



Training younger students with intellectual disabilities to pass the standards of the VFSK TRP using a specialized training apparatus

UDC 796.015



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Received by the editorial office on 03.09.2024

Abstract

Objective of the study was to demonstrate the efficacy of the training apparatus in the context of physical education for elementary school students with mild intellectual disabilities.

Methods and structure of the study. The experiment was carried out in the afternoon, during additional physical education classes, at the Amur Region State Educational Institution «Special (Correctional) Secondary School No. 7 in Blagoveshchensk». Two groups were formed, each consisting of 8 participants. The lessons were conducted three times a week for 40 minutes. The study employed methods of pedagogical testing, pedagogical observation, and mathematical statistics.

Results and conclusions. The utilization of a drum-like training apparatus empowers individuals with intellectual disabilities to acquire the motor skill of performing pull-ups on both high and low bars with minimal deviations from proper technique. Engaging in exercises on this apparatus fosters strength development, as evidenced by the outcomes of standing and wrist dynamometry at the conclusion of the experiment ($p < 0,05$); and alleviates anxiety and fear when undertaking the strength test of the VFSK TRP for individuals with intellectual disabilities.

Keywords: *younger schoolchildren with mental retardation, strength abilities, drum-type training device, pull-ups on a horizontal bar, VFSK GTO.*

Introduction. In the study of the dynamics of development of motor abilities of children with mild mental retardation, the results covered in the works of V.M. Mozgovoy (1977) [5], A.S. Samylichev (1985) [6], A.A. Dmitrieva (1987) [4], E.S. Chernik (1992) [7], N.V. Astafyeva (1996) [1], carried out in the twentieth century, indicate a decrease in the level of development of motor (including strength) abilities in mentally retarded schoolchildren compared to children without intellectual disabilities. Later, the attention of researchers began to be drawn to the issues of comparing the dynamics of development of motor abilities of children with intellectual disabilities living in different climatic and geographical zones of Russia (O.A. Barabash, 2005 [2], G.I. Vysoven, 2016 [3]), and determining the sensitive periods of their development. In recent years, the study of the development of motor skills of children with disabilities has received a new vector of

development due to the development and implementation of the All-Russian Physical Culture and Sports Complex GTO for the disabled, and the results of the tests have become a guide for practicing teachers, showing the direction of further work to improve the process of physical education of schoolchildren with disabilities. As is known, the relationship between motor skills and motor abilities is considered as a dialectical unity (motor abilities are manifested through certain actions, which in turn exist only in the presence of certain abilities). In this regard, attention is drawn to the difficulties that schoolchildren with intellectual disabilities encounter when passing the All-Russian Physical Culture and Sports Complex GTO pull-up test from a hang on a horizontal bar (high, low 90 cm), as evidenced by the results of pedagogical observation during the passing of the All-Russian Physical Culture and Sports Complex GTO standards by students of the



State Autonomous Educational Institution of the Amur Region "Secondary (Korolev) School No. 7 of the city of Blagoveshchensk". If some schoolchildren are still able to demonstrate push-ups in a prone position, then the vast majority of students are not able to cope with pull-ups on a horizontal bar. This obliges teachers to look for various ways to improve the process of physical education and the formation of motivation of schoolchildren using new methods and means of teaching. One of the ways to solve these problems is the use of modern and diverse sports equipment. For this purpose, a training device was developed that allows, in simplified conditions, not only to master the technique of performing pull-ups from a hang for boys and pull-ups from a hang lying down for girls, but also to effectively develop the strength abilities necessary to fulfill this standard of the VFSK GTO complex for people with intellectual disabilities.

Objective of the study was to demonstrate the efficacy of the training apparatus in the context of physical education for elementary school students with mild intellectual disabilities.

Methods and structure of the study. The following methods were used in the experiment: pedagogical testing, pedagogical observation, and the method of mathematical statistics.

The study was conducted at the State Autonomous Educational Institution of the Amur Region "Special (Correctional) Comprehensive School No. 7 of Blagoveshchensk" in the afternoon during additional physical education classes. At the beginning of the experiment, preliminary testing of boys and girls aged 8-9 (8 people each) was conducted, which showed that not a single child was able to perform the pull-up test on a high (low) bar in full (the assessment was carried out according to the method of M.F. Sautkin 2007 for boys¹ and 2008 for girls²).

Before the main pedagogical experiment, a con-

trol and an experimental group of 8 people each were formed. They included children whose results did not statistically significantly differ from each other. In both groups, lessons were held 3 times a week for 40 minutes based on the working program of the subject "Physical Education", which included the balanced development of all motor abilities and the acquisition of a range of motor skills in all sections of the educational program. In the main part of the lesson, both in the experimental and control groups, exercises were used for all muscle groups (back, abdomen, shoulder girdle, arms), which were performed in dynamic and static modes using the "circular" method. The selection of exercises in both groups was carried out so that the exercises in the complex were aimed at different muscle groups and in different modes: flexion and extension of the trunk in the supine position, arching from the initial prone position – "boat" with a minimum separation of the legs and trunk from the floor, holding the gymnastic stick at the top, holding the corner in the supine position with the arms at the top. The selection of these exercises was due to the inclusion of the largest number of muscles involved in the pull-up test. The last station was different:

- in the control group, pull-ups were performed on the horizontal bar (high for boys, 90 cm for girls from the floor), with the help of a teacher (or trained schoolchildren), first in a yielding mode, then in an overcoming mode;

- in the experimental group, for the safest and most interesting conduct of classes, a training device was developed and used, which was two L-shaped stands connected by crossbars. On the axle, fixed to the racks, there are two rims with spokes, connected to each other by slats of different colors and forming a drum. A disk brake and adjustment device allowing to adjust the speed of the drum.

