Correction of the Manifestations of Attention Deficit Hyperactivity Disorder in Primary School Children

Anatoly Ivanovich Alifirov

1Department of Physical Education and Sport, professor, Russian State Social University, st. V. Pika 4, Moscow, Russia.

Abstract

Context: Currently, attention deficit hyperactivity disorder remains very common among children. The ongoing attempts to correct this condition, including using an integrated approach through the use of several individually selected method at once, have not yet yielded satisfactory results. In the course of the study, the correctional possibilities of the author’s methodology of teaching chess for children aged 7-9 years with attention deficit hyperactivity disorder were evaluated. The technique turned out to be effective due to the integrated use of multimedia accompaniment and special techniques for switching the attention of children during classes. It is established that the author’s technique helps to reduce the severity of symptoms in children with attention deficit hyperactivity disorder. Semi-annual classes provided in all cases the elimination of existing violations and the achievement in children of a balance of excitation and inhibition in the cerebral cortex during the development of a game of chess according to the author’s method.

Keywords: Attention deficit hyperactivity disorder, learning to play chess, children, primary school age, chess, inclusive education.

Introduction

Living organisms inhabiting the planet, despite the serious successes of modern science, remain heavily burdened by various pathologies1. This is equally true for wildlife, productive animals2 and humans3. Despite the increased attention of science and practice of medicine to humans, significant pathological burden still remains at all ages and in all countries4. It significantly reduces the quality of life and can shorten its upcoming duration5. One of the most common pathological conditions in the children’s population remains attention deficit hyperactivity disorder. The frequency of this syndrome in children reaches 18%. Its main symptoms are impaired attention and impulsiveness due to a lack of control over behavior. In the absence of adequate treatment, attention deficit hyperactivity disorder subsequently leads to a violation of social and emotional development and often to associative behavior6.

Modern science is actively seeking approaches to the correction of attention deficit hyperactivity disorder. To achieve a good effect in such children, it is customary to use an integrated approach to correction through the use of several individually selected method at once7.

In mild cases of attention deficit hyperactivity disorder, children seek to develop creative abilities in order to correct them. To this end, children with this syndrome often use chess training programs adapted to their capabilities8. This program allows you to adjust the condition of such children by providing them with information in small, logically completed blocks (10-15 minutes each). Pauses between them are filled with physical activity, often in the form of outdoor games using chess attributes9. However, the development
of such programs for children with attention deficit hyperactivity disorder is not complete and there is a need to increase their effectiveness, which requires further research.

The purpose of the study is to assess the dynamics of the state of children with attention deficit disorder and hyperactivity using the author’s methodology of teaching the game of chess.

**Material and Research Method**

The conduction of the research was approved by the local Ethics Committee of the Russian State Social University in May, 15th, 2018 (Record №7).

The study was conducted in 2017-2018 on the basis of a chess school named after A.E. Karpov Gymnasium №16 of the city of Mytishchi, Moscow Region, Russia. The study involved 16 boys of 7-9 years old with a diagnosis of attention deficit hyperactivity disorder.

All examined for the purpose of correcting attention deficit hyperactivity disorder underwent six months of training in the basics of the game of chess according to the author’s methodology. Its application was aimed at the development of basic mental characteristics: attention, memory, thinking; imagination, creativity, perseverance, determination and independence in decision making.

Classes were held twice a week for an hour in groups of 6 people. These groups were formed by age, taking into account the psychological characteristics of each child. Within an hour of being in a group, each child was immersed in a developing learning environment with the help of individually adapted for the whole group of developing techniques of playing chess. This ensured the achievement of the maximum, long-lasting positive trace in the emotional sphere of children.

At the beginning of each lesson, with the help of an author’s audio recording of chess in the form of a song in combination with a video collage (vivid entertaining chess pictures and photographs), children’s attention was switched to chess lessons. As a result, the children reflexively developed an attitude toward the training process. During the lesson, techniques were used that smoothly switched the attention of children from one type of activity to another.

