LEVEL OF SELECTED FITNESS ABILITIES OF PUPILS AT PRACTICAL ELEMENTARY SCHOOLS IN RELATION TO THE AETIOLOGY OF THEIR INTELLECTUAL DISABILITY

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The objective of the study was to determine the level of the selected fitness abilities of 153 pupils (aged 10.62 ± 0.56 years) at practical elementary schools in Prague in relation to the aetiology of their intellectual disability. A unifittest battery (6–60) was used to assess the level of motor performance with regard to fitness abilities. Clear differences were found between pupils with polygenetically determined lower intellectual abilities in combination with an unstimulating upbringing or neglect, who achieved the best results, and pupils with multiple disabilities, who recorded the lowest motor performance.

Keywords: Intellectual disability, aetiology of intellectual disability, practical elementary schools, fitness abilities.

INTRODUCTION

Practical elementary schools (former special schools) are primarily designed to educate children with mild mental retardation (IQ 69–50). In recent years in particular we have encountered pupils here whose reasoning abilities fall into the intellectual below average band, or possibly even the intellectual average band, who for some reason, did not make progress at ordinary elementary schools. At these schools there may be individuals with mental and nervous disorders, with specific learning defects, slight brain dysfunctions, autistic features, mutism, behavioural defects, and sometimes a combination of defects (epilepsy, sensory defects, endocrinological defects, speech defects, motor defects etc.); a considerable number come from an unstimulating socio-cultural environment. Children come to these schools from different environments – directly from the family, from a special kindergarten, from an ordinary kindergarten, or from an elementary school. There are almost 20% more boys than girls in these schools (Dolejší, 1987). The principal differences in the work of practical elementary schools and ordinary elementary schools are the differentiated content, methods and forms of teaching and instruction, the modified working environment, the lower number of pupils in classes enabling individual treatment, the slower pace of work and greater attention paid to exercising and consolidating the acquired knowledge, skills and habits.

Our contemporary civilisation increasingly needs individuals whose excellence enables them to keep pace with the perfection of technology and, seeing that the future work process of those leaving these schools focuses mainly on manual work, a good standard of motor performance is a precondition of their successfully finding work.

In view of the considerable heterogeneity of pupils in terms of their mental development, age and sex, motor abilities, emotional factors, motivation, concomitant defects, socio-cultural background etc., teaching physical education (which is, incidentally, often undervalued) to one class can be highly demanding for a special needs teacher. We therefore regard it as essential in the teaching process to make allowance for an internal differentiation process that would lead to a more effective management of the teaching unit and would also enable individualisation according to pupils' special needs and capabilities. Besides the aetiology of intellectual disability, we see the fundamental criterion in the degree of intellectual disability, on the basis of which pupils would be split into relatively homogeneous groups with approximately the same motor ability, which would make it possible for the vast majority of them to achieve the set goals of the physical education programme.

PROBLEM

At present a relatively large quantity of results are available from empirical studies examining the differences in motor performance between children with mild mental retardation (MR) and intact children from the same age group. Those studies generally come from other countries, but in the Czech Republic relatively little attention has been paid to the assessment of the level of motor indicators for children with mild MR, or more precisely, pupils at practical elementary schools, and the professional literature only presents general facts, not exact data.

There is very little data available on the relation between the aetiology or type of MR (regardless of the degree) and the motor performance of persons with MR, especially children. Studies of adolescents and adults are concerned with a comparison of the level of motor indicators primarily among individuals with Down's syndrome, non specific MR, MR caused by organic brain damage (Frey & Kronewirth, 1981; Klempert & Hagmeier, 1981; Schumacher, 1981; Kusano & Gohara, 1990; Henderson, Illingworth, & Allen, 1991; Schantz, 1994; Angelopoulou et al., 1999a, 1999b), and autism (Okuzumi, Haishi, & Kokobun, 1994; Kokobun & Koike, 1995; Kokobun et al., 1997). Válková and Thaiszová (1989) have also made a contribution to this issue in the Czech Republic.

One of the objectives of our relatively extensive study was therefore to determine the level of the selected fitness abilities of pupils of secondary school age at practical elementary schools in Prague, in relation to the aetiology or type of their intellectual disability.

METHOD

Subjects

The research sample consisted of 153 practical elementary school pupils (61 girls and 92 boys, aged 10.62 ± 0.56 years) of two identical birth years. This involved an exhaustive survey at those schools that offered suitable conditions for and agreed with the conducting of the research (a total of 17 out of a basic sample of 24).

