Development of the ability to differentiate the parameters of football players' movements taking into account their typology

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ABSTRACT:
Objective: To investigate the influence of type nervous system on the training of young football players on the ability to differentiation of parameters of movements.
Method: thirty football players, 12-13 years old, participated in study. Fifteen football players were used as the experimental group (EG) to improve the ability to differentiation of parameters of movements. The other 15 players made up the control group (CG). The football players in the EG were divided into groups according to the strength of the nervous system.
Results: After the experiment was a significant increase in the ability to differentiation of parameters of movements in football players in the EG. In football players with a strong nervous system, indicators improved from 4.9±0.7 seconds to 5.1±0.3 seconds (p<0.01), and in football players with a weak nervous system from 5.6±0.6 seconds to 5.9±0.5 seconds (p<0.05). In the control group too, improvement occurred but the changes were not statistically significant (p>0.05).
Conclusion: The study showed the effectiveness of the use of the typological properties of the nervous system as a method of determining the type of training required to improve the ability to differentiation of parameters of movements of young football players.
The relevance of the topic is determined by the search for improvement of the training process for young players, which will increase the ability to kinesthetic differentiation of children and improve their results in football.

KEY WORDS: typology; nervous system; football; differentiated development.

INTRODUCTION

Every four years held the World Cup on football. In 2018, it will take place in Russia. This is important from the point of view of the development of football in the country. In order to achieve high results in adult sports, it is necessary to work hard from childhood. However, the result depends not only on how many years the athlete started playing football, but also on the quality of the training system.

Coordination abilities in the technical training of a football player play a leading role [1, 2]. Specific coordination abilities Pay special attention already from 11 years and older. Specific coordination abilities are the foundation for the technical training of a football player [3].

One of the most important specific coordination abilities in the technical training of players is the ability to kinesthetic differentiation of the parameters of movements [1].
At the age of 10-11 years, children develop intensively kinesthetic coordination abilities. The body of adolescents quickly adjusts to work, this is explained by the great mobility of the nervous processes, and so the warm-up in the classes should take no more than 8-10 minutes [4].

The ability to kinesthetic differentiation of the parameters of movements determines the high accuracy, economy of the spatial, temporal, and strength parameters of the football player's movements [3].

For the development of kinesthetic coordination abilities in young football players, it is better to use specific exercises at the beginning of the main part of the training session for 15-20 minutes [1].

In children's and youth sports, a differentiated approach is often use, it is very important, since with this approach the athlete can realize all the hidden opportunities of his organism [5-7].

In the training activity of athletes under a differentiated approach, one should understand the method of combining athletes into groups taking into account their athletic qualities. And also the use for each group of certain training methods that are adequate to their characteristics (gender, age, temperament, level of fitness) [8].

The criteria for differentiating athletes into groups are diverse. One of the most progressive and effective ways of dividing into groups is the typological criterion [9-11].

The typological criterion refers to the features of the manifestation of the properties of the strength of the nervous system in the process of excitation. The strength of the nervous system is understanding as the working capacity of nerve cells, their ability to endure strong stress and not to fall into an out-of-control inhibition.

Athletes with a weak nervous system, learn quickly the complex technical elements. Persons with a strong nervous system display better in competitive conditions [9].

From the very beginning, athletes with a strong nervous system can work with greater intensity, and athletes with a weak nervous system pass more easily from one task to another [10].

To date, there is an optimal load option for young gymnasts, which includes changing the basic parameters of the load (volume and intensity). In athletes with a weak nervous system, the greatest training effect achieved when using volumetric loading. Athletes with a strong nervous system work more efficiently under conditions of intense stress [11].

The problem is that the effectiveness of the differentiated approach has been proved, the use of typology as a method of differentiation into groups of athletes - there are no studies that pay attention to football players, the development of their coordination of movements taking into account the type of their nervous system.

Thus, the aim of the research is to increase the technical training of football players of 12-13 years with different typologies due to the development of the ability to kinesthetic differentiation of the parameters of movements with different typologies.

The research hypothesis is that the method of differentiated development of kinesthetic coordination abilities of players with different typologies will increase their technical training and competitive result.

To achieve the goals and implementation hypothesis testing, the following tasks were set:

1) determine the level of development of the ability to kinesthetic differentiation of the parameters of movements in young players;
2) develop and apply an experimental methodic;
3) to study the influence of the methodic, which is aimed at improving the technical training of players with different strengths of the nervous system.

