Athletics as a Way to Correct the Lag in Physical Readiness of Middle-Aged Schoolchildren with Hearing Disorder

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ABSTRACT

The authors analyze the physical readiness of middle-aged schoolchildren with hearing disorder versus their healthy peers. Statistically significant differences were found in quickness, coordination, speed-power abilities and also static and dynamic balance. The lag was corrected by athletics with attention to the individual characteristics of students with hearing disorder. The formative experiment allows speaking about the efficiency of athletic means.

Keywords: Middle-aged schoolchildren with hearing disorder; physical readiness; corrective athletics; touch technology; motion limiter.

Introduction. The motor abilities of deaf people have long been under close attention of experts [1, 2, 3]. The research aimed at examining the motor abilities made it possible to identify the features of physical readiness of schoolchildren with hearing disorder versus their healthy peers.

The partial or complete loss of hearing and immature oral speech is caused by motional constraint and stiffness [4].

Such authors as A. Barabas (1990), A. Spragins (1994), J. M. Furman (1995), F. I. Loughorn (2002) and H. Grimmet (2004) think that deaf and hearing-impaired children have lower performance of static and dynamic balance, coordination, quickness and speed-power abilities versus their healthy peers [5, 6, 7, 8, 9].

The works of physiologists (N.A. Agadganyan, 2001; V.N. Vasilyev, 2010) say that quickness and speed-power abilities are revealed not only by the natural properties of musculoskeletal apparatus. Quickness and explosive force are to a large extent connected with the ability of nervous system to conduct nervous impulses or, in other words, with the speed of latent motor response [10, 11]. Besides, researchers note that the performance of these physical abilities depends not only on genetic factors. The power of stimulus is of great significance for them.

On the basis of the above, the **goal** of this paper is to analyze the physical readiness of middle-aged schoolchildren with hearing disorder; to work out and ground the corrective athletic means aimed at improving the lag of physical readiness of middle-aged schoolchildren with hearing disorder taking into account their individual peculiarities.

Research methods

the analysis and generalization of scientific methodological publications; the analysis of pedagogical documentation; the analysis of medical records; the tests of physical readiness; pedagogical observation; pedagogical experiment; statistical processing of results with mathematical methods.

Research details

The experimental research was conducted in the period from September, 2012 to May, 2013 in a Special Boarding School in Yelabuga (the Republic of Tatarstan, the Russian Federation). Twenty middle-aged schoolchildren with hearing disorder took part in the experiment. The control group consisted of twenty peers from the Lastochkina Special Boarding School (Kazan, the Republic of Tatarstan, the Russian Federation).

Results of the ascertaining experiment

In middle school age, the teenagers of the experimental and control groups have the following quickness lag versus their healthy peers in 30 m heat: the girls from the experimental and control groups are behind the healthy girls by 10.2% and 12.4%. The lag of boys is 7.9% and 8.42% respectively.

The disparity of indexes in control exercises “shuttle run” and “snake run” between the girls from the experimental and control groups and their healthy peers is 7.06% and 11.65%; between the control group and healthy girls is 10.07% and 16.04%; between the boys from the experimental and control groups and their healthy peers is 7.29% and 14.78%; between the control group and healthy boys is 8.4% and 20.1% respectively.

The analysis of speed-power abilities in motion tests “standing long jump” and “medicine ball

throwing" showed the difference between the performance of healthy and hearing-impaired schoolchildren. The experimental group of girls is behind their healthy peers by 14.3% and 10.39%. The indexes of the control group are behind by 18.57% and 8.13%. The difference between the boys is 14.3% and 10.39% respectively.

The comparative analysis of dynamic force in exercises "pull-up" and "sit-up" showed an unreliable difference ($p<0.05$) between the girls from the experimental group and their healthy peers: 1.13% and 1.53%, between the control group and healthy girls: 3.2% and 5.2%. The indexes of boys from the experimental group are behind the indexes of healthy peers by 2.18% and 3.73%; the control group is behind by 3.22% and 4.9% respectively.

The disparity in test "six minute run" between the experimental group of girls and their healthy peers is 3.3%; between the control group and healthy girls is 2.7%. The disparity between the boys from the experimental group and their healthy peers is 4.27%; between the control group and healthy boys is 3.6%.

The indexes of static balance in the "Romberg test" show the lag of girls from the experimental group versus their healthy peers by 197%; girls from the control group versus their healthy peers by 189%. The boys show the values 241.5% and 247% respectively.

Theoretical grounding for the efficiency of corrective athletics means.

Corrective athletics. This section is included in a program of physical training for schoolchildren with hearing disorder because such children have a special sensorimotor and functional development and also an individual specificity of motor abilities. The experimental lessons of athletics were conducted in autumn (September-October) and in spring (April-May) during physical training classes two times a week and in winter (December, February) outside regular hours ones a week.

Various motion limiters (medicine balls, barriers, plastic cones and foam rubber rectangles) were used to develop quickness and coordination of the most backward children.

For middle-aged teens, we used: 1) run with motion limiters (high foot, high thigh, low barriers for one and three run steps, snake run, shuttle run); 2) various jumps with motion limiters (one-leg and two-leg jumps while running, standing long jump, standing high jump and jump run).

