OVERALL ASSESSMENT OF PHYSICAL FITNESS IN CHILDREN WITH MENTAL RETARDATION IN THE TEST "EUROFIT SPECIAL"

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Annotation. *Purpose.* The aim of this research was to assess general extensive physical efficiency in children suffering from moderate mental disability with the use of "Eurofit Special" tests, and to compare general extensive physical efficiency and its components in the aspect of sexual dimorphism (Rohrer index). The research presents the problem of mental imparity (epidemiology, classification) and the issue of extensive physical efficiency. *Material, methods.* The research included 52 pupils (25 girls and 27 boys, aged 10-14) from Wroclaw Centre of Education and Rehabilitation of the Disabled. *Results.* The results of the tests proved the existence of differences in somatic body constitution of boys and girls. However, statistically significant differences between the "Eurofit Special" test results were not observed with reference to children's sex or the correlation between somatic constitution and achieved results. *Conclusions.* Somatic constitution of boys and girls aged between 10 and 14 was clearly different, and most visible in the average values of Rohrer's index, with these values being higher among girls.
Key words: mental imparity, physical efficiency, Rohrer index, test.

Introduction

Intellectual disability is one of a variety of the causes of psycho-motoric dysfunctions. In fact limitations of extensive (general) physical efficiency affect a growing number of people and the age of the affected population lowers. These limitations decrease general daily functioning and the ability to adapt to new conditions, which is closely linked to health Plomin R., et al. [13], Denysiuk L., et al. [5]. General physical efficiency of mentally disabled children has frequently been researched in a variety of fields, such as medicine, psychology, pedagogics, as well as physical education and physiotherapy Malina R.M., et al. [8]; Volkova S.S., Hotalevich E.V. [15]; Kalogerova V.G., et al. [7]; Shields N., et al. [14]; Nordstrøm M., et al. [10]; Angulo-Barroso R., et al. [1]. The results attempted to describe and classify the population of the mentally disabled, assess the degree of disability and its influence on social functioning among the people suffering from intellectual deficiency, find the relationship between physical and motoric limitations and the ability to function as a member of society or working and participating actively in social life (Bolach E. [2, 3], Marchewka A., et al [9], Plomin R. [13], Parsons C. [11], Cogulu D. [4]).

Aim The aim of this research was to assess general extensive physical efficiency of children aged 10-14 suffering from moderate mental disability and to compare general extensive physical efficiency and its components in the aspect of sexual dimorphism, measured with anthropological index, i.e. Rohrer index.

Research questions

1. What is the somatic structure of the body of girls and boys suffering from moderate mental disability at the age between 10 and 14?
2. Does general physical efficiency and its components (measured with "Eurofit special" attempts) differ between groups of boys and girls?

Material and methods

The research included 52 pupils (25 girls and 27 boys) from Wroclaw Centre of Education and Rehabilitation of the Disabled (CeKiRON). The research was carried out in February 2006. Girls constituted 48% of the research material and boys 52%. Average age of girls was 12.6 and boys 12.5. Age distribution within both groups was similar (there was no statistically significant difference between groups, $p>0.05$). All pupils suffered from moderate mental retardation. Average IQ among boys amounted to 54.8(I.I), whereas it was 58.2 among girls(I.I). The cause of mental deficiency was unidentified in the majority -62%- of the research material (social causes and others), in 27% of cases it was caused by infantile cerebral palsy and 11% by Down Syndrome. The "Eurofit special" was used to assess general physical efficiency in children with moderate mental disability (Pilicz S. [12]).

The test included additionally children's body weight measurement and height. The achieved results were used to calculate Rohrer index, which directly defined the level of somatic development in the children tested. The results were subjected to the statistical analysis (Ferguson G. A., et al. [6]).

The results and interpretation

The results analysis was carried out with regard to two aspects to assess what features of somatic structure correlated with extensive physical efficiency of children tested: 1. Somatic body characteristic in tested children and their comparison with respect to sex

2. Specific "Eurofit special" attempts results analysis in two comparable groups

Ad1. The assessment of somatic structure of the pupils in tests.

Somatic structure of intellectually disabled pupils was determined on the basis of mass and height distribution analysis in groups of boys and girls, and calculated from this data Rohrer index. Body mass distribution characteristics (the number of tested and percentage) of compared groups were presented in tab. 1.

