitive abilities and motor readiness [1–6], 4 sources reflect the development of the aspect of movement perception [7–10], and 20 articles are devoted to technologies and methods for the development of motor readiness with combined influence on various aspects of cognitive abilities [11–30] (Table 1).

Further analysis of literary sources according to the parameters of effectiveness, accessibility and ease of application of technologies for the integral development of motor and cognitive abilities made it possible to highlight the following: 1 - the technology of using balls of different sizes for the development of accuracy of movements in combination with performing exercises with balls from various sports and for exercises with balls to develop attention, speed of mental processes, reaction and ability to concentrate; 2 – the technology of developing “feeling of the ball” to combine the impact on the aspect of perception in cognitive abilities and accuracy of movements; 3 - the technology of using plyometric exercises in water for the integral development of the ability to control the body in space and speed-power abilities. The use of football as a means of integral influence on the development of cognitive and motor abilities was also highlighted separately.
the impact of special precision-targeted exercises on the level and interrelationship of psychophysiological indicators, physical and technical preparedness of young football players. 22 young football players aged 10-12 took part in the study. The subjects were divided into two groups (control and experimental) of 11 people each.

To substantiate the developed technology, the authors used the following tests: a test on the accuracy of hitting the goal, an accuracy-coordination test, tests on the level of physical fitness, research on the level of attention according to the Gorbov method and the Schulte test. The statistical analysis involved the analysis of the effectiveness of the application of the developed technology according to the Student’s method.

The technology consisted in the fact that in the experimental group, in the main part of the lesson, the technique of complex development of precision-targeted movements was used. Additional exercises were included in the training, in particular, simultaneous performance of exercises with a soccer ball and with balls from other sports, juggling with legs and hands with balls of different sizes and weights, exercises with a ball in combination with exercises on attention, balance exercises and others. A feature of the technique was the combination of the spatial level of movement control with the subject level, which is related to consciousness, and with the basic level, which is responsible for muscle tone and synergy in the work of various muscle groups [17].

According to the results of pre-experimental testing, the control and experimental groups did not reliably differ from each other. Testing after 4 months of the experiment showed the presence of reliable differences between the control and experimental groups in terms of movement accuracy. A positive effect of the use of technology on the psychophysiological indicators of athletes was also revealed. An intragroup comparison also showed a significant improvement in the results of the physical and technical fitness of the athletes of the experimental group. For the control group, only a tendency to improve test results is characteristic, the changes are not reliable or reliable at a lower level of significance.

Table 1
Reflection of the problem of integral development of motor and cognitive abilities of young football players in modern scientific literature

<table>
<thead>
<tr>
<th>Analyzed problem</th>
<th>Authors</th>
<th>The results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Football as a means of integral development of motor and cognitive abilities</td>
<td>Pavlović, Siryi [6]</td>
<td>Football comprehensively affects the development of the level of physical fitness and cognitive abilities.</td>
</tr>
<tr>
<td>The relationship between cognitive and motor aspects in football</td>
<td>Cieślicka, et. all; Kraynik, et. all; Kostiukevych, et. all; Kozina, et. all; de Lima Pinto, et. all [1–6]</td>
<td>Motor and cognitive abilities of young football players have a relationship (r=0.5 - 0.7; p&lt;0.05).</td>
</tr>
<tr>
<td>Development of aspects of movement perception</td>
<td>Sobko, et. all; Kozina, et. all; Kozina, Ishchenko, et. all; Hryuchenko, et. all [7–10]</td>
<td>Different aspects of movement perception, i.e. special sensations (&quot;sense of the ball&quot;, &quot;sense of the field&quot;, &quot;sense of partners&quot; and others) reliably (p&lt;0.05) affect the technical skill of the players</td>
</tr>
<tr>
<td>Technologies for the development of motor readiness with a combined effect on various aspects of cognitive abilities</td>
<td>Peker, et. all; Merlin, et. all; Coito, et. all; Coito, et. all; Crossley, et. all; Nuccio, et. all; Pedrazzini, et. all; Kanishchev, et. all; Kozina, et. all; Chomani, et. all; Adi-Prasetya, et. all; Fiorilli, et. all; Grassi, et. all; Raya-González, et. all; Beaudouin, et. all; Colosio, et. all; Knudsen, et. all; Rommers, et. all; Latorre, et. all; Hart, et. all; Hadlow, et. all [11–13]</td>
<td>Quality of cognitive activity depends on the speed of impulses that pass through the structures of the brain. That is why psychophysiological capabilities are also an important component of cognitive abilities.</td>
</tr>
<tr>
<td>Technologies that, in terms of efficiency, availability, and ease of use, correspond to the modern realities of Ukraine</td>
<td>Kanishchev, et. all [17]; Hryuchenko, et. all [10]; Chomani, et. all [19]</td>
<td>Significant (p&lt;0.05) influence on various aspects of cognitive abilities and the level of physical fitness of football players</td>
</tr>
</tbody>
</table>
After the experiment, the number of reliable relationships between indicators of psychophysiological functions and indicators of technical and physical readiness in the experimental group increased to 10. In the control group, the number of reliable relationships between these indicators remained at the pre-experimental level (5 relationships). This testifies to the comprehensive impact of our methodology on the entire body of athletes and on several levels of movement control.

