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Evaluation of General Motor Performance in Older School Age Pupils with a Moderate Mental Disability

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Abstract

The authors of the contribution deal with evaluation of general motor performance in older school age pupils with a moderate mental disability. The aim of the research was to find out differences in the general motor performance between mentally disabled pupils and non-disabled pupils. The research sample consisted of 100 pupils aged 13 to 15. They included 25 boys and 25 girls with a moderate mental disability and 25 boys and 25 girls without a mental disability. To evaluate the general motor performance, the European test of motor performance Eurofit Special was used, modified for the needs of mentally disabled persons by Jean-Claude de Potter (1996). The research confirmed that the general motor performance of the youth with a moderate mental disability was statistically significantly lower than that of their non-disabled peers.

Keywords: *motor performance, mentally disabled pupils, Eurofit Special test battery*

Introduction

Persons with a moderate mental disability have a reduced perceptual ability. They perceive concrete features while not being able to distinguish substantial from unsubstantial. They manifest also difficulties with voluntary attention. However, they concentrate well on the performance of simple mechanical actions and observation of interesting objects. What is prevailing is involuntary attention. Such

persons have a limited memory range, but a good “photographic” memory can be encountered in some cases. They retain a good mechanical memory. Their pace of learning is very slow. A moderate mental disability is the most common among all the disability levels. Children with such a disability attend special schools or special classes of normal elementary schools, sometimes normal classes integrating pupils with special educational needs. The average pace of physical development is slower when compared with their non-disabled peers. The difference gets even deeper with the higher level of the disability. What is typical of them is lower strength, speed, endurance and coordination. Their motor development closely correlates with their mental development (Gawlik and Zwierzchowska, 2004).

Research aim

The aim of our research was to find out differences in the general motor performance between the youth with a moderate mental disability and the non-disabled youth.

Hypothesis

The youth with a moderate mental disability compared with their mentally non-disabled peers is characterized by reduced motor performance.

Research questions

1. Is the performance of girls with a moderate mental disability lower than that of their healthy peers?
2. Is the performance of boys with a moderate mental disability lower than that of their healthy peers?

Research Methods

The research was carried out in February 2013 in the Associated Special School in Polanica Zdroj (Zespół Szkół Specjalnych w Polanicy Zdroju) and in the Grammar School No. 3 in Kłodzko (Gimnazjum nr 3 w Kłodzku) in the Lower

Silesian Prowince. The research sample consisted of 100 pupils aged 13 to 15. They included 25 boys and 25 girls with a moderate mental disability and 25 boys and 25 girls without a mental disability. The average IQ of the moderately mentally disabled boys was 45.5 and girls 43.8.

All the pupils attended 45- minute physical education classes 4 times a week. Within their extracurricular activities, the mentally disabled as well as the non-disabled pupils went in for similar free time sports activities, e.g. basketball, football, swimming and skiing. To evaluate their general motor performance, the Eurofit European test of motor performance was used, modified for the needs of mentally disabled persons as Eurofit Special by Jean-Claude de Potter (Potter, 1996; Skowroński, 1999; Ziemilska & Skowroński, 1996).

The Eurofit Special test battery consisted of 6 tests:

1. Standing long jump with a two-foot take off (explosive strength of the lower extremities)
2. Sit ups in 30 seconds (dynamic strength of the abdominal muscles)
3. Sit and reach (flexibility)
4. 25 m dash from the standing position (speed)
5. 2 kg medicine ball throw with one hand (explosive strength of the arms)
6. Balance walk on a gymnastics bench- A test, and on an inverted gymnastics bench- B test (dynamic balance).

To compare the general motor performance in older school age boys with a moderate mental disability and non-disabled pupils of the same age group, the non-parametric Mann-Whitney U-test was used. The reason for the application of the non-parametric test instead of Student's parametric t-test was the abnormal distribution of results in many tests of the used Eurofit Special test battery. The correlation of the general motor performance test results and their score conversions was analyzed by means of Pearson's simple correlation coefficient.

The distribution of the studied somatic parameters was normal within the population, therefore Student's t-test for independent samples was applied in the comparative analysis (Ferguson and Takane, 1999).

The non-disabled boys had a higher body weight and body height when compared with their mentally disabled peers. The difference was statistically significant at the 1% level of statistical significance. With the girls, this phenomenon was observed in the youngest group only (13 years of age). The difference did not appear in the older girls (14 and 15 years of age) (Tables 1 and 2).

