

The use of karate for the correction of mental processes in children of primary school age with hearing impairment

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Abstract. *Movement training is one of the most important tasks in adaptive physical education. Movement training in children with hearing impairment is determined by the specifics of this nosological group, age characteristics, and functional abilities of the body.*

A number of researchers confirm that hearing impaired children differ from their peers in a number of indicators of physical development. Moreover, in deaf and hard of hearing children the development of new types of movements is slower due to the limited ability of making adjustments to the general structure of movements. Lack of hearing reduces the amount of current information that plays an active role in creating adequate representations when learning movements.

The purpose of this study was to analyze literature data on the development of psychoemotional functions in children with hearing impairment, to study the main characteristics of attention and the influence of the karate methodology on attention indicators in children with hearing impairment.

Keywords: *children with hearing impairment, psycho-emotional sphere, karate, attention.*

I. INTRODUCTION

Adaptive fitness and health improvement activities, as well as adaptive sports are among the main areas of rehabilitation of persons with disabilities [14].

Currently, there are many tools and methods for the physical and spiritual development of children with hearing impairments. Among them, karate plays an important role. It consists of the elements of martial art such as punches and kicks, throws, etc. [7].

This sport not only strengthens the body, but also fosters willpower, helping to overcome any obstacles and difficulties encountered in training and everyday life [7].

Karate classes for children with various hearing impairments are based on the psychophysical unity of organized motor activity and the purposeful formation of the child's personality, the correction and development of his/her cognitive abilities, sensory systems, mental abilities (perception, attention, memory, emotions, thinking, speech), etc. [15].

II. LITERATURE REVIEW

Scientists agree that the lack of internal speech and the impossibility of perceiving and transmitting information through the word limit the amount of incoming information and affect children with hearing impairment [1, 2, 4, 5, 8, 10, 11, 16]. A number of experts [11, 16, 1] note that most hearing-impaired children of primary school age are at the stage of image thinking, involving the use of visual representation and images of objects for problem solving. The long stay of deaf and hard of hearing schoolchildren at the stage of image thinking leads to difficulties in the transition from subject-action to mental forms of operations and vice versa. In children with hearing impairment, even in adolescence, image thinking continues to prevail over other types of thinking, which negatively affects their mental development.

Mental operations in children with hearing impairments were investigated by S.A. Kuramin with the help of electroencephalography [5]. Registration of bioelectric potentials of the cerebral cortex showed increased activation of the right hemisphere in most children. Thus, the impact mainly on the left hemisphere is insufficient for the harmonious psychophysical development of such children, and the use of psychoemotional stimuli associated with the right hemisphere is recommended [5].

The study of the psychoemotional sphere, conducted by S.A. Kuramin, confirms significant differences between the psychoemotional and neurodynamic functions of primary school children with hearing impairment and their healthy peers [5]. The revealed changes are associated with a negative mood and a decrease in emotional response that affect the speed of mental development and worsen the quality of life in the future.

Syndrome of mental retardation of deaf children, found in 80% of cases, was studied by L.B. Dzerzhinskaya [2]. The author reveals neurotic disorders inherent in children: from mental infantilism, naivety, suggestibility to hyperactivity, irritability, emotional instability, increased excitability and moodiness.

Problems in the emotional and personal sphere of children with hearing impairment were also studied by E.N. Novichikhina and L.D. Hodoy [6]. The revealed features of the psychophysical development and social fitness of children consist in significant instability and anxiety, as well as a decrease in activity and performance.

In a negative way, hearing impairment is reflected in other indicators [6]:

- curiosity and sociability are found in 36% and 48% of boys and 37% and 44% of girls, respectively;
- desire for solitude - about 40% in boys and girls;
- desire for leadership - 20%;
- aggressiveness - 57% for boys and 64% for girls.

The lack of hearing in deaf children is manifested in the lack of skills to obey the general requirements and rules of the game, inability to concentrate on tasks, instability of attention, disinhibition of behavior, etc. Difficulties in space orientation result in insecurity, isolation, timidity, shyness. To improve the attention of deaf children, A.L. Kramarenko used equipment of various colors and contrastingly colored objects. The author found that the colors that stimulate the attention of deaf children include yellow, orange, red, as well as their combination with black [4].