The application of the experimental method of developing the accuracy of target movements had a positive effect on the level of technical and physical preparation, as well as on the structure of the complex preparation of athletes. Subjects of the experimental group showed a reliable improvement in the technical indicators of football due to the development of the accuracy of target movements. A significant improvement in the results of the physical and technical preparation of the athletes of the experimental group was revealed: "Test on the accuracy of shots on the goal, number", p<0.01; "Coordination accuracy test, s", p<0.01; "Flexion-extension of the arms in a lying position", p<0.01; "Squat", p<0.05; "Flexion-extension of the arms in a lying position", p<0.01; "Squat", p<0.05. The control group was also characterized by a significantly more correlation coefficient by the results of testing on the level of technical and physical preparation, but not reliably or at a low level of significance. For technical readiness and psychophysiological indicators, the presence of significant differences between the control and experimental groups was revealed (p<0.05).

The positive influence of the application of the method of complex development of the accuracy of target movements on the psychophysiological indicators of athletes is shown. There was a significant improvement in the psychophysiological functioning of the experimental group according to the indicators "Schulte table, working capacity" (p<0.001), "Gorbov's red and black table, errors in work according to table 1" (p<0.01) and "Gorbov's red and black table, errors in work according to table 2" (p<0.001). After the experiment, the number of reliable relationships between indicators of psychophysiological functioning and indicators of technical and physical preparedness increased from 5 to 10 in the experimental group. In the control group, the number of reliable relationships between these indicators remained at the pre-experimental level (5 relationships) [17].

Another technology that can be applied in the modern realities of Ukraine is the technology proposed by Hrynchenko et.al. [10], for the development of the "feel for the ball". Another technology that can be applied in modern Ukrainian realities is the "ball feel" training technology proposed by Grinchenko et al. The purpose of the study was to develop and experimentally substantiate the technique of technical training of 8-9-year-old football boys based on the formation of "feel of the ball". 36 football players aged 8-9 years old (18 boys of the control group and 18 boys of the experimental group) with a two-year experience in football took part in the study. The peculiarities of the experimental methodology were that, firstly, the preparatory part of the classes included a set of special exercises on the spot; secondly, at each lesson, young football players practiced juggling with a ball of reduced weight and size; thirdly, in the main part of the classes, the "ball in the net" technique was practiced experimentally. Thirdly, in the main part of the classes, experimental training was conducted using the "ball in the net" device.

The application of the technique of technical training for boys aged 8-9, based on the formation of a developed "feel for the ball", contributes to the improvement of the quality of assimilation of the main technical techniques of the game and is a means of their implementation in the conditions of various combinations, movements and interactions with teammates. The results of the study showed that the differences between the control and experimental groups were statistically significant for all tests characterizing technical readiness (p < 0.05). The author's experimental method of developing the "feel for the ball" in young football players aged 8-9 includes the technique of dribbling, passing and hitting the ball. Techniques of dribbling, passing and hitting the ball, including repeated practice of the player's contact with the ball. Juggling exercises with a ball of reduced weight and size, as well as the use of a training device called "ball in a net" [10], are introduced into the educational and training process according to the authors' methodology.