Table 1. Somatic indicators of the boys

Age (years)	Non-disabled boys		Mentally disabled boys	
	BW (kg)	BH (cm)	BW (kg)	BH (cm)
13	53.0	157.9	44.2	149.9
14	57.2	167.7	41.1	152.0
15	63.0	170.9	51.6	157.4

Legend: BW- body weight; BH – body height

Table 2. Somatic indicators of the girls

Age (years)	Non-disabled girls		Mentally disabled girls	
	BW (kg)	BH (cm)	BW (kg)	BH (cm)
13	54.0	156.4	44.0	146.6
14	54.7	159.4	55.4	154.4
15	52.3	160.9	63.7	161.6

Legend: BW – body weight; BH – body height

Research Results

The research was carried out on a sample of 50 pupils (25 boys and 25 girls) with a moderate mental disability and 50 non-disabled pupils (25 boys and 25 girls). The aim was to compare the general motor performance of the above groups based on their results in the modified Eurofit Special test. The comparative analysis of individual Eurofit Special tests was made for the girls and the boys separately. Actually measured performances and scores were taken into account.

The non-disabled boys obtained considerably better results than their mentally disabled peers. All the results were statistically significant ($p < 0.01$) (Table 3).

The non-disabled girls obtained considerably better results than their mentally disabled peers. All the results were statistically significant ($p < 0.01$) (Table 4).

The Eurofit Special test results were converted to scores. The better the result was, the higher the score was. The conversion to scores did not change the picture of comparisons. The scores of the group of non-disabled boys and girls were always higher than those of the group of pupils with a mental disability. The conversion to scores made the differences in the results of both groups even more pronounced. They were all statistically significant. The unambiguous consequence of the substantial prevalence of the non-disabled youth group over the group of

Table 3. Comparison of the non-disabled boys' and mentally disabled boys' results in the Eurofit Special battery subtests

Eurofit Special tests	Boys	AM	SD	Mann-Whitney U- test		
				U	Z	p
Standing long jump with a two-foot take off (cm)	Non-disabled	180.6	17.0	0.0	6.063	<0.001
	Disabled	86.6	28.4			
Sit-ups (number)	Non-disabled	26.9	3.2	0.0	6.063	<0.001
	Disabled	12.0	3.3			
Sit and reach (cm)	Non-disabled	40.1	5.0	0.0	6.063	<0.001
	Disabled	16.8	4.2			
25 m dash from the standing position (s)	Non-disabled	4.8	0.5	74.0	4.628	<0.001
	Disabled	8.1	3.4			
2 kg medicine ball throw with one hand (cm)	Non-disabled	796.6	125.2	0.0	6.063	<0.001
	Disabled	375.3	109.0			
Balance walk on a gymnastics bench(score)	Non-disabled	5.8	0.4	147.5	3.201	0.001
	Disabled	4.6	1.4			

Legend: AM – arithmetic mean; SD– standard deviation; U – U-score; Z – Z-score; p – Statistical significance

Table 4. Comparison of the non-disabled girls' and mentally disabled girls' results in the Eurofit Special battery subtests

Eurofit Special tests	Girls	AM	SD	Mann-Whitney U –test		
				U	Z	P
Standing long jump with a two-foot take off (cm)	Non-disabled	167.0	8.9	0.0	6.063	<0.001
	Disabled	70.2	24.0			
Sit-ups (number)	Non-disabled	21.0	2.5	0.0	6.063	<0.001
	Disabled	10.7	2.7			
Sit and reach (cm)	Non-disabled	41.4	5.9	0.0	6.063	<0.001
	Disabled	13.5	3.3			
25 m dash from the standing position (s)	Non-disabled	4.9	0.5	1.0	6.044	<0.001
	Disabled	8.7	3.0			
2 kg medicine ball throw with one hand (cm)	Non-disabled	613.5	44.6	0.0	6.063	<0.001
	Disabled	252.4	63.9			
Balance walk on a gymnastics bench(score)	Non-disabled	5.6	0.5	158.5	2.988	0.003
	Disabled	4.3	1.7			

Legend: AM – arithmetic mean; SD – standard deviation; U – U-score; Z – Z-score; p – Statistical significance

their mentally disabled peers in each of the Eurofit Special tests was the statistically highly significant prevalence of the former in terms of the summary evaluation of motor skills (measured as the sum of scores) (Pictures 1 and 2).

Picture 1. Comparison of the non-disabled boys' and mentally disabled boys' Eurofit Special test results

Picture 2. Comparison of the non-disabled girls' and mentally disabled girls' Eurofit Special test results

In all the cases studied, the average results of the group of non-disabled youth (independently of the gender) were statistically significantly higher in comparison with the average results of the group of their mentally disabled peers. The most considerable difference was recorded in the third test (sit and reach), both in the boys and the girls.

The sum of scores in all six tests of Eurofit Special showed that the group of non-disabled youth (independent of the gender) had better motor skills than their peers in the mentally disabled group (Picture 3).

