

DEVELOPMENT OF PHYSICAL FITNESS OF PUPILS WITH MENTAL RETARDATION

by

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The purpose of this study was to evaluate the development of physical fitness during a four year program consisting of one weekly swimming lesson and two hours of PE classes. Mentally retarded boys from a special school (grades 3-7) were investigated using the EUROFIT. The psychological control shows that 59% of the pupils are mildly retarded and 41% moderately. The analysis of variance was used for determination of differences between mild and moderate mentally retarded age groups. EUROFIT results show a trend of progression with the process of growing up, but the level of moderately retarded groups is statistically significantly lower at all age ranges ($p < 0.001$), with the exception of results in sit and reach and sit-ups tests. A comparison of average values obtained in separate tests to the average level of boys without mental retardation show that the level of mentally mildly retarded boys approximated successively during school period to average achievements of boys without mental retardation. It concerns especially these test items which include static strength as well as arm and shoulder muscular endurance. The results of this study focus attention on children and youth with mentally moderate retardation. They indicate that the overall physical capacity of children and adolescents with moderate retardation are dramatically inferior to their peers with mild retardation.

Key words: mental retardation, physical fitness, EUROFIT

Introduction

A historical review of the treatment and social status of individuals with disabilities reveals a pattern of neglect, followed by the origins of tolerance and limited acceptance. Some significant changes took place in the twentieth century, especially in the last decade, with the expansion of the current trends of integration. Today, the position of mentally retarded persons is determined by

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many declarations. The most important is the Declaration of the Rights of Mentally Retarded Persons (1971) and the Declaration of the Rights of Disabled Persons (1975). In 1995 an International Conference was held in Warsaw, where the representatives of 239 countries emphasized, that a person with mental retardation is the same human being as any other citizen (Gałkowski, 1997). Although individuals with mental retardation have a cognitive disability, it should not be inferred that they are incapable of performing physically. In fact, if there are no secondary complications other than the mental retardation, there should not be any limits physiologically speaking. "Thus, an individual with mental retardation has the same potential to develop physically as his or her peers" (DePauw & Gawron, 1995; 173). They are able to communicate even when they cannot speak. They are able to take part in life and have some influence on it. A part of them is able to control life by themselves.

Apart from the integrative trend in education, special schools exist in many countries, cities and districts. At the beginning, special schools were organized in Poland for mildly retarded children who did not fulfill the demands of the educational programs of primary schools (Wyczesany, 1998), but the verification of diagnoses done by psychologists in special schools proves that more and more pupils attending special schools are retarded in moderate degree.

The aim of special education is to provide mentally retarded pupils with knowledge and skills determined in the school program, which embrace socialization and preparing them for life, as well as development of their personality. An important part of this process is improving the level of physical fitness as well as learning skills. In recent times much attention has been directed towards developing the role of physical education for improving health and well being of children and youth with developmental disorders.

Many studies show that physical development and level of physical fitness of children and youth with mental retardation is poor (e.g. Ślężyński & Zosgórnik, 1991; Maszczak, 1991; Kijo et al. 1994; Pitetti, 2000). The deeper the retardation, the lower the physical performance (Maszczak, 1991).

The purpose of this study was to evaluate the development of physical fitness throughout a four-year program, consisting of two hours of physical education and one lesson of swimming a week.

Material and methods

The investigated children attended a special school in Gdańsk. As far as physical education is concerned, three lessons per week were held, out of which two hours were devoted to physical training and one to swimming. The examination was repeated four times, taking place once a year, in June. To enlarge the number of investigated boys the data gathered in succeeding years was added to the data obtained in primary term of investigation. For example, the results of the fourth grade gathered in 1998, 1999 and 2000 were added to the results achieved by the fourth grade in 1997. In every school grade, from grade three to seven there were 32-46 pupils, who completed testing procedures. The psychological control which took place during the time of the examination shows that 59% of the boys were mildly mentally retarded and 41% moderately.

Most of the pupils are one year behind, and a few boys are even two years behind in the school course. To control motor development all the children were divided into age groups and the degree of mental disability (Tab. 1).

Table 1. Quantity of investigated boys

Age	Mildly retarded	Moderately retarded	Total
11	20	12	32
12	25	15	40
13	26	20	46
14	21	16	37
15	21	16	37
Total	113	79	192

From the EUROFIT the following tests were used for the assessment of physical fitness: flamingo balance test, plate tapping, sit and reach, standing broad jump, handgrip, sit-ups, bend arm hang, shuttle run (10x5 m), 20 m shuttle run.