A study of the emotional development of deaf children by V. Petshak showed that children correctly recognize joy, anger, fear, sadness, and other emotions, but experience difficulties in recognizing mental and socio-moral feelings [8]. Thus, the accuracy of recognizing emotions by verbal characteristics and revealing the causes of various emotions is much worse in deaf children of 10-11 years old compared to healthy children of 7-8 years old.

Gradually, by the age of 13-14 years, deaf adolescents master many concepts that characterize emotions and socio-moral feelings, and can correctly identify interpersonal relations as a cause of emotion. But in general, they still have difficulty with understanding the relationships between the emotions of a person and the life situations that give rise to them [8].

The differences between children with hearing impairments and their healthy peers are manifested in the formation of self-esteem. At 7-11 years old, the self-esteem of deaf children is very unstable and depends on the assessment of their educational activities and individual actions by teachers. By senior school age, students evaluate themselves taking into account their actions, knowledge, skills and relationships with other people. An important role in the formation of self-esteem at this age is given to moral behavior and moral values accepted in society: kindness, freedom,

justice, mutual assistance. In general, deaf teenagers are more likely to overestimate their abilities than underestimate. Deaf high school students (16-18 years old) evaluate themselves more adequately than adolescents, while some of them, more often girls, show increased self-criticism [10].

When studying the characteristics of the psycho-emotional sphere of children with hearing impairments Ya.V. Kalincheva revealed a high level of reactive and personal anxiety [3]. A high level of reactive anxiety was detected in 30% of hard-of-hearing students, and personal anxiety - in 40% .

Both types of anxiety are important for the description of the psychoemotional status of children in this nosological group:

- reactive anxiety is characterized by tension, anxiety, nervousness at the moment. Very high reactive anxiety causes impaired attention and impaired fine coordination and occurs as an emotional response to a stressful situation;
- personal anxiety is understood as an individual characteristic that reflects the subject's predisposition to anxiety arising from the expectation of danger.

A child with a high level of anxiety, not hoping for sympathy and help from peers, shows self-centeredness, alienation, aggressiveness. Such a child feels offended, complains, and deceives. This can contribute to the formation of a negative attitude towards other children, people in general, revenge, hostility, and a desire for solitude.

In general, a high level of anxiety in children with hearing impairment indicates a tendency to perceive a threat to their self-esteem and life. This fact once again emphasizes the importance of physical education, in particular karate, in the formation of self-confidence and a sense of success in such people.

III. MATERIALS AND METHODS

A special place among the mental cognitive processes in students with hearing impairments is given to attention, which plays a significant role in all types of human interaction, including motor activity.

Attention is the concentration of the subject's activity at a given moment of time on some real or ideal object: an object, event, image, etc. At the same time, consciously or unconsciously selecting one information and ignoring the other is very significant. The main characteristics of attention include: selectivity, volume, distribution, concentration, stability, switchability [9, 13].

The experiment was conducted, during which we determined the stability and selectivity of attention in children of primary school age with hearing impairments by means of developing coordination abilities with karate.

The stability of attention was studied with the "Corrective test", aimed at detecting fluctuations in the attention of subjects with respect to uniform visual stimuli under prolonged overload of the visual analyzer [12].

The child receives a paper on which letters are drawn one by one in random order, and crosses out all letters with which the line begins. When performing this work, the total time was recorded; number of characters viewed per minute; number of mistakes made. Five minutes are given for the task with a total of 17 lines with 30 characters each (510 characters).

The study of selectivity of attention, concentration of attention, and interference immunity in hearing impaired students was carried out by using the Munsterberg's test [9, 13]. The test consists of an alphabetic text with words that need to be found and highlighted as quickly as possible, line by line. For preschool and primary school age, the test contains 12 words. The high level of selectivity of attention of schoolchildren is considered to be 9-10 words; above average - 7-8 words; the average level is 5-6 words; below the average level - 3-4 words; low level - 0-2 words.

When determining the level of selectivity of attention of students with hearing impairments of 8-10 years, in addition to the number of correctly underlined words, the number of errors in terms of missed and incorrectly marked words was also taken into account.

IV. RESULTS AND DISCUSSION

Studying the results obtained at the beginning of the experiment, the average time to complete the "Corrective Test" was 4 minutes.

The average number of characters viewed by students in the first minute was 130. Then, in the second minute of the test, there was an increase in the number of characters viewed to 141. However, the rapid fatigue of the nervous system of students with hearing impairments led to a decrease in the speed of performance. As a result, the number of characters viewed in the remaining time was reduced to 122 in the third minute and to 117 in the fourth (Fig. 1).

