Methodology of increasing the level of motor abilities development among 13-14 year-old schoolchildren with mental retardation in terms of inclusive educational organization

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Abstract. The article presents the results of a pedagogical research concerning age-related development retardation compensation of motor abilities in children with mental retardation. The authors created the separate form of inclusive education organization in physical upbringing of general educational establishment, methodology with adapted methods and means realized on the basis of the differentiated approach. The effectiveness of the methodology is proved during the received indices analysis. The level of the respondents physical readiness corresponded age norm and in some cases increased it; progress and independent regulation of behavioral norms also increased.

1 Introduction

The period of school age is the definite life period, when all systems of a child's organism are formed and developed. The mentioned age range includes considerable changes in all motor abilities formation, development and improvement. During this period children gain skills and abilities. They can be the essence of the happening physical and psychological development [1-4].

The functions of motor analyzer include the main indices of mutual connections of all structural directions of central nervous system. It takes part in mutual work and intellective activity formation. Corresponding age characteristics of sensory-motor development is the part of a schoolchild's general psychic development [7].

In scientific sphere it is known that there are children, who have vivid and latent deviations in psychic and motor development, mentioned deviations have their reasons. It was stated by the scientists that the mentioned psychic deviations are connected with the deviations in age retardation in motor abilities development. The mentioned deviations are proved by medical-psychological-pedagogical diagnostics [5,6].

On the basis of statistical data the most frequently met deviation in psychic development of junior age schoolchildren is its retardation. Special pedagogics in modern education has considerable volume of research results concerning the mentioned category of children. The results have information about the reasons of the decreased level of psychic and motor spheres level development, the specificity of intellective activity. Scientific research works are directed toward educational-cognitive sphere of children. They study at junior classes and there are no sufficient works connected with schoolchildren with mental retardation during senior age.

Deviations in motor sphere of schoolchildren with mental retardation belong to the level of attenuated defects in development. They don't have hard forms, however, on the basis of pedagogical observations of the authors [1,8,9] age related retardation from motor development of coevals, random motor actions regulation violation in a form of motor defects were revealed. The level of motor abilities was also decreased. That is why the most effective direction of pedagogical activity concerning physical readiness defects elimination is the directed pedagogical influence on the basis of complex physical upbringing means.

Nowadays the project is realized. It involves inclusive education into educational system of children with special educational needs of general educational establishments. However, there are no integral demands claimed on the separate model of work organization connected with adaptive physical upbringing in the considered cases. We made the decision to create the separate form of physical upbringing inclusive educational process among senior schoolchildren with mental retardation of educational organization.

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2 Materials and Methods

The research was held on the basis of Municipal budgetary educational establishments "Secondary school № 24 and №12". Educational establishments realize inclusive educational process in a form of teaching schoolchildren with mental retardation in general classes, together with pupils. They don't have deviations. For comparative analysis, age related retardation revelation and stating indices according to the level of motor abilities revelation among schoolchildren with mental retardation and their coevals, who don't have deviations, we carried out pedagogical testing. We studied health state and psychic sphere of children during medical cards analysis. Pedagogical observation was used for motor sphere study and the existing deviations revelation. During the held research work we produced motivation influence on regular additional physical-correction extracurricular lessons of Federal State Educational Standards. For the studied contingent of children motor abilities development can be the main factor, when the sense of personal nonconformity of healthy classmates can have a negative influence on socialization in collective. The experimental methodology is based on the following drawbacks in the regularities of organism development: age related retardations in psychic and motor spheres development; motor regimen doesn't age related demands; the level of motor abilities development doesn't correspond with age indices and the indices of classmates. They don't have deviations; motor activity can last long because of volitional efforts absence; motor activities are produced with deceleration in a slow form and with a low level of turning attention to another kind of activity. The methodology includes the methods and means of moderate realization with the demands of psychic and physical character efforts making. At the initial stage small group motivation-developing lessons were held in order to provide mutual understanding and cooperation between schoolchildren and teachers and to increase the effectiveness of pedagogical influence.

