



Development of motor functions in children with autism spectrum disorders

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Abstract

Objective of the study was to experimentally substantiate the development of motor functions in children with autism spectrum disorders.

Methods and structure of the study. The educational experiment was conducted on the basis of two institutions: the theoretical part – at the Department of Theory and Methodology of Adaptive Physical Education of Yekaterinburg Institute of Physical Culture (branch) of Ural State University of Physical Culture (UralSUPC), the practical part – at the Autism Therapy Center «Aurora», Yekaterinburg.

Motor tests were used to rate the level of development of motor functions in children with autism spectrum disorders, including the level of motor skills and physical abilities according to age.

Results and Conclusion. The application of the methodology of development of motor functions in the children with autism spectrum disorders, taking into account their individual abilities, significantly improves their physical development and has a positive effect on the complex of morphofunctional properties of the body. It also helps to enhance the children's physical capacities, build and strengthen their motor skills.

Keywords: children with autism spectrum disorders, correction, motor function development, physical development.

Background. Motor disorders in infantile autism are characterized by their close relationship with sensory disorders, particularly with the lack of sensation of own movements. It is therefore needed to provide a comprehensive and systematic approach to the development of motor functions in children with autism spectrum disorders.

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Culture (UralSUPC), the practical part – at the Autism Therapy Center «Aurora», Yekaterinburg.

Motor tests were used to rate the level of development of motor functions in children with autism spectrum disorders, including the level of formation of motor skills and physical abilities according to age.

Results and discussion. The main directions of the methodology of development of motor functions in children with autism spectrum disorders are selected on a case-by-case basis, taking into account children's individual abilities:

1. Development of motor coordination skills:

– development of consistency of movements of individual body links: climbing an artificial wall, climbing a ladder; trampoline jumping with the execution of various tasks; walking with the execution of arm



movements; exercises with objects, exercises on a movable surface, etc.;

– development of visual-spatial coordination and space orientation: obstacle course with running objects around, crawling through a tunnel, stepping and springing over obstacles, 360 rotations; exercises from unusual starting positions, etc.;

– development of static and dynamic equilibrium: balancing exercises with closed eyes; stand on tip-toe – arms down, forward, and up; alternating arabesque; swinging exercises – «flying carpet», «log» forward-backward, right-left, clockwise and counter-clockwise; turns, tilts, rotations on a limited, elevated or movable surface; «bosu» exercises, etc.;

– formation of rapid reaction to changing external conditions and precision of movements: following along with the teacher's movements at a rapid pace; reaction ability exercises (sound, clap); ball throws on target, etc.;

– training muscle effort differentiation: stepping up, jumping on the stepper of different heights (10 cm, 20 cm, 30 cm), etc.;

2. Development of strength and endurance:

– development of wrist strength: making a fist; pressing a soft object (ball) with a hand; squeezing balls (expanders) of different diameter with a hand – one hand, two hands, etc.;

– improvement of muscular endurance of the back, abdominal press: parterre gymnastics; abdominal exercises; exercises against resistance; body-weight moves;

– improvement of muscular endurance of the upper and lower limbs: climbing an artificial wall; push-ups – from the knees, on the gymnastic bench; squats; lunges – left, right, forward and backward; medicine ball exercises;

– improvements of overall endurance: 15 min variable running; 10-15 min relay.

3. Development of flexibility:

– development of joint mobility: stretching exercises using soft modules, yoga in hammocks, swaying movement, etc.;

4. Development of speed:

– teaching children to differentiate the frequency of movements: high-knees running in place, heels-up running – quickly, slowly, etc.;

– development of reaction speed, speed of successive motor actions in general;

5. Correction and development of basic movements:

– formation of climbing, crawling, climb-over, and crawl-under skills: exercises using soft modules, tunnel, etc.;

– formation of ball throwing and catching skills: kick the ball from the floor (large diameter first, then small diameter), weighted ball throws with both hands behind the neck, underarm ball throws, ball throws on target (hoop) with one hand from a distance of 3-5 m, etc.;

– formation of jumping skills: jumping from a height of 30-40 cm; jumping squats; jumping to the right, left, forward, backward; one-leg leaps; springing over obstacles on one leg, on both legs; jumping onto the platform, 20-30 cm high, etc.;

6. Correction and prevention of somatic disorders:

– correcting and preventing postural disorders, scoliosis, flat feet, talipes valgus, talipes varus, cubitus recurvation, normalization of the muscle tone: symmetrical, asymmetrical exercises to form the core; detorsion exercises; using massage tracks to strengthen the sole muscles; alternation of muscle tension and relaxation; fitball gymnastics, «bosu» exercises, etc.;

– improvement of the respiratory and cardiovascular functionality: sound gymnastics; exhaling through a plastic tube into the water; abdominal breathing exercises; blowing up a balloon, short-distance accelerations (10-20 m), variable cross-country running (10-15 min), etc.

7. Development of sensory systems:

– formation of simultaneous reciprocal sensorimotor interactions, feeling of the body boundaries and its position in space, improvement of proprioceptive sensations: exercises using a «heavy blanket»; «bosu» exercises, etc.;

– development of tactile, dermo-kinesthetic, and musculo-articular perceptions, mimic gymnastics;

– development of fine motor skills: finger gymnastics, working in the pool with beans, peas, exercises on a tactile platform, «busy board» exercises;

– teaching to differentiate visual and auditory signals: reaction ability exercises (auditory signals of different modalities, visual color signals).

Children with autism spectrum disorders should be trained using visual aids (mirror exercises, use of pictures with exercises, boundary settlement). Children should be offered to choose among the number of repetitions (e.g. 10 or 15 reps). To broaden the horizon, the scores can be kept by units, hundreds, thousands, etc. (1,000, 2,000, 3,000, etc.). Instruc-



tions should not be long and should be given to a child clearly and specifically.

Conclusion. The application of the methodology of development of motor functions in children with autism spectrum disorders, taking into account their individual abilities, significantly improves their physical development and has a positive effect on the complex of morphofunctional properties of the body. It also helps to enhance the children's physical capacities, build and strengthen their motor skills.

References

1. Bernstein N.A. On agility and its development. Moscow: Fizkultura i Sport publ., 1991. 166 p
2. Manelis N.G., Nikitina Yu.V., Ferroi L.M., Komarova O.P. Sensory features of children with autism spectrum disorders. Assistance strategies. Haustov A.V., Manelis N.G. [ed.]. Moscow: MGPPU publ., 2018. 70 p.
3. Plaksunova E.V. Influence of classes under adaptive physical education program «Motor alphabet» on motor and psychomotor development of children with autism spectrum disorders. Autism and developmental disorders. Moscow, 2009. V. 7. No. 4. 67-72 pp.