Based on the data acquired from content analysis of pedagogical-psychological documentation, pupils were divided into three groups according to the aetiology or type of their intellectual disability:

- group 1: the reduction in intellectual abilities was owing to an unstimulating social environment or neglect in combination with polygenetically determined lower abilities (62 pupils – 43.5% girls and 56.5% boys),
- group 2: multiple disabilities – reduction in intellectual abilities combined with other deficits e.g. ADHD, specific learning difficulties, and epilepsy, which indicates damage to the central nervous system (44 pupils – 40.9% girls and 59.1% boys),
- group 3: a simple e.g. non specific, reduction in intellectual abilities (33 pupils – 42.4% girls and 57.6% boys).

The content analysis also revealed that the sample tested included 14 pupils of average intellectual ability who had been placed in the special education system for reasons unrelated to their intellect (e.g. lack of motivation or demotivation in school, health problems, anxiety, neuroticism etc.). We excluded them from the original sample, and did not place them in any of the three groups.

Because the fundamental criterion for the research's comparative objective was the standard of intellectual ability and not comparison with a certain norm, and because the groups were relatively balanced in terms of sex and age, we do not consider viewing the groups as a whole, i.e. irrespective of anamnestic medical history indicators, as too much of an error.

Instruments

In view of basic, predominantly fitness related motor abilities and based on the author's own previous experience of testing (Lejčarová & Tilinger, 2002), a unifit test battery (6–60) (Měkota et al., 1996) was used to assess the level of pupils' motor performance. For the age category under scrutiny this involved the following tests, which comprised relatively simple and technically undemanding motor tasks: the standing broad jump, repeated sit-ups, the 12 minute run, and the 4 × 10 m shuttle run.

Procedure

The following basic descriptive statistical characteristics were used to assess the standard and consistency of performances in individual motor tests: arithmetical mean (M), median (Me), and standard deviation (SD). The substantive significance of differences in average performances was assessed using Cohen's *d* index (effect size), in which differences between two groups are standardised using standard deviation. This index operates with conventional values, which make it easier to determine when a difference is large, or when the relative substantive significance of the difference in performance averages. If *d* is greater than 0.8 we rate the difference as large; if *d* ranges from 0.5 to 0.8, the difference is rated as medium; and we treat the substantive significance of a difference below the value of 0.2 as small (Kromrey et al., 2007). When judging substantive significance we worked on the sole basis of the mean of the scores of probands who had completed a given motor task.

Some pupils could not do all the motor tests owing to permanent health limitations (heart defects, asthma, epilepsy, diabetes) and were therefore not included in the final results in the particular disciplines.

RESULTS AND DISCUSSION

In the motor indicators monitored there was a substantively significant difference between groups 1 and

TABLE 1
Assessment of substantive significance of the difference in motor test results between individual groups of pupils differentiated according to the aetiology of intellectual disability

Motor test	1–2		1–3		2–3	
	Difference	d	Difference	d	Difference	d
Broad jump	large	**1.00**	small	0.34	medium	**0.64**
Sit ups	large	**0.95**	small	0.46	small	0.46
12 minute run	medium	**0.77**	small	0.06	large	**0.82**
Shuttle run	large	**0.91**	small	0.19	medium	**0.72**

2, with group 1 achieving better results, which is confirmed by the high values for Cohen's *d*. In contrast the scores for groups 1 and 3 did not differ significantly. We again find significant differences between groups 2 and 3 (with group 3 always achieving better results), with the exception of the results for the repeated sit-ups test (TABLE 1).

Overall, group 1 emerged as the most homogenous in the level of motor performance, while in group 2 there were substantial variations.

In the selected tests, group 1 achieved the highest scores, while group 2 had the lowest level of motor performance (TABLE 2).

Unfortunately we cannot compare the data collected with any studies of research subjects from the same age group and with a similar structure of intellectual disability where similar diagnostic instruments have been used to assess motor skills. We can find some support for our findings in the work of Frey and Kronewirth (1981), who after comparing the motor performance of girls aged 13–18 with MR in the 50 metre run, the standing long jump and throwing a ball, concluded that girls with cryptogenic disabilities (i.e. of uncertain origin), partially conditioned by their environment and partially hereditary, overall had higher motor performance than girls with MR due to organic brain damage. The authors put that finding in context, recording that the first group of girls did not mostly have any organic or other physical defects. Schumacher (1981) recorded similar results for the motor performance of 23 boys aged 11.5–18.5 with MR, i.e. the same categories as in the aforementioned study.