Athletic exercises with motion limiters are aimed at forming kinesthetic sensations and spatial orientation. This has a positive effect on the development of motional thinking. In spite of simple motional actions, exercises with limiters require the complete comprehension of motion amplitude and trajectory.

The problem of correct foot position, step length and thigh ejection while running will be successfully solved with the help of these means. Jump exercises are aimed at forming speed-power abilities. "Snake run" with limiters will promote the formation of kinesthetic sensations, improve the spatial orientation and correct the dynamic balance.

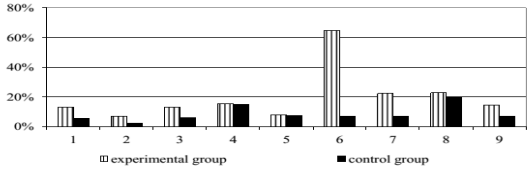
Because of partial or complete loss of hearing these schoolchildren are constantly strained while moving. They have difficulties in spatial orientation. Their constraint means that excitation processes in their CNS substantially predominate over inhibition processes. This worsens the conductivity of neural impulses, raises the time of latent response. As a result, their quickness and speed-power abilities, especially motion response rate and the quickness of single motions, deteriorate [11].

The experimental program includes athletic means with touch technology for the correction of quickness and speed-power abilities. The author used starting blocks with red bulbs. All motional actions should be performed with maximum quickness and power after the bulb is turned on. The bulb is in close proximity to a student. The exercises included *touch starts* (running with crouch start, high start, from squat position, front lying support, rear sitting support, etc.); *touch jumps* (standing long jump and standing high jump); *touch throwing* (1 kg medicine ball with various starting positions).

These means will favour the reduction of latent period during which visual information is processed. Besides, more muscle fibers will take part in motion. All this will have a positive influence on quickness and speed-power abilities.

Experimental grounding for the efficiency of corrective athletic means.

A small increase of physical readiness shown by the schoolchildren from the experimental group versus their peers from the control group (Fig. 1, 2) predetermines the effectiveness of used athletic means.



Note (here and at the next figure): 1 is a 30 m run; 2 is a shuttle run 3×10 m; 3 is a standing long jump; 4

is a pull-up; 5 is a 6 min. run; 6 is a Romberg test; 7 is a medicine ball throwing from sitting position (1 kg); 8 is a sit-up; 9 is a snake run (10 m).

Fig. 1. The increase of physical readiness of middle-aged schoolgirls from the experimental and control groups during the experiment (%)

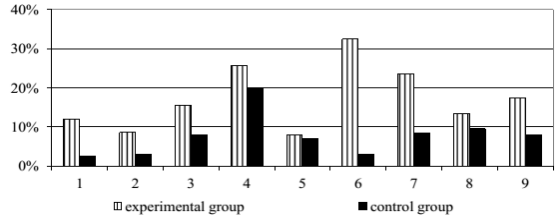


Fig. 2. The increase of physical readiness of middle-aged schoolboys from the experimental and control groups during the experiment (%)

Findings

Figures 1 and 2 demonstrate a significant superiority of tested physical readiness of schoolchildren from the experimental group over the respective indexes of the control group.

The increase of results showed by girls and boys from the experimental group in a control exercise "30 m run" was 13.2% and 11.4%. Their peers from the control group showed 5.7% and 3.5%.

In motion test "shuttle run 3×10 m", the indexes of girls and boys from the experimental group increased by 7% and 8.6%. In the control group they were 2.5% and 3% respectively.

The increase of indexes in exercise "standing long jump" showed by girls and boys from the experimental group was 13% and 12.5%. In the control group, the indexes of girls increased by 6.5% and the indexes of boys increased by 8%.

The indexes of static balance analyzed with the help of "Romberg test" increased in the experimental group of girls and boys by 64.7% and 32.5%. In the control group they increased by 7% (girls) and 3% (boys).

In control exercise "1 kg medicine ball throwing from sitting position", the increase of indexes showed by girls and boys from the experimental group was 22.3% and 23.6%. In the control group, it was 7% and 8.5% respectively.

During the year of experiment, the increase of indexes in test "snake run" showed by girls and boys from the experimental group was 14.5% and 17.5%. The schoolchildren from the control group showed 7% and 8% respectively.

A final stage of the formative experiment conducted among girls and boys of middle school age did not reveal a reliable difference ($p<0.05$) between the indexes of the experimental and control groups in motional exercises "pull-up", "6 minute run" and "sit-up". The increase of indexes showed by girls from the experimental and control groups was: 15.5% and 14.9% in pull-up; 8% and 7.5% in 6 minute run; 22.8% and 20% in sit-up. Boys showed in analogous tests 25.8% and 21.8%, 8% and 7.2%, 13.3% and 9.5% respectively.

Conclusion

So the results of the formative experiment let us speak about the efficiency of athletic means aimed at correcting the lag in motional coordination, static balance, quickness and speed-power abilities of middle-aged schoolchildren with hearing disorder.

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