Program material was distributed according to necessary tonus for all kinds of motor abilities on the basis of circular method in a flow fulfillment. We alternated 3 blocks of lessons: of athletic orientation (speed, general endurance); power oriented (power, speed-power oriented training); sports games (coordination, dexterity, quickness). Correctional-developing program includes the complexes of different orientation: special exercises selection with individual loads. They simultaneously influence on 2-3 motor abilities during one lesson; the program includes an optimal alternation of the complexes for each lesson of one orientation. Athletic exercises alternate with the exercises for flexibility and weak qualities development. The exercises for power development alternate with motor activity for speed-power training and flexibility level increase. The exercises directed toward coordinating abilities, dexterity and quickness development alternate with motor activity for weak motor abilities development; we also used purposeful and program alternation of the complexes. They are characterized by the developing and supporting orientation. We used repetitive, game, competitive, proportional and alternating methods. The loads were defined taking into account individual indices of people, who train.

3 Results and Discussion

At the end of the pedagogical experiment, which was directed toward motor abilities development in 13-14 year-old schoolchildren with mental retardation, we held the control test checking the effectiveness of the chosen methods, methodical techniques and means. The received indices were systematized and went through mathematical handling, the results of which showed that according to all directions of testing there were positive changes in both groups, however, the results in the EG turned out to be higher, than in the CG (table 1,2). Thus, there is the necessity to analyze the received indices for the presented hypothesis verification.

While defining the level of experimental methodology means and methods influence on "speed" ability development, we revealed that in "30 meters running from a high start" test the results increase in the EG among 13-14 year-old schoolchildren in the following way: among boys by 18,9%; among girls by 15,3% with validity of differences between the stating and control results $p<0,05$. In the CG the changes were not considerable, among boys by 3,9%, among girls by 1,5%.

In "2 kg stuffed ball throwing" test, which defines the level of speed-power ability development, we revealed the same changes during mathematical handling and analysis fulfillment. In the EG there were considerable changes. They are demonstrated in a form of high indices, the increase of the studied ability among boys was 14,3%, among girls 19.7%. The validity of differences in values was $p<0,05$. In the CG changes can't be considered significant, the increase among boys was 1,5%, among girls 1,6%. High level of increase in the EG should be connected with the influence of experimental methodology means and methods. Defining the level of coordinating abilities, dexterity and quickness development we used "running along gymnastic bench with further basketball ball dribbling according to guiding points" test. The difficulty of the mentioned exercise is in a complex demonstration of motor abilities. They are characterized by the integral orientation.

Table 1. The indices change, which reflect the level of motor abilities development in 13-14 year-old schoolchildren with mental retardation before and after the pedagogical experiment

Indices	X±σ

		boys EG	boys CG	girls EG	girls CG
30 m running from high start (sec.)	1	5,3 ± 1,3*	5,2 ± 2,1	5,9 ± 1,3*	5,9 ± 1,2
	2	4,3 ± 3,1	5.0 ± 0,9	5,0 ± 1,3	5,6 ± 1,1
2 kg stuffed ball throwing (cm.)	1	397,5 ± 1,4*	397.0 ± 1,3	329,9 ±23,0*	329,9 ± 21,4
	2	454,1 ± 21,3	403,4 ± 29,4	394,8 ± 22,6	331,0 ± 23,4
Running along gymnastic bench with further basketball ball dribbling according to guiding points (sec.)	1	11,3 ± 1,2*	11,2 ± 1,5	12,7 ± 1,8*	12,3 ± 1,3
	2	8,7 ± 0,3	10,9 ± 1,4	10,6 ± 1,2	11,9±2,9
Pull-up hanging and lying support hang (quantity)	1	3,7 ± 1,1*	3,8 ± 1,4*	8,6 ± 1,0*	8,9 ± 1,7
	2	5,4 ± 2,3	4,3 ± 3,1	12,2 ± 2,6	9,0 ± 2,2
Lean forward from standing position on a bench (cm.)	1	- 4,3 ± 3,3*	- 4,1 ± 3,1*	2,5 ± 3,1*	2,5 ± 4,1*
	2	5,7 ± 2,9	- 3,2 ± 4,4	7,9 ± 2,5	4,4 ± 1,6
1000 m running (min./sec.)	1	4,24 ± 0,21*	4,23 ± 0,19	5,17 ± 11,7*	5,17 ±10,3
	2	3,48 ± 0,13	4,19 ± 0,12	4,29 ± 12,4	5,13 ± 12,8

Notes: 1 – before the beginning of the pedagogical experiment; 2 – at the end of the pedagogical experiment; * – validity of differences in terms of ($p<0,05$)

After the influence of the offered by us methodology in both examined groups we revealed positive changes, however, in the EG they were more significant: in boys the increase was 23,1%, in girls – 16,6%. In the CG the increase was on the basis of natural age related increase: in boys - by 2,7%, in girls - by 3,3%. High level of the studied motor abilities increase in the EG should be connected with the initial low result at the stating test and further influence of the experimental methodology.