The difficulties in performing the Flamingo balance test, by nearly 40% of boys (Wyżnikiewicz-Nawracała, 1997), were the reason for its replacement by the Kiphard-Schilling balance test (walking backwards on three beams; 6 cm, 4,5 cm and 3 cm wide).

The mean values and standard deviations were calculated for boys in successive age groups with mild and moderate mental retardation. The analysis of variance (ANOVA) was used for determining differences between mild and moderate mentally retarded age groups.

The arithmetical means of separate test items obtained by boys attending the special school, were compared with the average level of boys without mental retardation. Because there has not been any Polish-wide EUROFIT examination till now, the data of boys living in the city of Poznań was chosen for comparison (Osiński & Biernacki, 1993).

Results

The level of physical fitness of mildly and moderately retarded boys is shown on the background of healthy boys attending schools in Poznań (Figures 1-8). The test results of boys attending the special school have shown a trend of progression during the school period. In all of the test items, the level of achievements of mildly retarded boys was higher than the level of moderately retarded boys. The differences between the arithmetical means are statistically significant ($p < 0.001$) for all age groups, with the exception of the sit and reach and sit-ups tests. The flexibility test (sit and reach) revealed no statistical differences between all age groups. The second one shows no statistically significant differences between the age groups of 11, 12 and 15 years.

The results of the standing broad jump obtained by both groups with mental retardation show an increasing trend with age groups (Figure 1). The results of older boys, at the age of 14 and 15 years, with mild retardation approximated the average level of the boys without mental retardation.

The achievements of "bent arm hang" test revealed high significant differences between compared groups (Figure 2). The value of arithmetical means of boys attending the special school are at the age of 11 very low, in comparison to their peers without mental retardation. During the school

education period, arm strength of the boys with mild retardation increased successively and at the age of 14 approximated the average level of boys without mental retardation and at the age of 15 it exceeds their results.