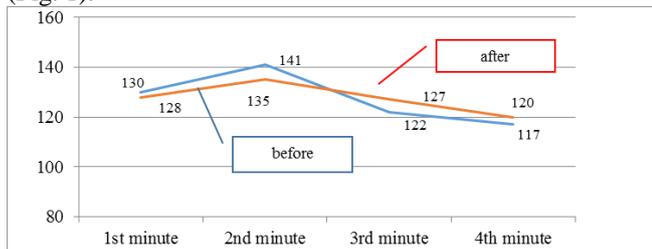


Fig. 1. Performance by minute in hard-of-hearing students of 8-10 years old in the "Corrective test" before and after the experiment (number of characters)

In addition to a decrease in the speed of performance, a noticeable increase in the number of mistakes was recorded: from 3-4 mistakes made at the beginning of work to 5-6 by the end of the task.

It can be noted that karate classes helped to improve the results of the "Corrective Test", performed by hard-of-hearing students at the end of the experiment. So, the average performance time decreased to 3 minutes 40 s. The speed of performance became more even, without pronounced fatigue by the middle of work and a sharp decrease in working capacity by the end of the task.

Comparing the mistakes made by schoolchildren in the "Corrective test" before and after the experiment, a decrease in their number can be noted, which indicates the benefit of karate classes in the development of stability of attention in subjects. By the end of the test, students made half as many mistakes (Fig. 2).

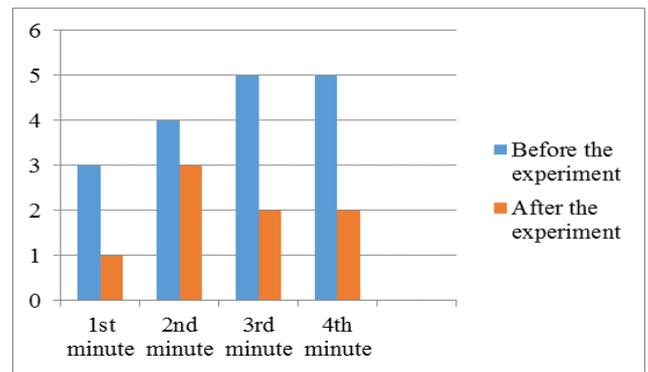


Fig. 2. Number of mistakes made by hard-of-hearing students of 8-10 years old in the "Corrective test" before and after the experiment (number of characters)

The results of the Munsterberg's test showed that 36% of students have an average level of selectivity of attention, 10% - below average, 24% - low, 18% - above average and 12% - high (Fig. 3).

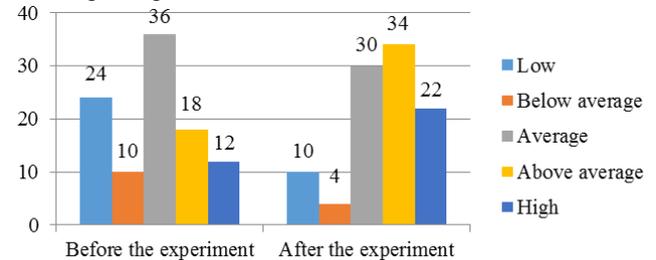


Fig. 3. Selectivity of attention in hard-of-hearing students aged 8-10 years in the Munsterberg's test before and after the experiment (%)

After karate classes with children of primary school age with hearing impairment, a significant improvement in the results of the Munsterberg's test was recorded, during which the selectivity of above average and high levels increased to 34% and 22%, respectively.

In the test Munsterberg test, performed at the end of the experiment, as well as in the assessment of the "Corrective test", there is a decrease in the number of errors made by students.

V. CONCLUSION

Thus, the analysis of literature data on the development of psychoemotional functions in children with hearing impairments shows that the formation of abilities in children occurs according to the general laws of children's mental development. However, the difficulties of verbal communication and formation of conceptual thinking affect all the abilities that can only be successfully developed by solving the issues of mental development that remained unsolved.

The study of the attention properties of hearing impaired schoolchildren is necessary for selecting accessible and specific forms of pedagogical influences on personality development.

The results of the "Corrective test" showed the fatigue and slow involvement into work of children, which affected their concentration of attention and a large number of mistakes made by the end of the work.