The dynamics of the condition of children was evaluated using a number of method. Emotional stability with the determination of the integral indicator of a vegetative response was recorded by the method of Suvorova V.V. Identification of the degree of anxiety was carried out on a scale of situational and personal anxiety Spilberger-Khanin. Express diagnostics of the properties of the nervous system by psychomotor indices was determined by the method of the tapping test of E. P. Ilyin. Assessment of volitional self-control was carried out according to the method of A.G. Zverkova, E.V. Eidman. The degree of social normalization and organization was revealed according to the method of Kettel’s multifactorial personality questionnaire (16-PF). The mathematical processing of the results with the calculation of the student criterion is applied.

**Research Results and Discussion**

The results of the study of the considered characteristics of those examined with attention deficit hyperactivity disorder during their learning to play chess are presented in table 1.

**Table 1: Dynamics of personality parameters of children with attention deficit hyperactivity disorder during learning to play chess**

<table>
<thead>
<tr>
<th>№</th>
<th>Registered indicators</th>
<th>Initial data</th>
<th>Level</th>
<th>At the end of observation</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Emotional stability, points</td>
<td>3.02±0.64</td>
<td>Low</td>
<td>3.62±0.46*</td>
<td>Average</td>
</tr>
<tr>
<td>2</td>
<td>The degree of anxiety, points</td>
<td>3.55±0.50</td>
<td>Average</td>
<td>3.12±0.42*</td>
<td>Low</td>
</tr>
<tr>
<td>3</td>
<td>The presence of internal tension, points</td>
<td>3.28±0.39</td>
<td>Average</td>
<td>2.88±0.35*</td>
<td>Low</td>
</tr>
<tr>
<td>4</td>
<td>The level of social self-control, points</td>
<td>1.91±0.43</td>
<td>Low</td>
<td>3.52±0.38**</td>
<td>Average</td>
</tr>
<tr>
<td>5</td>
<td>The degree of social organization, points</td>
<td>2.66±0.27</td>
<td>Low</td>
<td>3.94±0.31**</td>
<td>Average</td>
</tr>
</tbody>
</table>

Legend: reliability of dynamics during observation * – p<0.05, ** – p<0.01.
When taken under observation in children with attention deficit hyperactivity disorder, low emotional stability, an average degree of anxiety, and an average severity of internal tension were noted. This was accompanied in their initial state by a low level of social self-control and a low degree of social organization.

As a result of learning to play chess, children with attention deficit hyperactivity disorder have shown significant progress in mastering chess and the school curriculum. Regular classes in the game of chess ensured six months later in children with attention deficit hyperactivity disorder positive changes in all the parameters taken into account. All examined persons managed to increase emotional stability by 19.9%, taking it to an average level. Moreover, they experienced a decrease in the degree of anxiety from medium to low (by 13.8%). This was accompanied by a decrease of 13.9% in the degree of internal tension, which ensured its exit to a low level. Regular playing the game of chess according to the author’s method also ensured that the children observed had an increase to the average level of their social self-control (increase by 84.3%) and the degree of their social organization (increase by 48.1%).

Children with manifestations of attention deficit hyperactivity disorder are always at a low level of self-control, there is low productivity of cognitive processes and their high overall emotionality. They almost never have the presence of life strategies focused on solving existing problems, and almost always there is a tendency to avoid problems and social indifference.

In many countries of the world, psychostimulants are most widely used in the treatment of attention deficit hyperactivity disorder. The effect of these psychostimulating agents is based on an increase in the content of dopamine and norepinephrine. Despite the large number of studies on the use of these psychostimulants in the treatment of attention deficit hyperactivity disorder, this issue is still accompanied by discussions about the likelihood of side effects.

In Russia, nootropic drugs have traditionally been used to treat attention deficit hyperactivity disorder. In the presence of attention deficit hyperactivity disorder accompanying the disorder, tics, tranquilizers are allowed.

The generally accepted position is that the treatment of attention deficit hyperactivity disorder should be comprehensive, that is, include both drug therapy and psychotherapeutic method. The leading link in the psychocorrection of children with attention deficit hyperactivity disorder is often considered changes in the behavior of adults - parents and teachers, with the replacement of non-adaptive approaches to their children with adaptive ones.

Behavioral psychotherapy method are often used to change children’s behavior. Its basis is a reward for the required behavior and punishment for the wrong.

The author has developed a methodology for treating children with attention deficit hyperactivity disorder by teaching chess.