In the work of Chomani et.al, an interesting technology for the development of speed and strength abilities of young football players using plyometric exercises performed in water is also proposed. The authors determined the effect of water plyometric training on such components of sports performance as explosive power, dexterity and speed in young football players. Develop practical recommendations for building a training process to improve athletes' sports results. When dividing athletes into groups, the
method of parallel randomization was used to create experimental and control groups of 20 athletes each (age 16.25 ± 1.0 years, height 168 ± 3.0 cm, weight 61.03 ± 4.0 kg). The duration of the experimental program was two months. The experimental group underwent an aquatic plyometric training (APT) program, while the control group underwent a land plyometric training (LPT) program.

In the experimental group, jumps in height and length increased by 21.05% and 8.84%, respectively. Agility also significantly increased by 9.35% in the experimental group at a significance level of less than 0.05, t-value = 7.19. Agility as a physical ability combines many other physical abilities such as speed, strength and power. The experimental group also showed a significant increase in speed by 12.50% at a significance level of less than 0.05 [19].

Plyometric training in water improved leg strength in soccer players, increasing vertical and horizontal jumps by 21.05% and 8.84%, respectively. In addition, the two-month training program resulted in a 9.35% increase in agility and a 12.50% increase in speed.

**Discussion**

Thus, the goal of the study was achieved, since as a result of the literature review, technologies for the integral development of motor and cognitive abilities of young football players were selected, which meet the requirements of efficiency, access portability and ease of use. These technologies can be used in the work practice of modern Ukrainian football coaches and physical education teachers. The first technology consists of using balls of different weights and sizes for juggling, dribbling, throwing and hitting for accuracy. The technology also includes attention exercises that are performed while working with the balls. This contributes to the development of intellectual, psychophysiological, sensory aspects of cognitive abilities in combination with the development of physical qualities and technical skills. Also, this technology is quite affordable, as it does not require bulky equipment and large expenditures of funds for its implementation.

The second technology, which was selected based on the analysis of literary sources, is the development of "ball feeling" through the activation of the sensory aspect of the cognitive abilities of young football players. This technology also includes ball juggling, namely keeping the ball on the foot, dribbling the ball, various types of ball passes, dribbling and other exercises. The sensory aspect is an important element of cognition, as it ensures an adequate perception of the world, in particular, - technical and tactical actions in football. First, a person receives signals from the environment through the senses, that is, vision, hearing, kinesthetic and tactile sensations. Then these signals are analyzed by the brain, and as a result, a person makes a decision. That is why the sensory aspect of cognition is an important element of intellectual and creative activity.

Also, the quality of cognitive activity depends on the speed of impulses that pass through the structures of the brain. That is why psychophysiological capabilities are also an important component of cognitive abilities. In addition, the level of concentration and switching of attention is a reflection of the intellectual aspect of cognitive abilities, and therefore this aspect is also important for the formation and manifestation of cognition. All these aspects are involved in the technology proposed by Kanishchev, et al. [17].

The sensory aspect is most pronounced in the technology proposed by Hryncenko, et. al [10], because the feeling of the ball is basic for the successful development and realization of the technical skills of the players. In addition, the sense of the ball is also a result of the development of technical skills of young football players.

The technology of using plyometric exercises in water [19] also comprehensively develops motor and cognitive abilities due to the unusual use of plyometric exercises aimed at the development of jumping. The usual application of plyometric exercises, that is, jumps immediately after jumping from a surface with a height of approximately 60 cm, involves performing jumps on the ground. Performing these exercises in water, the authors suggest, not only develops leg strength, but also activates the sensory aspect of cognitive abilities through performing unusual movements.

**Conclusions**

1. As a result of the search for literary sources on the topic of integral influence on the motor and cognitive abilities of young football players, 4,360 sources were selected using the keyword "football", from which, after clarification,
the keywords "physical fitness", "motor abilities", "psychophysiological capabilities ", "nervous system", "cognitive abilities", "intelligence". 143 sources were selected, of which 30 sources were identified for analysis. Of these sources, 6 reflect the relationship between psychophysiological and intellectual aspects of cognitive abilities and motor readiness, 4 sources reflect the development of the aspect of movement perception, and 20 articles are devoted to technologies and methods for the development of motor readiness with a combined effect on various aspects of cognitive abilities.

2. The analysis of literary sources according to the parameters of efficiency, accessibility and simplicity in the application of technologies for the integral development of motor and cognitive abilities allowed us to highlight the following: 1 – the technology of using balls of different sizes to develop the accuracy of movements in combination with performing exercises with balls of different types sports and ball exercises for the development of attention, speed of mental processes, reaction and ability to concentrate; 2 – the technology of developing "feeling of the ball" to combine the impact on the aspect of perception in cognitive abilities and accuracy of movements; 3 - the technology of using plyometric exercises in water for the integral development of the ability to control the body in space and speed-power abilities. The use of football as a means of integral influence on the development of cognitive and motor abilities was also highlighted separately.