The Munsterberg's test allowed distributing the selectivity of attention of students with hearing impairments and revealing the children whose test results are below the average level. The percentage of children corresponding to a high level was only 12%.

The main task during karate classes is to constantly focus students. Karate classes with children of this age should differ by:

- a wide range of educational tools;
- strictly regulated time of the lesson;
- compliance with the principles of increasing the load - from the simplest movements to synchronous movements of individual parts of the body.

It should be remembered that repetition of the same exercise will lead to a loss of interest among schoolchildren, making its performance purely formal.

Karate classes, in addition to strength, flexibility, dexterity and coordination of movements, develop children's memory, logical and image thinking, learn to focus and switch attention, contribute to the ability to correctly distribute forces for the entire period of work. In addition, children become more confident, emotionally stable and adapt more easily to a new environment and new people.

Our karate program included:

1. Exercises for developing the ability to reduce muscle tension;
2. Exercises for developing static and dynamic balance;
3. Exercises for developing fine motor skills;
4. Exercises for developing motor rhythm;
5. Exercises for developing space orientation;
6. Exercises for developing the ability to coordinate movements as part of a motor action;
7. Exercises for developing the ability to differentiate efforts, time, space;
8. Exercises for developing the speed of response.

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REFERENCES

- [1] T. G. Bogdanova and Yu. E. Shchurova, "Dynamics of intellectual development of children with hearing disorders," *Questions of psychology*, 2009. Vol.2. pp. 46-55.
- [2] L. B. Dzerzhinsky, *Method of correction of deviations in the development of deaf preschoolers by means of rhythmic gymnastics of hearing: dis. ... cand. ped. sciences*. Volgograd, 1997. 169 p.
- [3] Y. V. Kalincheva and V. I. Sytina, "Health aerobics as means of development of psycho-emotional component in personality's structure of hard-of-hearing schoolchildren at 12-15 years," *Journal "Tambov University Review. Series Humanities"*, 2011, vol. 11 (103), pp. 201-206.
- [4] A. L. Kramarenko, V. A. Zamaraev "Pedagogical experience of using controlled information environment in physical education of children with hearing impairment". *Uchenye zapiski universiteta imeni P.F. Lesgafta*, 2008. vol. 7 (41). pp. 48-52.
- [5] S. A. Kuramin, *Age-related features of psychophysiological functions in children 7-10 years old with hearing impairment: author. dis. ... cand. biol. sciences*. Chelyabinsk, 2008. 22 p.
- [6] E.N. Novichikhina and L. D. Khoda, "Research of influence of game activity in adaptive motor recreation on psychophysical development of deaf children of 8-11 years," *Adaptive physical education*. 2006. vol. 2 (26), pp. 26-29.
- [7] L. Benassi, I. Blazevic, B. Trajkovski, "Quantitative changes in the anthropological status of middle school aged pupils over a two-year period", *Human. Sport. Medicine*, vol. 18 (1), pp. 5-19,
- [8] V. Petek, *Emotional development of deaf children: avtoref. diss. ... doct. the course of studies sciences*. Moscow, 1991.
- [9] *Psychological tests / comp. S. Kasyanov. M.: Eksmo*, 2006. 608 p.
- [10] T. E. Puik, "Features of assessment and self-assessment of socially significant personality traits in deaf schoolchildren". *Personality Research of children with hearing disorders: a Collection of scientific papers*. M, 1981. pp. 12-17.
- [11] T. V. Rozanova, *Development of memory and thinking of deaf children*. M.: Pedagogy, 1978.
- [12] K. R. Sidorov, "Qualitative assessment of the efficiency of attention in the methodology of "Cancellation Test" by B. Bourdon" *Bulletin of Udmurt University. Series Philosophy. Psychology. Pedagogy*, 2012. Vol. 4, pp. 50-57.
- [13] *Dictionary of practical psychologist / Comp. S. Y. Golovin. Minsk : Harvest; Moscow: AST*, 2001. 800 p.
- [14] S. N. Popov, O. V. Kozyreva, M. M. Malashenko et al. *Physical rehabilitation*. M.: Academy, 2013. 288 p.
- [15] *Private methods of adaptive physical culture: textbook / Pod. edited by L. V. Shapkova. M.: Soviet sport*, 2003. 464 p.
- [16] N. V. Yashkova, *Visual thinking of deaf children*. M.: Pedagogy, 1988. 141 p.