METHODS

To test the hypothesis used a variety of methods:
- Theoretical methods: analysis of scientific and methodical literature, studying of materials on the problem, studying existing programs and systems of training of players;
- Empirical methods: pedagogical experiment, including diagnosis of nervous system excitation process [12], the method of assessment the level of development of ability kinesthetic differentiation of the parameters of movements [13], as well as methods of mathematical statistics [14].

The base of the research is sports school - 5 in Kirov.
The study conducted in three stages:
2) Carrying out a pedagogical experiment. Investigation of the effectiveness of the methodology.
3) Analysis of the results of research, conclusions.

The effectiveness of the methodology was assessing by the evaluation criteria:

1) Change of indicators of ability to kinesthetic differentiation of parameters of movements; the score was measure by the test «Kicking the ball into the target».

In the middle of the gymnastic mat there is a gymnastic hoop (diameter 90 cm), and in the middle of the hoop - a medical ball (weight 2 kg). At a distance of 10 m from the mat, a line is
determined, from which the subject performs blows of a soccer ball to the target from the air. The athlete himself tossing the ball, held in his hands.

Both foot and any part of the foot perform the blows. Only 10 hits on the ball.

If you get into the mat, he gets one point, for getting into the hoop - two, for getting the ball in the field between the hoop and the stuffed ball - three points, and for getting into the stuffed ball - four.

Result: the total amount of points scored from ten strokes [13].

2) The result of friendly matches in beginning and at the end of the experiment between the control and experimental group.

The essence of the experiment - is to use different loads to develop the ability to kinesthetic differentiation of the parameters of movements in football players with different strengths of the nervous system.

Structure of the experiment:
1. Organization of control and experimental groups and subgroups in them.
2. Determining the level of development of the ability to kinesthetic differentiation of the parameters of movements [13], the determination of the strength of the nervous system in football players 12-13 years [12].
3. Carrying out the main pedagogical experiment.
   Description of the pedagogical experiment
   1) We used a differentiated approach to players taking into account the strength of their nervous system. Known in football exercises used: juggling the ball low and high, juggling in pairs with changing the distance between partners; juggling with a ball of various weights and sizes; ball strikes on objects located at different distances; jumping forward and back for a certain distance, kicking the ball into the wall in one touch and other exercises.

2) After a warm-up for 30 minutes, the players in the experimental group performed exercises to develop the ability to kinesthetic differentiation of the parameters of movements.

3) Basic methods - repeated, variable, game.

4) Methodical techniques - the introduction of new exercises, the complication of old exercises, changing the speed of the exercise, the introduction of new goals.

5) Load components.

The main feature of the methodic was that players with different nervous systems performed one exercise with different loads. Load, for players with a strong nervous system was more intense, and for players with a weak nervous system was more voluminous.

For players with a strong nervous system, the intensity of the load increased due to: the number of exercises, reducing the rest between exercises and a series of exercises.

For players with a weak nervous system, the volume load increased due to an increase in the number of repetitions and rest intervals.

The intensity of the exercises 140-160 beats per minute, rest time (until complete recovery, pulse 100-120 beats per minute) character of rest (passive). The duration of the exercises for players with a strong nervous system was 1-2 minutes, and the weak - 2-3 minutes.

The number of repetitions of one exercise and the number of episodes in players with a strong nervous system was 5-7 times in the series, and in the case of the weak, 6-8.

In the experiment, 30 players participated in the age of 12-13 years. The equipment of the control and experimental groups carried out by random selection, based on the typology of the nervous system. In the year, 130 lessons were conduct. One lesson lasted 90 minutes.

In the control group (CG) there were football players with weak and strong nervous system. This group was engaged in the usual program for sports schools [15].

In the experimental group (EG) there were football players with a strong and weak nervous system, they were engaged in an experimental methodic.

4. Measurement of indicators after the pedagogical experiment.

5. Statistical and mathematical processing of experimental results. Used parametric criteria (t-student), Microsoft Excel 2007. Was performed correlation analysis using the Bio Stat 2009 program. The result was significant at a value of P > 0.05 [14].

6. Conclusions and practical recommendations were formulated.

**STATISTICAL RESULTS**

Prior to the beginning of the pedagogical experiment between the CG and EG, a control companionable match was held, the meeting ended with a score of 3-2 in favor of the KG team.