Assessing pupils' motor performance on the basis of their scores in specific tests does not reveal the internal and external factors that their performance depends on, and which are various among pupils due to individual differences. The causes of the level of motor performance recorded for pupils in the individual groups are as diverse as the causes of their disability, and are in part identical with them. As multiple factors usually operate here, shortcomings in pupils' motor performance can only rarely be unambiguously attributed to a single specific cause. We consider organic factors, which we cover in more detail below, to be the main negative factor in the lowest scores for motor performance tests in the group with multiple disabilities compared with the other two groups, while inadequate conditions in pupils' environments, specific psychological and emotional aspects and cognitive difficulties also have an influence.

TABLE 2
Basic statistical characteristics of scores in motor tests for individual groups of pupils, differentiated according to the aetiology of intellectual disability

Motor test	Group 1				Group 2				Group 3			
	n	M	SD	Me	n	M	SD	Me	n	M	SD	Me
Broad jump[1]	62	129.66	24.07	130.5*	44	102.95	29.47	101.5	33	120.97	26.63	120
Sit-ups[2]	62	26.23	9.81	28*	44	17.14	9.30	19.5	33	21.61	10.12	22
12-minute run[3]	55	1582.55	365.20	1480*	40	1325.75	299.28	1300	31	1564.52	279.86	1540*
Shuttle run[4]	56	13.64	1.44	13.4*	44	15.33	2.26	15.1*	33	13.93	1.64	13.9*

Legend:
* abnormal distribution of data,
[1] M, SD, Me are given in centimetres,
[2] M, SD, Me are given in number of cycles,
[3] M, SD, Me are given in metres,
[4] M, SD, Me are given in seconds.

In the following part of the discussion we look more closely at pupils' difficulties in performing certain tests and the factors that could affect their performances.

Performance in the standing broad jump is fundamentally influenced by the proband's body mass (negatively), which they have to overcome, and the manner in which, primarily, the take off and landing are executed. Conversely, an above average physical height has a positive effect on performance (Čelikovský, 1986). Seeing that no substantively significant difference was found between individual groups in somatic indicators, we do not attribute a relevant role in the different standard of performances to them. Two pupils had problems jumping with their legs together when performing this motor task. For that reason we had to take appropriate measures to ensure that these boys were able to spring with both legs simultaneously, otherwise their test score could not be counted in the overall assessment.

The length of the jump is influenced both by the explosive power of the legs and also by jumping skill, which increases with the probands' age and movement experience. The standing broad jump requires a high degree of neuromuscular coordination and development of the legs' submaximal muscle strength. As this motor task represents, according to Rarick (1973), a somewhat higher degree of neuro-motoric complexity, or sensomotoric difficulty, than, say, running (not specified in greater detail by the author), it is a reasonable assumption that children's performance in the jump will be at an even lower level than their running performance, which was confirmed by our research. The substantive differences between the groups' performances (from the point of view of the magnitude of index *d*) in the jump were almost without exception greater than the differences in their performances in the 4 × 10 metre shuttle run. This fact is also indirectly confirmed by Válková and Thaiszová (1989), who found that power/speed disciplines require simple skills, but, being based on short term maximum concentration, they were relatively very difficult for juvenile individuals from the Social Care Institute.

Although the reason for the poorer performances by children with mild MR in tests of strength abilities is not absolutely clear, it is fair to assume, in accordance with Rarick (1973), that this may be the consequence of either a quantitative or qualitative defect in muscle tissue, primarily related to their physically inactive lifestyle (whereby the difference in performance compared to the intact population in this case indirectly concerns mild MR, as this is the result of external factors), or the consequence of their insufficient ability or unwillingness to mobilise their neuromuscular system to expend the maximum exertion in strength tests, or possibly a combination of the two factors. Deficits in muscle tissue mainly concern low muscle tone, or muscular hypotonia, something that, for example, Schilling (1979), Heller et al. (1996) draw attention to in this population group. By contrast, Bös (1987) claims that the reduced performance in this test is more a question of the insufficient coordination of swing and movements in the legs rather than a low level of strength in the legs. Similar conclusions were reached by DiRocco, Clark and Phillips (1987), who addressed the qualitative aspects of performance in this test among 4–7 year old children with mild MR and children of the same age without disability. They found that, although the coordination formula of legs and arms was similar among both groups, the average distance jumped by children with mild MR was at the level of those aged 2–3 years younger than the performances achieved by intact children. The authors explain this discrepancy with reference to either a lack of optimal coordination between legs and arms, which is essential for this skill, or differences in control mechanisms (the control process).