Conflict of interest

The authors declare that they have no conflict of interest.

References


2. Kraynik Y, Mulyk V, Okun D. Relationship between quantitative indicators of motor actions and technical and tactical indicators in young football players 13-14 years of different playing roles. Health, Sport, Rehabilitation. 2019;5(4):41-47. https://doi.org/10.34142/HSR.2019.05.04.05


12. Merlin M, Cunha SA, Moura FA, Torres RDS, Gonçalves B, Sampaio J. Exploring the determinants


Information about the authors

Zhanneta Kozina
zhanneta.kozina@gmail.com
http://orcid.org/0000-0001-5588-4825
H.S. Skovoroda Kharkiv National Pedagogical University
Altchvskyh str., 29, Kharkiv, Ukraine

Oleksiy Vasyutin
matlaevvitalik8@gmail.com
https://orcid.org/0009-0001-9606-3051
H.S. Skovoroda Kharkiv National Pedagogical University
Altchvskyh str., 29, Kharkiv, Ukraine

Valery Ganin
matlaevvitalik8@gmail.com
https://orcid.org/0009-0001-9606-3051
H.S. Skovoroda Kharkiv National Pedagogical University
Altchvskyh str., 29, Kharkiv, Ukraine

Ruslan Martynenko
matlaevvitalik8@gmail.com
https://orcid.org/0009-0001-9606-3051
H.S. Skovoroda Kharkiv National Pedagogical University
Altchvskyh str., 29, Kharkiv, Ukraine

Dmytro Orohchenko
matlaevvitalik8@gmail.com
https://orcid.org/0009-0001-9606-3051
H.S. Skovoroda Kharkiv National Pedagogical University
Altchvskyh str., 29, Kharkiv, Ukraine

Bohdan Borodin
matlaevvitalik8@gmail.com
https://orcid.org/0009-0001-9606-3051
H.S. Skovoroda Kharkiv National Pedagogical University
Altchvskyh str., 29, Kharkiv, Ukraine

Maksym Zhylin
matlaevvitalik8@gmail.com
https://orcid.org/0009-0001-9606-3051
H.S. Skovoroda Kharkiv National Pedagogical University
Altchvskyh str., 29, Kharkiv, Ukraine

Інформація про авторів

Жаннета Козіна
zhanneta.kozina@gmail.com
http://orcid.org/0000-0001-5588-4825
Харківський національний педагогічний університет імені Г.С. Сковороди вул. Алчевських 29, Харків, 61002, Україна
Олексій Васютін
matlaevvitalik8@gmail.com
https://orcid.org/0009-0001-9606-3051
Харківський національний педагогічний університет імені Г.С. Сковороди
вул. Алчевських 29, Харків, 61002, Україна

Валерій Ганін
matlaevvitalik8@gmail.com
https://orcid.org/0009-0001-9606-3051
Харківський національний педагогічний університет імені Г.С. Сковороди
вул. Алчевських 29, Харків, 61002, Україна

Руслан Мартиненко
matlaevvitalik8@gmail.com
https://orcid.org/0009-0001-9606-3051
Харківський національний педагогічний університет імені Г.С. Сковороди
вул. Алчевських 29, Харків, 61002, Україна

Дмитро Оробченко
matlaevvitalik8@gmail.com
https://orcid.org/0009-0001-9606-3051
Харківський національний педагогічний університет імені Г.С. Сковороди
вул. Алчевських 29, Харків, 61002, Україна

Богдан Бородін
matlaevvitalik8@gmail.com
https://orcid.org/0009-0001-9606-3051
Харківський національний педагогічний університет імені Г.С. Сковороди
вул. Алчевських 29, Харків, 61002, Україна

Максим Жилін
matlaevvitalik8@gmail.com
https://orcid.org/0009-0001-9606-3051
Харківський національний педагогічний університет імені Г.С. Сковороди
вул. Алчевських 29, Харків, 61002, Україна

This work is licensed under a Creative Commons Attribution 4.0 International License (CC BY 4.0)

Received: 2023-06-28        Accepted: 2023-07-22        In press: 2023-10-02        Published: 2023-10-25