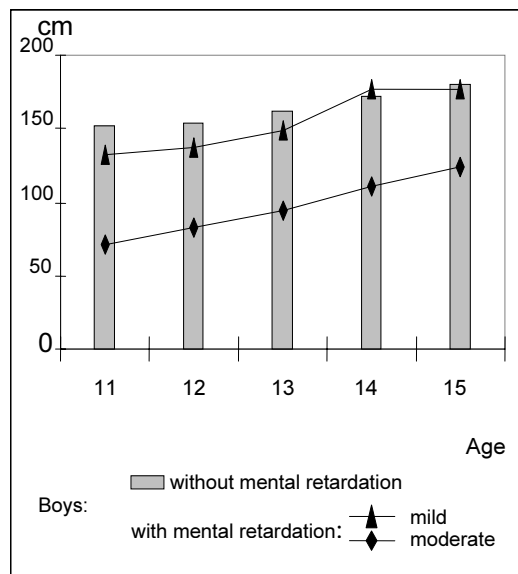


Fig. 1. Standing broad jump

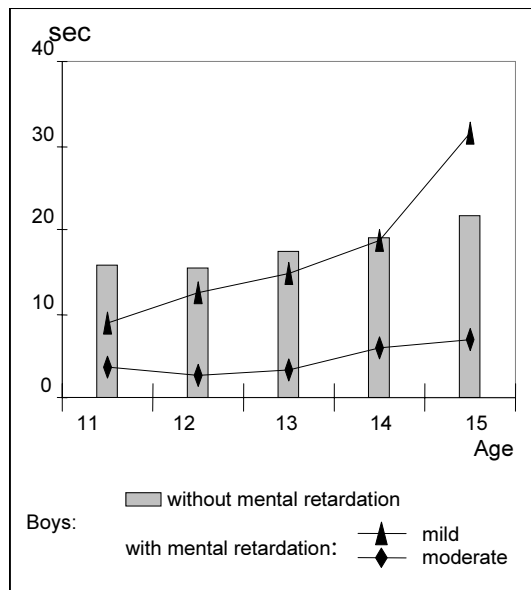


Fig. 2. Bent arm hang

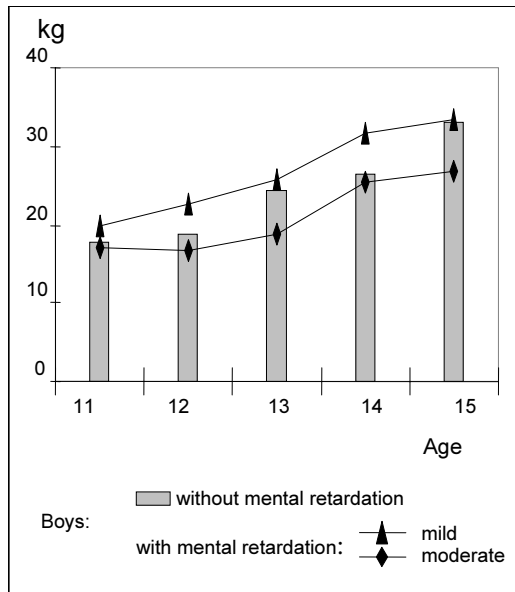


Fig. 3. Handgrip

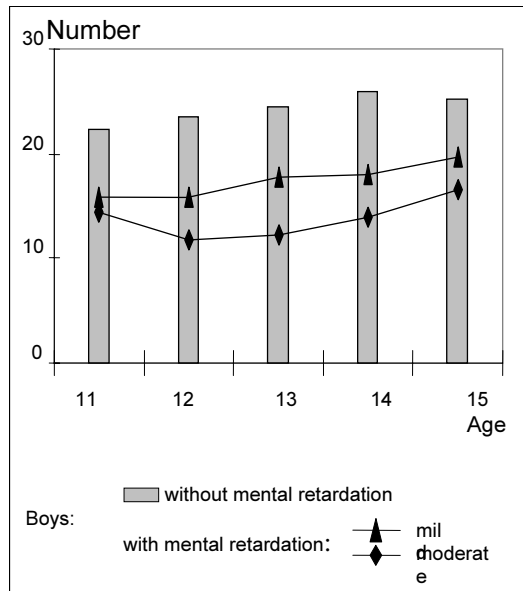


Fig. 4. Sit-Ups

Figure 3 confirms the results presented in Figure 2. The mentally mildly retarded boys achieved results in static strength (handgrip) which exceeded the

average level of the boys without mental retardation. The results of moderately retarded boys are also very high when compared with their achievements in other test items.

