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THE DEVELOPMENT OF THE REACTION IN CHILDREN WHO ARE ENGAGED IN FOOTBALL TAKING INTO ACCOUNT THEIR NERVOUS SYSTEM

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ABSTRACT

In this study, we investigated the effect of typological peculiarities of manifestations of properties of the nervous system of young football players the ability to react quickly. 32 young football players of 10-11 years participated in the pedagogical experiment. 16 athletes were engaged in experimental methodic which is based on using the same exercise and methods development of the ability to react quickly, but different components of the load, for players with a strong nervous system (8 people), the load was intensive, but for players with a weak nervous system (8 persons) - volumetric load. The other 16 football players made up the control group. For 8 months of the experiment there was a significant increase in the ability to react quickly football players 10-11 years old in the experimental group, which was engaged in by a special methodic. The football players with a strong nervous system indicator has improved from 251.4 ± 4.6 cm to 231.4 ± 5.9 cm (P<0.05), and football players with a weak nervous system – from 252.9 ± 4.2 cm to 234.3 ± 8.1 cm (P<0.05). In the control group also occurred the positive, but not significant changes (P> 0.05). The study proved the effectiveness of the use of the typological properties of the nervous system as a differentiated method of developing the ability to react quickly of young football players. This approach allows to improve the quality of the training process of young athletes.

Key words: Typology. Football players. Nervous system. Differentiated approach.

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RESUMO

O desenvolvimento da reação em crianças que estão envolvidas no futebol levando em conta o sistema nervoso

Neste estudo, nós investigamos o efeito das peculiaridades tipológicas de manifestações de propriedades do sistema nervoso de jovens jogadores de futebol a capacidade de reagir rapidamente. 32 jovens jogadores de futebol de 10-11 anos, participaram na experiência pedagógica. 16 atletas foram contratados experimental metódica, que é baseado no uso de um mesmo exercício e métodos de desenvolvimento da capacidade de reagir rapidamente, mas diferentes componentes da carga, para os jogadores com um forte sistema nervoso (8 pessoas), a carga foi intenso, mas, para os jogadores com um fraco sistema nervoso (8 pessoas) - volumétrica de carga. Os outros 16 jogadores de futebol compõem o grupo de controle. Durante 8 meses do experimento, houve um aumento significativo na capacidade de reagir rapidamente os jogadores de futebol 10-11 anos de idade no grupo experimental, o qual foi contratada, em especial metódica. Os jogadores de futebol com um forte sistema nervoso indicador melhorou de 251,4 ± 4,6 cm para 231,4 ± 5,9 cm (P<0,05), e os jogadores de futebol com um fraco sistema nervoso – a partir de 252,9 ± 4,2 cm para 234,3 ± 8,1 cm (P<0,05). No grupo de controlo também ocorreu o positivo, mas não alterações significativas (P> 0,05). O estudo comprovou a eficácia da utilização do tipológicas propriedades do sistema nervoso como um método diferenciado de desenvolver a capacidade de reagir rapidamente de jovens jogadores de futebol. Esta abordagem permite melhorar a qualidade do processo de formação de jovens atletas.

Palavras-chave: Tipologia. Jogadores de Futebol. Sistema Nervoso. Abordagem Diferenciada.

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INTRODUCTION

Football is the most popular sport in the world. Everyone plays football, on an amateur and professional level. In order to become a great football player must be engaged from childhood. The general level of training of a football player consists of such factors as his technical training, physical training, theoretical knowledge, tactical thinking and some other types of training.

One of the most important types of training for a football player, especially at a young age, is his technical level of preparation. The technique of the athlete is the level of development of coordination abilities (Jaakkola and collaborators, 2017; Oskolkov and Kshinin, 2011).

On how much the coordination abilities of the sportsman depends successful mastery of technical techniques by the player. (Boichenko and collaborators, 2003; Grigoryan, 2009; Witkowski, 2003).