Picture 3. Comparison of general motor skills (sum of scores in all Eurofit Special battery tests) of the non-disabled boys and girls with mentally disabled youth

Discussion

The general motor performance of persons with various levels of mental disability and various age and gender plays an important role in their social life. A lower performance level impairs the co-existence with their environment and cooperation with others, thus their social health (Blacburn et al. 2000, Block et al. 1998, Bendikova, 2012, Kornatovska, 2014). A higher level is a chance for a longer independent life. It makes sense for these people to take care of their performance. At present, attention is focused not only on the life span, but also on its quality (Gawlik & Zwierzchowska, 2004).

Baranowski (2005, 2006) examined the motor activity of people with a moderate mental disability. To gather data, he used a questionnaire compiled by himself,

with questions about their interest in motor activities, general motor performance, care of appearance, and leisure activities. Results showed that the actual activity was lower than that declared, which was caused by poor motivation to engage in any activity. Moreover, he found out that one of the reasons for mentally disabled persons not living actively was their poor awareness of the importance of exercise for a healthy lifestyle.

In their paper, Marchewka and Schmidt (200) studied the influence of selected factors on the decision of the youth with a moderate and severe mental disability to engage in sports activities. Results showed that the motor performance and sports activities were clearly higher in the research sample attending a particular special school than in the pupils of a different specialized facility. Research also showed that pupils with a moderate and severe mental disability from a school attended mostly by children with a mild mental disability showed no interest in sports.

According to Bolach (1995), the general motor performance of 9–11 years old children with a moderate mental disability was statistically significantly lower than that of non-disabled peers in all tests of the Eurofit Special battery and increased with the subjects' age. Galecka et al. (1998) examining the motor performance in children with a light mental disability arrived at similar results.

Similarly, in their studies, Bolach (2000), Bolach & Bolach (2003), Bolach & Ficyk (2006) and Bolach et al. (2008) confirmed the findings by Marchewka and Schmidt (2000) and Markis (2001) when evaluating the general motor performance of children, youth and adults with various levels of mental disability. The authors confirmed that general motor performance depended on the IQ and motor activity, because the higher the subjects' motor activity and IQ were, the higher general motor performance was recorded.

Also Ziemilska and Skowroński (1996) carried out measurements of general motor performance, including all types of mental disability. The research sample consisted of 198 persons (111 men and 87 women). They included 115 persons with a mild mental disability, 56 with a moderate mental disability, 20 with a severe mental disability and 7 with a profound mental disability. The age of the subjects ranged from 10.5 to 56. The authors also used the methods of the Eurofit Special test battery. In the test measuring the strength of abdominal muscles, a statistically significant difference was found only between the mild and the moderate mental disability, as well as between the women and men with a moderate mental disability. A statistically insignificant result was recorded in the test measuring flexibility, since the women with a profound mental disability reached higher values than the women with a moderate and a severe mental disability.

Similar results were obtained also in our research. The general motor performance of the non-disabled youth (boys and girls) was statistically significantly higher than that of their peers with a moderate mental disability. It is clear that due to the low number of respondents the obtained results cannot be generalized and they are valid only for the sample studied.

Conclusion

1. The general motor performance of the youth with a moderate mental disability was statistically significantly lower than that of their non-disabled peers. The fact that the average IQ of the boys with a moderate mental disability was 45.5 and the girls 43.8 is considered one of the causes.
2. The non-disabled boys had higher body weight and body height in comparison with their mentally disabled peers. The difference was statistically significant at the level of 1%. Also, this fact was one of the causes of their higher general motor performance. In the girls, this phenomenon could be observed only in the youngest group (13 years of age). The difference did not appear in older girls (14 and 15 years of age).
3. The results in the test of balance walk were on average better in the group of non-disabled boys and girls than in their peer group with a moderate mental disability.
4. The average results in the standing long jump were statistically significantly higher in the group of non-disabled boys and girls in comparison with the average results in their peer group with a moderate mental disability.
5. The average results in the medicine ball throw were statistically significantly higher in the group of non-disabled youth than those in the mentally disabled group, with a more pronounced prevalence of the group of non-disabled girls.
6. The average results in the sit and reach test of both boys and girls in the non-disabled group were statistically significantly higher in comparison with those of the mentally disabled group, with a more pronounced prevalence of the girls in the non-disabled group.
7. The average results, expressed in scores, in the non-disabled group both of boys and girls were higher in comparison with those of the mentally disabled group. All the results were statistically significant.
8. Both the girls and boys in the non-disabled group obtained better average results in the sit-up test.

9. To increase the general motor performance of youth with a moderate mental disability, special attention should be paid to instruction providing development of this group's motor skills such as the explosive strength, flexibility, dynamic strength and balance.
10. On the basis of our results we would like to suggest further research in this area to examine a possible increase in the motor performance through motivation and influence on self-confidence and to verify the effect of IQ on the motor performance of youth with a moderate mental disability.

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