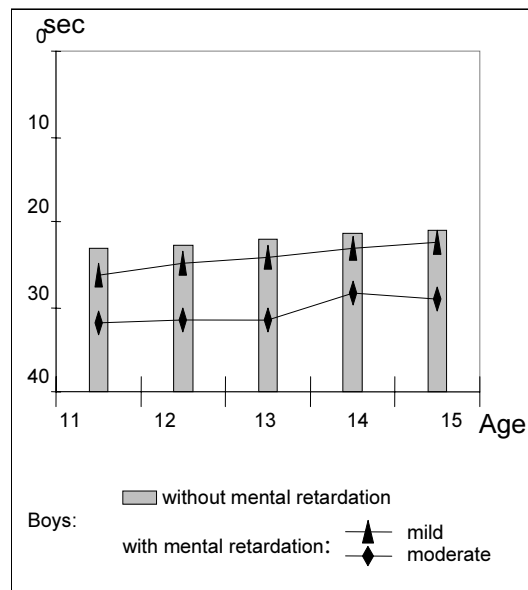


Fig. 5. Shuttle run 10x5 m

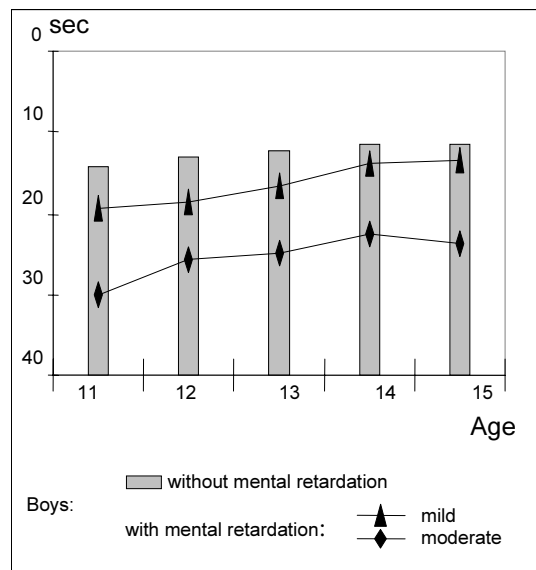


Fig. 6. Plate tapping test

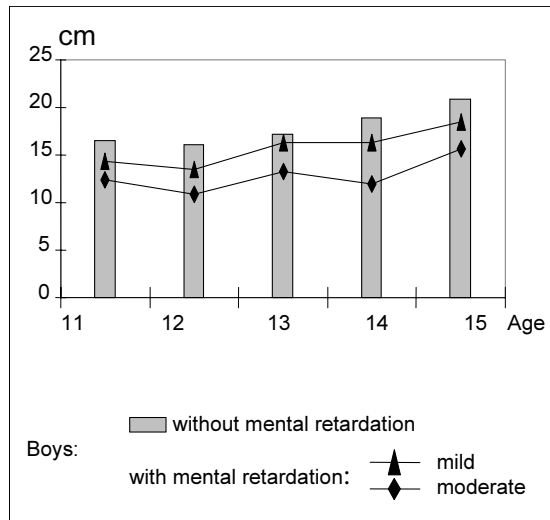


Fig. 7. Sit and reach

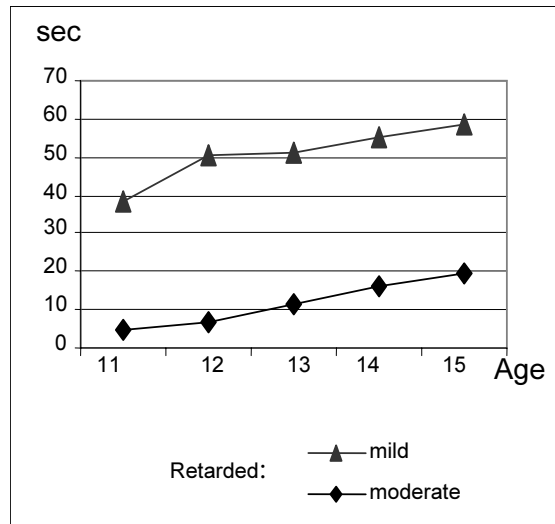


Fig. 8. Kiphard-Schilling balance test

The results of sit-ups (Figure 4) which reflect trunk strength and abdominal muscles endurance are distinctly lower in both mentally retarded groups in comparison to boys without mental retardation.

Figure 5 shows significant differences between the mildly and moderately retarded groups in running speed and agility (shuttle run, 10x5 m). The

development trends of all compared groups are nearly similar. However, it could be seen, that the mildly retarded group presents a little higher progress in comparison with moderately retarded groups.

The differences between mildly and moderately retarded age groups in plate tapping test, which reflects speed of upper limb movement are evident. They are presented in Figure 6. The level of achievements of both mentally retarded groups is lower in comparison with their peers without mental retardation.

No statistical differences have been noticed in measurements of flexibility (*sit and reach*) between mildly and moderately retarded boys. The levels of results did not approximate the averages of their peers without mental retardation (Figure 7).

The trends of results achieved by both groups with mental retardation in balance test (Kiphard – Schilling balance test) reflected the development of balance abilities during the school period (Figure 8). It could be seen that mildly retarded boys performed three times more steps than their peers with moderate retardation.

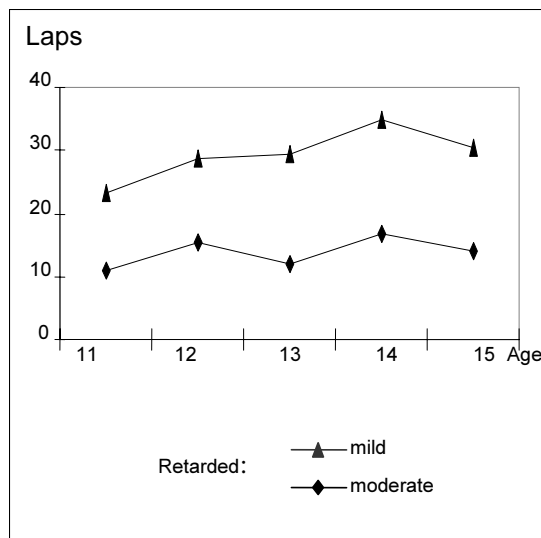


Fig. 9. 20 m shuttle run

The results of the endurance test (20 m shuttle run) reflect cardiovascular fitness (Pitetti et al. 2001). The differences between mildly and moderately

retarded age groups are statistically significant. Mildly retarded boys completed over 100 % more laps than the moderately retarded boys (Figure 9).

Discussion

The aim of this study was to evaluate the development of physical fitness during a four year program consisting of two hours of physical education training and one swimming lesson per week. EUROFIT results show a trend of progression with the process of growing up, but the level of moderately retarded boys is statistically significantly lower than the level of their mildly retarded peers. A comparison of the arithmetical means of the results obtained in separate test items shows that the level of mentally mildly retarded boys approximated successively during the school period to the average results of boys without mental retardation. It concerns especially those tests which include static strength (handgrip) as well as arm and shoulder muscular endurance (bent arm hang), which even exceeded, in the older age groups, the average level of boys without mental retardation.