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Table 1

Body mass distribution (the number of tested and percentage) of compared groups

	Number of tested			percentage		
Body mass klass	boys	girls	total	boys	girls	total
x<30,0	0	1	1	0%	4%	2%
30,0<=x<40,0	7	6	13	26%	24%	25%
40,0<=x<50,0	10	8	18	37%	32%	35%
50,0<=x<60,0	6	8	14	22%	32%	27%
60,0<=x<70,0	3	2	5	11%	8%	10%
70,0<=x<80,0	1	0	1	4%	0%	2%
total	27	25	52	100%	100%	100%

Average body mass among boys amounted to 46.4 kg, and 45.5 among girls. Girls were slightly lighter than boys but this difference was not of statistical significance. Collecting the results of measurement defining somatic structure of the researched population of boys and girls allowed for detailed characteristic of the researched material. Simultaneously, it facilitated the answer to the first research question. The measurements collected showed that girls were, on average, shorter and slightly lighter than boys. The differences observed among the average results, however, were not of statistical significance. Sex groups, however, differed significantly in the type of body structure defined by Rohrer's index. Average value of this index in girls was statistically higher than average value in boys. Thus girls are characterized by a more massive body structure, that is similar body mass and, at the same the, lower height value (tab.2)

Table 2

Average body mass value, height values and Rohrer index values along with standard deviations for comparison groups of boys and girls

	boys		girls		t-Student	p
	x	[sd]	X	[sd]		
Body mass	46,4	11,1	45,5	9,1	0,33	0,74
height	154,0	12,3	149,1	9,6	1,58	0,12
Rohrer index	1,26	0,17	1,37	0,21	2,01	0,05

Ad.2. Specific "Eurofit special" test results analysis and their comparison between tested groups. Results of long jump attempt in both tested groups were presented in tab.3.

Table 3

First test results. Comparison of average values between groups of boys and girls

„Eurofit Special" 1st test	Number	
Distance in cm	boys	Girls
Not done	1	0
20<=x<40	2	0
40<=x<60	1	2
60<=x<80	4	4
80<=x<100	5	7
100<=x<120	6	2
120<=x<140	1	6
140<=x<160	6	4
160<=x<180	1	0
X	100,5	103,3
[SD]	36,3	32,3
t-Student test	0,288	
P	0,774	

As the above table shows, one boy did not perform the test even though this fact did not result from body structure limitations or his functioning. The boy was excluded for calculating averages, standard deviations and testing. Despite this, average results in both compared groups did not show statistically significant differences, although slight average difference showed that girls performed better in this test than boys. Additionally none of this girls performed at

the lowest jump length level, between 20 and 40 cm, whereas 2 boys fell into this category. The biggest number of girls jumped between 80 and 100 cm. The most boys achieved results in the categories between 100 and 120 cm and 140-160 cm (6 boys each). Only one boy jumped further than 160 cm, while none of the girls achieved the result above 160 cm. Test results did not show the advantage of either of the groups tested in the long jump test. The results of the second test were presented in tab.4.

Table 4

Second test result

„Eurofit Special" 2nd test	number	
Repetition	boys	boys
Not done	2	0
5<=x<9	2	5
9<=x<13	4	2
13<=x<17	1	4
17<=x<21	9	5
21<=x<25	8	6
25<=x<29	1	**3**
X	17,7	16,8
[sd]	5,5	6,7
t-Student test	0,556	
P	0,581	

In the group of boys, 2 boys did not jump at all, although one boy attempted but was unable to rise his trunk above the matress and the attempt was not considered successful. All children put a lot of effort in quick and ever excessively accurate sit-ups. In the test, the most boys were able to do between 17 and 21 repetitions, while the girls (mostly) fell into the category of between 21 and 25 repetitions. A small number of children, only 3 girls and one boy, were able to do more than 25 repetitions within the time limit of 30 seconds. Average number of repetitions of sit-ups from the lying position amounted to 16.8 in the group of girls and 17.7 among boys, with the standard deviation respectively 6.7 and 5.5. However, the difference between average values in compacted groups was not statistically significant, which did not prove sexual dimorphism in the results of this test. The results of the flexibility test were presented in tab.5.

Table 5

Results of the third test

„Eurofit Special" 3rd test	number	
Pts	boys	boys
Not done	1	1
5<=x<10	0	1
l(X=x<15	1	2
15<=x<20	4	6
20<=x<25	6	2
25<=x<30	5	4
30<=x<35	9	6
35<=x<40	1	0
40<=x<45	0	1
45<=x<50	0	2
X	24,9	25,1
[sd]	6,3	10,0
t-Student test	0.086	
P	0,932	

Average results of this test in both sex groups were similar. For boys, the results amounted to 29.4 pts, whereas for girls it was 25.1, that is around 5-6 cm before the feet line. This shows that the majority of children tested did not reach their feet line, however the biggest group, both boys and girls, feel into the category of between 25 and 30 points (nine boys and six girls). Also two girls reached 10 cm beyond the 0 line, which showed high level of elasticity of tested muscle groups. The statistical analysis excluded children who did not carry out the test (1 boy,1 girl) however the result distribution did not show features of sexual dimorphism. Average values did not show statically significant differences, so the flexibility of tested boys and girls was similar. Flexibility tested in the 25-metre run was presented in tab.6.