Each sport has its own characteristics, that is, its specificity. In football, the basic coordination abilities are the foundation for the development of specific coordination abilities. However, the specific coordination abilities make up the technical feature of the sport chosen by the sportsman.

In the modern literature there are a number of classifications of specific coordination abilities, one of the most popular classifications is the classification proposed by Hirtz and Lyakh. In all the classifications of specific coordination abilities studied by us, the authors unanimously sing out the ability to respond (Hirtz, 1985; Lyakh and collaborators, 2002).

Age 10-11 years is the most favorable for the development of children's ability to respond (Feoktistov, 2010; Karpeev, 2008; Petukhov, 2006).

The game of the football players is carried out in the constantly emerging unexpected situations, which require the manifestation of the speed of reaction, the ability to concentrate and switch attention, space-time accuracy (Parmuzina, 2006).

In order to fully reveal and realize the athlete's ability to use an individual approach to training activities. In children's and youth sports, as a rule, this approach is called differentiated.

That is, during the training session, children are divided into groups, taking into account some criterion, for example, in terms of technical training, physical training and some others (Abramov, 2006; Battalov, 2006; Kozhevnikov, 2011).

Criteria for dividing players into groups can be very diverse. However, in our opinion, it is necessary to rely on the typological features of the manifestation of the properties of the nervous system, that is, the strength-weakness indicators of the nervous system in the process of excitation.

This is a new and poorly understood approach in the training activity of athletes. The use of typology in the training process was studied on athletes - in basketball (Lubkin, 2004; Makarov and Hussain, 2011), gymnastics (Krivoshchekova, 2005), table tennis (Voronin, 2007), sprint track and field athletes (Kostyunina and collaborators, 2010).

In all the studies listed above, the effectiveness of the typological criterion was proved. At the same time, we were unable to find studies on football players, the preparation of which is carried out based on the difference in the properties of the nervous system.

The aim of the study is to improve the technical training of athletes engaged in football, using a differentiated approach based on typological features of the manifestation of the properties of the nervous system due to the development of the ability to respond.

The hypothesis of the study is the assumption that the experimental differentiated method of developing the ability to respond, based on the type of nervous system of players will increase the technical training of young football players.

Objectives of the study

1. Determine the level of development of the ability to respond to a moving object from football players of 10-11 years.
2. Develop an experimental methodology for developing the ability to respond, based on the typology of the nervous system.
3. To study the influence of the experimental methodology on the level of technical training of football players 10-11 years old.

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MATERIAL AND METHODS

Theoretical and empirical methods were used to implement the hypothesis.

1. Theoretical methods - the analysis of literature, the study of materials on the problem being studied, the study of the training system for young football players.

2. Empirical methods:

a) Basic pedagogical experiment - determination of the strength of the nervous system (Raigorodskiy, 2001), determination of the level of development of the ability to respond quickly (Hirtz, 1985);

b) Methods of mathematical statistics (Paramonov, 2011; Zheleznyak, 2002).

The basis for the study was sports school № 5 in Kirov.

The study was conducted in five interrelated and sequential stages:

1. Theoretical analysis and generalization of literary sources.

2. Definition of the object, the object, the goal, the hypothesis of the study. Determination of tests that determine the main indicators in the study.

3. Development of an experimental differentiated methodology based on the typology of young players.

4. Carrying out the pedagogical experiment. Processing of results.

5. Evaluation of the effectiveness of the experimental methodology, the formulation of conclusions.

Criteria for evaluating the effectiveness of the methodic

The strength of the nervous system of players was determined by the method of "Tapping-test"

Sheet A4 is divided into six arranged three in a row of equal squares, according to the signal, the players begin to put dots in each rectangle. For the allotted time for each rectangle (5 s), you need to put as many dots in it as possible. You can move from one rectangle to another by command only.

All work is done at the maximum rate, after the sixth rectangle the exercise ends. Result: count the number of points in each rectangle, build a work schedule. Based on the analysis of the shape of the curve, diagnose the type of strength of the nervous system. (Raigorodskiy, 2001)

Evaluation of the ability to quickly respond to the subject was carried out by a special exercise "stop rolling the ball with your foot."