Other investigators reported that mildly retarded boys show a high level of strength measured by the medicine ball throw. Their results in this test exceeded the level of boys without mental retardation at the age of 13,5 –15,5 (Maszczak, 1991, p. 77).

Kijo et al. (1994) reported EUROFIT results of early adolescents (12-14) with mild mental retardation from Łódź, comparing to control groups. The authors indicated no statistically significant differences between boys without mental retardation and with mild mental retardation in handgrip at the age of 12 –14, and in “bent arm hang” test at the age of 12-13. There were also no significant differences between the compared groups in the “sit and reach” test. These results are similar to data obtained in this study.

When comparing the boys with mild mental retardation from Gdańsk to their peers from Łódź, static strength (handgrip) was in the first group higher by about 5 kg at the age of twelve; 4.7 kg at the age of thirteen and 3.2 kg at the age of 14. It is remarkable that the boys without mental retardation from Poznań also achieved higher results in this test as their peers from Łódź. (5.3; 0.9 and 1.6 kg respectively to age groups). The boys with mild mental retardation from

Gdańsk and the boys without mental retardation from Poznań achieved also higher results in the standing broad jump than their peers from Łódź (at the age of 12 the mildly retarded boys performed longer jumps by 8.21 cm; at the age of 13 - 11.05 cm, and at the age of 14 - 17.53 cm; the boys without mental retardation jumped 10.28; 1.8 and 5.71 cm far than retarded boys.

In opposite to these results, arm and shoulder muscular endurance ("bent arm hang") was lower. It concerns both compared groups (Poznań and Gdańsk). The differences across age groups were: for Gdańsk 5.24; 3.88 5.87 s and for Poznań 3.80, 2.94, 3.76 s, respectively to the age groups.

The mildly mentally retarded boys from Łódź performed more sit-ups (dynamic trunk strength). In the speed of limbs test (plate tapping) the differences between the boys with mild mental retardation decreased with age (3.28; 0.81; 0.08 s).

There were no remarkable differences regarding running speed (10x5 m) and flexibility.

Many factors should be taken into consideration to explain the revealed differences between the presented above data. Many authors searched for relationships between motor physical capacity and basic anthropological measurements. Most of them revealed that children with mental retardation are behind children without mental retardation in physical development (body weight and height). Maszczak (1991) found a correlation between obesity and the degree of mental retardation.

Pitetti et al. (2001) evaluated the effect of body mass in the 20 m shuttle run performance by controlling Body Mass Index (BMI). When the effect of BMI was factored out, there were still significant differences between participants with mild mental retardation and without retardation.

Mentally retarded children and youth are involved in physical education at school. There are school competitions which mobilize to develop their motor abilities. Involvement in sports is very important, because it helps in the process of integration into common/able-bodied society.

Swimming lessons introduced in physical education program let the mildly mentally retarded children learn to swim and some of them to take part in competitions. One of the boys from the examined school won the Polish

championship for disabled children for two successive years. None of the moderately retarded pupils were able to learn to swim.

The results of this study focus attention on children and youth with moderate mental retardation. They indicate that the overall physical capacity of children and adolescents with moderate mental retardation are dramatically inferior to their peers with mild retardation. These children are also involved in physical education, but many of them have secondary health complications or poor health generally. Therefore, they are more frequently absent at school and they are more dependent upon others in outdoor activities.

This study shows that the conducted program of physical education influences the process of motor development in a positive way, but the children with mental moderate retardation need more support to develop their motor abilities.

The results of this study suggest the need for careful investigations embrace diagnosis of health and fitness and motor behavior to intervene with exercise (to improve or prevent declining of motor abilities).

The author is aware that the findings in this study are not completely new, but the new approach to health and physical activity as well as the tendency of integration of the people with disabilities into society oblige to deal intensively with problems of this population.

Conclusions

1. The results obtained in this study showed the trends of progression in physical fitness of mentally retarded boys in the process of growing up. The realized program consisting of one weekly swimming lesson and two hours of PE classes contributes to the changes of physical fitness. They reflected in successive approximation of boys with mentally mild retardation to average achievements of boys without mental retardation. It concerns especially these tests which include muscular strength and endurance.
2. Muscular strength and endurance are very important for the disabled because of commonly known positive relationship between health and work performance as well as independence.

3. The overall physical capacity of children and youth with moderate mental retardation are dramatically inferior to their peers with mild retardation. Developing intervention that will improve the fitness level of pupils with mentally moderate retardation is much more difficult because of their poor health condition and quite often some other disabilities. Therefore new initiatives are required to develop effective intervention strategies for children with moderate retardation.

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