The motivation of pupils in our sample was satisfactory. This was the only motor task of the set that the majority of them had never come across.

The repeated sit ups test is dependent on body mass that the proband has to overcome, height and technique (accelerating and decelerating movement). Seven pupils scored zero – this can be attributed to a high BMI in the case of two of them. We again attribute the pupils' poorer performances in this test to Rarick's aforementioned suppositions (1973). Besides the individual standard of their abdominal and iliopsoas muscles, the problem of some of the probands also lay in an insufficient ability to exert their maximum strength and low motivation and perseverance to complete the movement (Sugden & Keoch, 1990), which manifested itself in increasingly unpleasant feelings of fatigue from the accumulation of lactic acid in the applied muscles. In a small number of individuals, however, and particularly in boys, knowledge of their co-pupils' results and a great effort to be the best had a positive influence on the final number of cycles. Based on our own experience from our previous research among 14–15 year old special schoolchildren (Lejčarová & Tilinger, 2002) we have to say that in the younger age group we observed a degree of motivation and effort of will, especially in the endurance tests (repeated sit ups, 12 minute run), that was greater than among the older pupils.

"Running technique, weight and somatometric factors considerably influence the results of the 12 minute run" (Čelikovský, 1986, 76). A higher BMI has indeed proven to be a negative factor in performance in the running endurance test among children and adolescents with mild MR (Fernhall & Pitetti, 2000; Pitetti, Yarmer, & Fernhall, 2001). After this factor is discounted, however, the differences between individuals with mild MR and their intact peers were still considerable, however;

from this the authors of the cited studies deduce that higher BMI alone cannot explain the low standard of performance in this specific population category. The strength capability of the legs of children and adolescents with MR has been seen as an independent predictor of cardio-respiratory capability and endurance ability (Pitetti & Fernhall, 1997; Fernhall & Pitetti, 2000).

From the methodological point of view, ascertaining endurance abilities is very difficult, particularly among individuals with MR. We are aware that performing field tests of long term running endurance is a problem with individuals with reduced intellectual capacities and in this regard they should be regarded merely as indirect methods for measuring endurance ability. The principal difficulty is that individuals with intellectual disability are not capable of completing the run (Seidl, Reid, & Montgomery, 1987). That is attributed to a combination of factors, including a low level of cardio-respiratory capacity, the difficulty of choosing and maintaining a suitable running pace and a lack of motivation and perseverance to complete prolonged and monotonous activity[1] in the face of discomfort related to, for example, an inability to cope with an increasing breathing frequency and fatigue, exhaustion, and even pain (Watkinson & Koh, 1988; DePauw et al., 1990; Pizarro, 1990; Baumgartner & Horvat, 1991; Fernhall, 1993; Lavay, McCubbin, & Eichstaedt, 1995; McCubbin, Rintala, & Frey, 1997; Kozub et al., 1998). Another key factor in this regard is the complexity of the task, consisting in the abstract nature of the expended maximum effort over a particular length of time, in other words understanding the point of long distance running – if a specific task is not set, or the length of track is not marked out, then many pupils soon lose interest in the run and stop (Fait, 1972; Cressler, Lavay, & Giese, 1988). Another possible factor influencing performance in the long term running endurance test is mentioned by Fediuk (1990) and Sherill (1998) – poor running technique and economy, which is then reflected in, among other things, an earlier onset and greater level of fatigue in the probands.

The substantive difference in performances between the individual groups was overall the smallest of all the undertaken fitness tests. When performing the tests, some pupils did not just display a lack of will power – they also displayed shortcomings in the emotional sphere and were governed primarily by the kind of emotional impulses that they could not satisfactorily control. This behaviour was evidently a reaction to excessive strain. The results could also have been influenced by the children's limited, or in some cases non existent experience of endurance running, which is also confirmed by Jakubec (2005) among 8th and 9th grade special school pupils in the Czech Republic; he found that 34% of the 147 questioned pupils had never performed endurance running during school physical education classes.