Table 2. Motor abilities development indices increase in 13-14 year-old schoolchildren with mental retardation after the pedagogical experiment (%)

Kinds of tests	Boys		Girls	
	EG	CG	EG	CG
30 m running from high start	18,9	3,9	15,3	5,1
2 kg stuffed ball throwing	14,3	1,5	19,7	1,6
Running along gymnastic bench with further ball dribbling according to guiding points	23,1	2,7	16,6	3,3
Pull-up hanging and lying support hang	45,9	13,1	41,8	1,1
Lean forward from standing position on a bench	132,7	22,0	216,0	76,0
1000 m running	18,0	1,0	17,1	0,8

During the level of “power” ability determination we used “pull-up hanging at a high bar” test in boys and “lying support hang at a low bar” test in girls. During the research we revealed that there was considerable increase in the EG, in boys - by 45,9%, in girls - by 41,8%, however, in the CG results increased by 13,1% in boys and minimal increase was in girls 1,1%. Validity of differences in schoolchildren from EG and boys from the CG was $p<0,05$, in girls from the CG - $p>0,05$. The used tests for power index determination among 13-14 year-old schoolchildren with mental retardation directly depend on body mass, however, in terms of rational loads distribution they achieved high indices.

In order to define the level of “flexibility” development we used “lean forward from standing position on a bench” test. At a stating test indices turned out to be with minus among boys and with not high level of development among girls in both groups. After the pedagogical experiment the level of spine flexibility development increased in the experimental group and the control group, with validity of differences $p<0,05$, among boys from the EG and the CG the increase was by 132,7% and by 22%. Among girls from the EG and CG the increase of indices was by 216,0% and 76,0%. High ability increase was in EG because of a low result during the stating test and further pedagogical influence of the offered by us methodology. In CG considerable increase should be connected with not often use of spine flexibility increasing means.

During the experimental methodology realization we revealed that the greatest difficulty was during general endurance development, the ability estimation was held on the basis of "1000 meters running" test use. High level of increase was in EG, the indices increase was in boys by 18,0%, in girls by 17,1%. In the CG there were no practical changes, in boys the increase was 1,0%, in girls 0,8%.

4 Conclusions

On the basis of the received results concerning the experimental methodology use for the level of motor abilities increase in 13-14 year-old schoolchildren with mental retardation we come to the conclusion that offered by us methodical techniques, methods and means of the directed influence were effective for p[resented by us hypothesis verification. The level of the studied abilities in schoolchildren with mental retardation started to correspond with the indices of schoolchildren. They don't have deviations and in some kinds of physical abilities increased them. In an integral mechanism of pedagogical influence there happened positive changes in progress and behavioral indices.

References

1. V.V. Andreev, A.V. Fominykh, I.E. Konovalov, L.G. Solodukhina, Science and sport: current trends, **2**, 114-121 (2019)
2. C.F.S. Barboza, A.S.L. Ramos, P.A. Abreu, H.C. Castro, Creative Education, **10**, 714-725 (1999)
3. E.M. Kathleen, L.J. Lauren, D.M. Gail, Journal of Deaf Studies and Deaf Education, **19(2)**, 270–281 (2012)
4. G.B. Glazkova, L.A. Parfenova, Theory and practice of physical culture, **12**, 43-45 (2017)
5. D.L. Menezes, L. Marmeleira, José Disability and Health Journal, **10(1)**, 33–38 (2017)
6. L.A. Parfenova, E.A. Gerasimov, Theory and practice of physical culture, **1**, 13 (2019)
7. A.S. Sarma, International Journal of Physical Education, Sports and Health, **4**, 86-88 (2014).
8. A.S. Kuznetsov, Z.M. Kuznetsova, Russian Journal of Physical Education and Sport, **14(4),** 5-7 (2019)
9. O.A. Shokhan, R. Mohd, R. Abdul, H. Mohd, Y. Mohd, D. Ma, American Journal of Engineering Research (AJER), **8**, 29-35 (2018)