Two gymnastic benches with a marking of 5 cm are attached by one side to the gymnastic staircase at a height of 1 m from the floor at a distance of 5 cm from each other. A soccer ball is set up above. At the signal the ball is released down the bench. A football player in 4 m stands with his back to the bench, at the signal turns and runs to the ball. You need to touch the ball as fast as possible with any foot (foot). The result is accurate to within 5 cm (Hirtz, 1985).

In addition to the basic test for determining the level of development of reaction speed, the result of a friendly match that was played before the experiment and after the experiment between the control group (CG) and the experimental group (EG) was taken into account.

The essence of the experiment was to use different loads to develop the ability to respond to the subject in players with different strengths of the nervous system.

Description of the experiment

In total, 32 football players of 10-11 years took part in the experiment. Prior to the experiment, the players were divided into KG and EG by random sampling (Afanasiev, 2007). Each group had the same number of players with a strong and weak nervous system in the process of excitation.

During the training year, the CG players were engaged in the regular program (Godik, 2011), and the players in the EG were engaged in an experimental methodic. In football training in EG, a differentiated approach based on the typology of the nervous system was used. During the experiment, 138 training sessions were conducted for 90 minutes each training session.

Mathematical and statistical processing of the experimental results was carried out using the parametric criterion (t-student) (Paramonov, 2011; Zheleznyak, 2002), used by Microsoft Excel 2007. Correlation analysis was performed using the Bio Stat 2009 program. The result was significant at a value of P> 0.05.

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Feature of training in EG:

1. After a short warm-up, the players of the EG performed exercises for 20 minutes on the development of reaction speed in different subgroups (strong and weak nervous system. Starts from different positions on the signal, blows on the ball in the air after the ball is dropped from the hands, passing through the wall, game "numbers", catching the ball from several partners, run with speed change, a game of passing with a partner with a mandatory change of beating legs, juggling low and high flying balls and many others (Lyakh and Witkovski, 2010).

2. The main methods of developing the reaction were repeated, varied, playing and competitive methods (Holodov and Khuznetsov, 2009; Khuramshin, 2007).

3. The main methodical admission were - the introduction of new exercises or the complication of old exercises, changing the speed of the exercise and the introduction of new targets (Holodov and Khuznetsov, 2009; Khuramshin, 2007).

4. The main difference in the training of players with a strong and weak nervous system were the load components. The load for players with a strong nervous system was intense, and for players with a weak nervous system - a voluminous.

The intensity of the load increased by increasing the number of exercises and reducing rest, and the volume increased due to the increase in the number of repetitions and rest intervals.

The intensity of the exercise is 150-170 beats per minute in both groups.

The duration of the exercise for players with a strong nervous system 20-30 seconds, weak 30-40 seconds.

In both subgroups, the rest-time lasted until complete recovery; the character of the rest-time was passive.

The number of repetitions of one exercise for football players with a strong nervous system 3-5 times, and for a weak one - 4-6 times. The number of series for strong 6-8, and for weak - 7-10.

RESULTS

After the KG and EG were formed, a friendly match was played between them. Which showed an objective level of possession of the technical skills of young players. The meeting ended with a score of 2-2. Also, before the beginning of the pedagogical experiment, all the players passed a control test "stop rolling the ball with the foot," which shows the level of development of the speed of reaction to a moving object (ball). There were no significant and significant differences between the indices of soccer players of CG and EG and within the groups (P> 0.05).

The results in the test "Stop rolling the ball with a foot" (from 251.4 to 257.1 cm) correspond to the average level of development of the ability to respond (Lyakh and Witkovski 2010)

Indicators of the ability to respond to football players 10-11 are presented in Table 1.

Table 1 - Indicators of the ability to respond to the subject of football players 10-11 years old (M ± m).