The aforementioned methodological difficulties in testing the endurance abilities of individuals with intellectual disability give rise to a need to construct valid and reliable field tests to measure these abilities. According to DePauw et al. (1990), the 12 minute run test cannot be a suitable measure of the cardio-respiratory capacity of adolescents with mild MR because of cognitive and motivational shortcomings. The authors recommend other modified tests that provide a substantially greater overview of their ability to perform, such as walking at a constant speed. The endurance shuttle run over 20 metres was found to be a reliable and valid indicator of aerobic capacity for children and adolescents with mild MR (Fernhall et al., 2000). In addition, Sherrill (1998) stresses that valid measurements can be made with probands with mild MR but not with persons with profound MR.

The aforementioned factors may therefore limit pupils' efforts to display their maximum performance level, which means that the performance limits in endurance running among this population may often be conditioned by factors other than their level of cardio-respiratory capacity. In this regard, a lack of opportunities for pupils to participate in movement programmes and their hypoactive lifestyle also play a major role.

The latest studies of the aerobic capacity of children and adolescents with MR (Fernhall et al., 1996; Pitetti, Miller, & Fernhall, 2000) found that the reliability of physiological responses among individuals with MR and their intact peers is similar and, at the same time, high, which is testament to the very consistent effort and motivation in both sets of individuals. To a certain extent the results of these research studies cast doubt on the earlier supposition that weak motivation and comprehension of the task among persons with MR has a negative impact on their potential maximum performance. We should note, however, that practice is important when obtaining precise data in endurance capability tests – if the test is practised, the reliability of tests should not differ between mentally retarded and intact individuals.

At present it is still not clear whether aerobic capacity is influenced by the degree of MR, as was suggested in certain field research studies[2] (Londeree & Johnson, 1974; Eichstaedt et al., 1991; in Eichstaed & Lavay, 1992), or whether their lower standard stems from MR individuals' insufficient activity and motivation. It is therefore necessary to examine the possibility of a lower

[1] This problem proved particularly serious among children with minimal brain dysfunction accustomed to busy movement activity and also at the point when the intervals between individual pupils increased in mass testing.

[2] Conversely, Rarick, Widdop and Broadhead (1970), who used a 300 yard walk/run to test the aerobic capacity of children with mild MR, state that the relationship between endurance ability and cognitive performance document a merely insignificant correlation to the profundity of intellectual disability.

maximum heart performance among the mentally retarded using laboratory tests and thus to help clarify the complex relationships between the test scores and their limitation in terms of both the cardio-respiratory and, in particular, neuromuscular system. For example, Heller et al. (1996) registered just a slightly reduced cardiorespiratory function under strain among 10 boys, with IQs of 60–80, who were aged 11–15.

"In the majority of the scrutinised indicators, discrepancies were found between the absolute values of the functional parameters of a satisfactory level and reduced values relativised to body mass or active body mass or to body surface area" (Heller et al., 1996, 127).

It seems that increased somatic development in the probands was more advanced than the development of the organism's functions and capacity.

Similar results from the study by Bar-Or, Shephard and Allen, (1971), who examined the standard of endurance capabilities among 10–13 year old children with mild MR and intact children based on physiological parameters of maximum oxygen consumption and the value relativised to body mass, do not demonstrate significant differences between sets of individuals. The authors state that the high intensity of "all out" physiological tests often means they cannot be used among this population group because of motivation, concomitant disability (primarily cardiological, neurological, pulmonary or muscular) or the premature termination of the test by probands (in the cited research 21% of children with mild MR did not complete the test, compared to 7% of the intact children). These limitations then mean that the data used for comparative purposes do not represent the entire spectrum of the performance of the mentally retarded, rather just the results of a best performing sample.

During the 4 × 10 metre shuttle run, extra attention had to be paid to the choice of running track surface, suitable footwear and time recording with regard to measurement errors. From the psychological point of view, performing the test requires control of motor coordination and the mutability of nerve processes, i.e. the possibility of rapid alternation of excitation and attenuation. Motivation is another key factor. Performance is also affected by the anatomical construction of the body influencing the leverage that can be exerted by the limbs (Čelikovský, 1977). Besides running speed, the results of this test partly reflect strength and dexterity (adaptability and ability to change movement), as well as reaction time to the start signal that depends almost exclusively on the course of the involved nerve processes. Reaction time, which is considerably longer among children with reduced intellectual capacity than the intact population (Heller et al., 1996), constitutes just a very small part of the overall time, however, and has only a limited impact on the final score in the run.