The mechanism of teaching a game of chess is the directed activation of nonspecific activating systems of the brain and the intensification of the processes of morphofunctional development of immature elements of the cortex due to the normalization of neurodynamics. Apparently, this leads to a decrease in the degree of functional immaturity of the brain. Such treatment allows, in the practical absence of undesirable side effects, to directionally change the functional state of the brain. The achieved results can also be regarded as a consequence of the stimulating and at the same time balancing effect of the game of chess on the author’s technique on the brain. Apparently, the upcoming effect is also associated with stimulation of energy exchange in the cerebral cortex and in the subcortical nuclei, as well as with balancing the number of inhibitory and activating mediators formed and synaptically ejected in all zones of the cortex.

Apparently, the basis of the obtained results is such an important factor as the universal ability to morphofunctional plasticity inherent in the cerebral cortex. Many facts indicate a high plasticity of sensory functions, their ability to change their functional characteristics under the influence of training and exercises. By themselves, these facts indicate the presence of a deep interdependence between the two main mechanisms of higher nervous activity: analyzers and temporary connections. The facts of the exercise of sensory functions indicate that the development of conditioned reflexes from the analyzer increases its efficiency, makes the brain more adapted to various conditions of the physical and social environment.

Hemispheric connections between different areas of the brain, which begin to work actively during the learning of a game of chess, are even more plastic than...
the intrahemispheric ones. Unlike the former, they are more inherent in individual characteristics, which are very closely related not only to cognitive abilities, but also to the nature of the activity performed. As a training effect on the brain, chess is considered the most physiological, “soft” and effective\textsuperscript{21}.

The increase in the adaptive capabilities of the cortex of the children observed in the study was manifested in an increase in their academic performance at school and in their receipt of sports categories in chess.

As an illustration of the effectiveness of the author’s methodology used in the study, examples of the dynamics of the considered indicators in children with attention deficit hyperactivity disorder are given.

1. Denis P. began studying chess in the author’s technique at the age of 7. At the time of the start of classes, the child was diagnosed with attention deficit hyperactivity disorder. Initially, the child had low emotional stability (2.8 points), average anxiety (3.4 points), average internal stress (3.1 points) with low levels of social self-control (1.8 points) and social organization (2.5 point). After six months of training according to the author’s method, the child’s emotional stability (3.5 points), the degree of social self-control (3.3 points) and the severity of social organization (3.8 points) increased to an average level while lowering to a low level of anxiety (3.0 points) and internal tension (2.9 points). In the qualification tournament, after six months of classes, the child fulfilled the norm of the 3rd youth category in chess.

2. Egor Y. 8 years old, diagnosed with attention deficit hyperactivity disorder. Initially, he had low emotional stability (2.7 points), average anxiety (3.5 points), average internal stress (3.2 points) with low levels of social self-control (1.7 points) and social organization (2.3 points). After six months of training according to the author’s method, the child showed an increase to an average level of emotional stability (3.6 points), the degree of social self-control (3.4 points) and the severity of social organization (3.9 points) while lowering to a low level of anxiety (2.9 points) and internal tension (2.8 points). In the qualification tournament, the child fulfilled the norm of the 2nd youth category in chess after six months of classes.

3. Dmitry P. 9 years old, diagnosed with attention deficit hyperactivity disorder. Initially, he had low emotional stability (2.6 points), average anxiety (3.6 points), average internal stress (3.0 points) with low levels of social self-control (1.9 points) and social organization (2.4 points). After six months of training according to the author’s method, the child’s emotional stability (3.7 points), the degree of social self-control (3.5 points) and the severity of social organization (4.0 points) increased to an average level while lowering to a low level of anxiety (3.0 points) and internal tension (2.7 points). In qualifying tournaments, the child fulfilled the norm of the 1st junior category in chess after six months of classes.

**Conclusion**

In the course of the study, the correctional possibilities of the author’s methodology of teaching chess for children aged 7–9 years with attention deficit hyperactivity disorder were evaluated. The methodology turned out to be effective due to the integrated use of multimedia accompaniment and special techniques for switching the attention of the child during classes. It has been established that the author’s technique helps to reduce the severity of symptoms of attention deficit hyperactivity disorder in children. Semi-annual classes provided in all cases the elimination of the manifestations of the syndrome that the children had and the achievement of a balance of excitation and inhibition in the cerebral cortex during the development of the game of chess according to the author’s technique.

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**References**