Indicators	The strength of the nervous system	KG			EG			P (2-5)
		Before	After	P	Before	After	P	
		1	2	3	4	5	6	
Run to the numbered balls (s)	Strong	16.2 ± 0.5	14.9 ± 0.2	t=2.42 P>0.05	16.2 ± 0.3	15.5 ± 0.3	t=0.62 P>0.05	t=1.30 P>0.05
	Weak	15.8 ± 0.4	14.8 ± 0.5	t=2.35 P>0.05	16.0 ± 0.3	15.6 ± 0.3	t=0.83 P>0.05	t=1.50 P>0.05
		t=0.08 P>0.05	t=0.26 P>0.05	-	t=0.47 P>0.05	t=0.46 P>0.05	-	-

After the experiment was over, positive changes occurred in the test "Stop rolling the ball with my foot".

In KG in football players with a weak and weak nervous system, the indicators improved, but not significantly (P> 0.05).

In football players of the EG with a strong nervous system, the indices improved from 251.4 ± 4.6 to 231.4 ± 5.9 cm (P <0.01), and for players with weak nervous system - from 252.9 ± 4.2 Up to 234.3 ± 8.1 cm (P <0.05). Such indicators correspond to a high

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level of development of the ability to respond for the age of 10-11 years (Lyakh and Witkovski 2010).

After the end of the pedagogical experiment of the boys' team, the EG and KG again played a friendly match among themselves. The game ended with a confident victory of football players EG with a score of 5-0. In the game, the guys from EG looked much faster and more technically than the players from the KG. Such a result allows us to judge the effectiveness of the methodic technique.

DISCUSSION

The importance of general and specific coordination abilities in game sports is very high. Leading role in the development of technical skill in a particular sport, for example, in football, play a specific coordination ability.

For football players, one of the most important specific coordination abilities is the ability to respond (Boichenko and collaborators, 2003; Grigoryan 2009; Jaakkola and collaborators, 2017; Karpeev, 2008; Oskolkov and Kshinin, 2011; Witkowski, 2003).

In sports schools, in the classes with children, a differentiated approach is often used, this approach is based on the individual and personal characteristics of athletes, it allows the effective use of hidden reserves of the body (Abramov, 2006; Battalov, 2006; Kozhevnikov, 2011).

One of the directions of using a differentiated approach is the typological features of the manifestation of the properties of the nervous system. The use of the typological parameter in the training activity of athletes when they were divided into subgroups proved to be effective (Lubkin, 2004; Krivoshchekova, 2005; Makarov and Hussain, 2011; Voronin, 2007; Kostyunina and collaborators, 2010).

The effectiveness of applying a differentiated approach based on typology was confirmed by our research, which was conducted for the first time on football players of 10-11 years.

To date, there are methodic in which the components of the load, tools and methods that are aimed at developing the abilities of athletes with different typologies are briefly described. In our methodology, for the first time in detail, we specified all the parameters of the means, methods and components of the load when performing physical exercises for football players of 10-11 years.

It should also be noted that athletes with a strong nervous system perform a high-intensity load more efficiently, and athletes with a weak nervous system should be given exercises with a more voluminous load (Krivoshchekova, 2005; Kostyunina and collaborators, 2010; Lubkin, 2004; Makarov and Hussain, 2011; Voronin, 2007). Such statements were justified in our method of developing the ability to respond to young players with different typologies.

In the course of the experiment, new results were obtained and specific recommendations were given on working with young players 10-11 years old, who have different typological features of the manifestation of the properties of the nervous system.

CONCLUSION

The experimental technique of differentiated development of the ability to respond to a subject in soccer players aged 10-11 with different types of nervous system had a positive and progressive impact on soccer players EG ($P < 0.01$).

In terms of football players in the KG, who were engaged in the usual method, the results of the ability to respond also improved, but not significantly ($P > 0.01$).

The result of a friendly match, which was played at the end of the pedagogical experiment, can serve as a confirmation of the effectiveness of the experimental methodic.

The victory of the EG over the KG with a score of 5-0 indicates that the footballers of the EG surpassed the players of the CG in all respects, including technical ones.

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