The main task at the initial stage is to give a correct idea of the motor action "pull-up" in simplified conditions using the training device, to include in the work all the muscle groups participating in this test (first the shoulder muscles are included in the work on straight arms sorting through the bars, and then the muscles are included in the work - flexors and the latissimus dorsi). In parallel with this, tasks were given to include the muscles of the trunk, pelvis and lower extremities. The device allows to develop not only strength abilities and correct technique, but also to relieve tension and fear when doing pull-ups in children with intellectual disabilities.

¹Patent 2339296. Rossiyskaya Federatsiya, MPK A61V 5/00 (2006.01). Sposob opredeleniya silovoy vynoslivosti verkhnikh konechnostey i plechevogo poyasa. M.F. Sautkin [ed.]. zayavitel i patentoobladatel Gosudarstvennoye obrazovatelnoye uchrezhdeniye vysshogo professionalnogo obrazovaniya «Ryazanskiy gosudarstvennyy meditsinskiy universitet imeni akad. I.P. Pavlova Federalnogo agentstva po zdravookhraneniyu i sotsialnomu razvitiyu». No. 2007124056/14; 26.06.2007; opubl. 27.11.2008. Byul. No. 33. 4 p.

²Patent 2382602. Rossiyskaya Federatsiya, MPK A61V 5/22 (2006.01). Sposob izmereniya silovoy vynoslivosti pri podtyagivaniyakh tela v naklone. M.F. Sautkin [ed.]. zayavitel i patentoobladatel Gosudarstvennoye obrazovatelnoye uchrezhdeniye vysshogo professionalnogo obrazovaniya «Ryazanskiy gosudarstvennyy meditsinskiy universitet imeni akad. I.P. Pavlova Federalnogo agentstva po zdravookhraneniyu i sotsialnomu razvitiyu». No. 2008111301/14; 24.03.2008; opubl. 27.09.2009. Byul. No. 36. 8 p.: il.



Results of the control and experimental groups during the pedagogical experiment

| Parameters | Control group | | | | Experimental group | | | |
|----------------------------------|---------------|------------|------------|-------|--------------------|-----------|------------|-------|
| | Before | After | Difference | p | Before | After | Difference | p |
| | M±m | M±m | % | | M±m | M±m | % | |
| Pull-ups by M.F. Sautkin (kg, m) | 12,03±3,43 | 15,34±2,56 | 27,5 | <0,05 | 11,85±4,46 | 22,3±5,4 | 88,1 | <0,05 |
| Right arm dynamometry (kg) | 3,25±1,12 | 3,64±1,23 | 12 | >0,05 | 3,55±0,97 | 4,72±1,12 | 32,9 | <0,05 |
| Left arm dynamometry (kg) | 2,75±1,67 | 3,11±1,46 | 13 | >0,05 | 2,67±1,23 | 3,53±1,78 | 32,2 | <0,05 |
| Deadlift dynamometry (kg) | 15,6±3,31 | 17,23±3,54 | 10,4 | >0,05 | 15,3±3,7 | 19,14±4,5 | 25 | <0,05 |

Results of the study and discussion. A comparative analysis of the results of tests after the pedagogical experiment allows us to conclude the following.

Statistics showed that the students in the experimental group performed pull-ups better than the students in the control group. This was confirmed by an expert assessment of 4,7 points and 3,5 points, respectively. When evaluating the pull-up test using the method of M.F. Sautkin [11, 12], the indicators were reliable in both groups ($p < 0,05$). The control group showed a result with an increase of 27,5%, but the students found it difficult to independently perform pull-ups technically correctly with the maximum result. While in the experimental group, with an increase of 88,1%, the children showed good technique for performing the exercise with the maximum number of reps.

The increase in the actual strength capabilities of the back muscles (dead-end dynamometry) in the experimental group is 14,6% higher compared to the control group ($p < 0,05$). According to the results of wrist dynamometry, the experimental group showed significantly higher indicators: the right hand by 20,9% and the left hand by 19,2% compared to the control group ($p < 0,05$). This is explained by the fact that the experimental group worked on a training device that allows students to perform all exercises to failure, without fear of breaking down and getting injured, and to improve the results of this test.

Conclusions. The use of the presented drum-type training device allows to develop the motor skill of performing pull-ups both on a high and on a low bar, to develop the strength abilities of students with intellectual disabilities, to relieve tension and fear when performing the strength test of the All-Russian Physical

Culture and Sports Complex GTO for people with intellectual disabilities.

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