Although the group of boys included three boys with clearly poorer scores, that is 11.97 sec; 12.39 sec ; and 12.40 sec, the average in the boys group was only slightly higher, and the difference between this group and the group of girls was not of statistical significance and did not show the advantage of girls in this test. It is worth noticing, however, that some of the girls did not exceed the score of 9.5 sec in the 25-metre run test.

Table 6

The results of the fourth test

„Eurofit Special" 4th test	number	
Time [s]	boys	boys
4,5<=x<5,5	8	6
5,5<=x<6,5	8	8
6,5<=x<9,5	6	5
7,5<=x<8,5	2	3
8,5<=x<9,5	0	3
9,5<=x<10,5	1	0
10,5<=x<ll,5	1	0
ll,5<=x<12,5	1	0
x	6,66	6,54
[sd]	1,69	1,30
t-Student test	0,279	
p	0,781	

The results of the penultimate test of “Eurofit special” were presented in tab. 7. Average result of shot-put was slightly better in the group of boys (2.07 m) in comparison with the average achieved by girls (1.86 m), but the difference was not statistically significant.

Table 7

The results of the fifth test

„Eurofit Special" 5th test	number	
dystans [m]	boys	boys
0,5<=x<l,0	3	3
1,0<=x<1,5	1	4
l,5<=x<2,0	8	8
2,0<=x<2,5	7	5
2,5<=x<3,0	3	2
3,0<=x<3,5	4	3
3,5<=x<4,0	1	0
X	2,07	1,86
[sd]	0,80	0,70
t-Student test	1,027	
P	0,310	

The last test assessed general balance and involved a walk on gymnastic bench in the standard position (test A) and the upside down position of the gymnastic bench (test B). The results of the test are presented in tab. 8. The difference between the last test and the previous tests was that the result was a number between 1 and 6. This required different testing of possible sexual differences.

Table 8

Numbers and percentages of pupils in groups depending on achieved scores in test six

„Eurofit Special" 6th test	Number		Percentage	
score [pts]	boys	Girls	boys	Girls
1	3	1	11%	4%
2	2	2	7%	8%
3	4	2	15%	8%
4	4	1	15%	4%
5	1	3	4%	12%
6	13	16	48%	64%
average [pts]	4,4	5,0		
Mann-Whithey test		1,32		
P		0,19		

Vast majority of those tested (64% of girls and 48% of boys) performed the most difficult version of the test (test B). In the test the percentage of girls exceeded the percentage of boys by 16%, and also the percentage of cases of girls who did not perform the test was lower. This suggested that girls, on the whole were more successful in the balance test. However, the statistical analysis did not consider the girls' advantage to be of statistical significance ($p>0.05$). The analysis helped to answer the second research question. General physical efficiency, as well as its components, did not show statistically significant difference between the compared groups of boys and girls.

Conclusions

Summing up the results of the analysis of the correlation between extensive physical efficiency and specific features of somatic constitution it must be noted that statistical calculations did not show the unequivocal fact of the existence of such correlation. "Eurofit Special" tests correlation results with averages describing somatic constitution of compared group of boys and girls were mostly too low to be considered of statistical significance, however this correlation should not be denied altogether. Statistical method used, which was to calculate correlation coefficient, did not show the non-linear correlation between tested features. It was not however a perfect tool, especially in cases where small samples are tested. Perhaps, test on bigger population numbers, considering a wider range of factors, which might possibly influence the results of efficiency tests, particular correlations may be observed. The correlation between child's physical efficiency and somatic structure seemed obvious. However, simultaneously, within the very correlation there is a number of indirect conditions such as child's previous physical activity, genetic predispositions in body structure, forms of spending leisure time, parents or careers attitude to physical condition, degree of intellectual imparity or physical disability.

Tests carried out did not show the correlation of the results achieved in physical tests and sexual dimorphism (body mass, height or Rohrer's index). This related to both compared research groups, boys and girls. No visible differences in the level of extensive physical efficiency, described by six efficiency tests, were observed between boys and girls. **The conclusions are**:

1. Somatic constitution of boys and girls aged between 10 and 14 was clearly different, and most visible in the average values of Rohrer's index, with these values being higher among girls.
2. The differences in body constitution between boys and girls resulted from the dynamic changes of the period of puberty leading to the formation of secondary sexual attributes visible in the body constitution.
3. Majority of "Eurofit special" tests results did not show the advantage of either boys or girls in terms of motoric efficiency.
4. Slight advantage of girls over boys was visible in the results of balance test. The boys were slightly better in the strength test.
5. The results of shot-put were significantly correlated with the values of Rohrer's index, however, the nature of this correlation differed in both sex group.
6. After combining sex groups a significant correlation was observed in the results of flexibility tests and body mass.

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