Prior to the beginning of the pedagogical experiment in both groups in the test «Kicking the ball into the target» (from 4.9 to 5.6 points), the level of development of the ability to kinesthetic differentiation of the parameters of movements can be characterized as average [3]

There were no significant differences between the groups and subgroups prior to the start of the experiment (P> 0.05).

Changes in the indicators of the ability to kinesthetic differentiation of the parameters of soccer player movements of 12-13 years presented in Table 1.
During the period of the pedagogical experiment, the indicators in the test «Kicking the ball into the target» improved in both groups.

In KG, the indices did not improve significantly (P > 0.05).

In the EG there have been significant changes. The performance of players with a strong nervous system improved to 7.0 ± 0.6 seconds (P < 0.05), and players with a weak nervous system - up to 7.9 ± 0.3 seconds (P < 0.05) To kinesthetic differentiation of the parameters of movements became above average [3].

At the end of the pedagogical experiment, the teams EG and KG again played a friendly match among themselves. This time the EG team was much stronger, which was engaged at the experimental methodic. EG footballers not only won with a score of 4-1, but also looked much more technical than the players from the team KG. This fact undoubtedly confirms the effectiveness of the methodic used.

**Table 1 Changes in the indicators of the ability to kinesthetic differentiation of the parameters of the movements of football players 12-13 years old (M±m)**

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Strength of the nervous system</th>
<th>KG Before</th>
<th>KG After</th>
<th>P</th>
<th>EG Before</th>
<th>EG After</th>
<th>P</th>
<th>P (2-5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kicking the ball into the target</td>
<td>Strong</td>
<td>5,0±0,9</td>
<td>7,0±0,6</td>
<td>t=2,26</td>
<td>4,9±0,7</td>
<td>5,1±0,3</td>
<td>t=0,35</td>
<td>t=2,77</td>
</tr>
<tr>
<td>(Amount of points)</td>
<td>Weak</td>
<td>5,3±1,1</td>
<td>7,9±0,3</td>
<td>P=0,05</td>
<td>5,6±0,6</td>
<td>5,9±0,5</td>
<td>P=0,36</td>
<td>t=3,49</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>t=1,35</td>
<td>P=0,05</td>
<td></td>
<td>t=0,75</td>
<td>P=0,05</td>
<td>P=0,05</td>
</tr>
</tbody>
</table>

**DISCUSSION**

The importance of coordination abilities, namely the ability to kinesthetic differentiation of parameters of movements in sports, including in football, is fully proved by many studies [1-3, 16].

It is also proved that a differentiated approach in the training process plays a huge role in the training of athletes. It allows to reveal their individual qualities, and to increase the result in competitive activity [5-7, 17].

Among the many criteria for dividing players into groups, experts distinguish typological features of manifestations of the properties of the nervous system.

The experiment carried out on football players of 12-13 years confirms the effectiveness of applying the typological criterion used in other sports [9-11, 18].

Undoubtedly, the main realization of the criterion of strength and weakness of the nervous system is different components of the load. For athletes with a strong nervous system, it is intense, and for athletes with a weak nervous system - volumetric [9-11, 18].

This theory was confirmed by the experiment conducted on football players.

It is important to understand that if an athlete has a weak nervous system in the process of excitation, this does not mean that he is weak. This suggests that athletes with a strong and weak nervous system go to the same goal in different ways.

As a result of the experiment, the players of the EG surpassed the athletes from the KG for all indicators, they improved the ability to kinesthetic differentiation of the parameters of movements (P < 0.05) and confidently won a friendly match after the experiment.

In the course of the experiment, new results obtained and specific recommendations were given on working with young players who have different nervous systems.

**CONCLUSION**

The methodic had a positive effect on the level of development of the ability for kinesthetic differentiation of the parameters of the movements of young football players in the EG for players with a strong nervous system and players with a weak nervous system (P < 0.01).
In the KG, the results of test «Kicking the ball into the target» also improved, but their significance was not significant (P> 0.05).

Confident victory of football players EG in the control match over the players from the KG also speaks about the effectiveness of the methodic used.

The direction associated with the typology of athletes is poorly studied. However, the results of athletes in different sports indicate that the direction of the typology of the nervous system in sports is promising [9-11, 18].

Despite the study of the question of coordination abilities, technical training of football players. Despite the fact that the proven effectiveness of differentiation in the training, the effectiveness of the types of nervous system. There are no specific recommendations and studies on football. Of course, this makes the issue relevant.

REFERENCES