Because practical elementary school pupils, or children with mild MR, have attention difficulties, we consider it important to mention the finding of Kostadinovová (1992) that there is a significant correlation between attention and shuttle running – a lower level of attention goes hand in hand with worse performance in this test, while a higher standard of attention does not play a role in the degree of success in this test.

When performing this motor test a considerable number of pupils had difficulties following the correct running track. In exceptional cases, a change of direction caused the pupils slight spatial orientation problems, consisting in a considerable deviation from the direction towards the marker in front of them, which was naturally reflected in the resulting time. Nor must we overlook the fact that although some were able to achieve quick acceleration, difficulties always arose when estimating speed before the marker, or with slowing down locomotive movement, which is partially linked to strength capabilities. It is also necessary to draw attention to the unsuitable running style of certain children, characterised by their placing their weight on the full sole and too slow, incorrect or non existent arm movement. Graunke and Schmidt (1983) also state that on short track runs, practical elementary school pupils often display, e.g. irregular, maladroit movement, lacking in power, with a non straight trajectory, arrhythmic arm movements and inflexible, clumsy "stamping" using the full sole.

In the case of this test in particular we would like to again stress the fact that many children attending practical elementary school come from a socially unstimulating environment with a low socio-economic standard, which is reflected, among other things, in their material means. Some pupils' poor quality footwear might to some extent influence performance in this test in particular. This is a merely speculative supposition, perhaps unwarranted or even banal, but we believe that we should not ignore any, even minor factors that could negatively influence these pupils' test performances. Unfortunately we were not able to ensure objective testing conditions in this regard.

Assessing pupils' motor performance on the basis of their scores in specific tests does not reveal the internal and external factors that their performance depends on, and which have a various valence among pupils due to individual differences. The causes of the level of motor performance recorded for pupils in the individual groups are as diverse as the causes of their disability, and are in part identical with them. As multiple factors usually operate here, shortcomings in pupils' motor performance can only rarely be unambiguously attributed to a single specific cause. We consider organic factors, which we cover in more detail below, to be the main negative factor in the lowest scores for motor performance tests in the group with multiple disabilities compared with the other two groups, while inadequate conditions in pupils' environments, specific psychological and emotional aspects and cognitive difficulties also have an influence.

A large proportion of the deficiencies in motor performance among pupils with mild MR is associated with organic brain damage. In that context Schilling (1979) points out that we must anticipate the possibility of limited motor performance for any disability in childhood. Of course, according to the author it is also true that such disabilities only lead to serious and long term motor defects if an organic condition is discovered, or if other unsuitable conditions are involved.

Many shortcomings in the motor performance of some pupils at practical elementary schools can, with a high degree of probability, be attributed to the aforementioned minimal brain dysfunction. Among those children in gross motor skills there are typically developmental defects (motor infantilism), defects in the harmonising and coordination of movements, i.e. an inability to perform multiple movements simultaneously to produce a complex movement comprising individual movements, defects in rhythmic movement, defects in directed movements (performing many more movements than necessary) and defects in movement memory, which are primarily apparent in larger complex movements where the sequence of individual movements is defective and the overall performance therefore worse. In short the children appear clumsy (Třesohlavá, 1986; Černá et al., 1999). Their specific psychological features (perceptual, emotional and behavioural dysfunctions and dysfunction in concentration and attention) may also negatively influence their test scores, and also complicate motor learning. The approach adopted when testing those pupils' motor skills is derived from those factors: it is necessary to guide the children individually in a way that allows the true level of motor performance to be ascertained as accurately as possible, as their performance at any one time may be influenced by agitation, insufficient attention, a momentary fluctuation in performance, lack of motivation, overall mental instability, a decline in their interest in the task in question, fatigue, etc. For a clumsy, unfocused and unstable pupil, the testing may be unpleasant or too demanding, with the consequence that the pupil refuses to cooperate, runs away and focuses on something else. The pupil is easily fatigued and performing tasks to order within a specific time limit is a source of frustration.

Schilling (1979) states that the differences between children with organic brain damage and children with no brain damage are primarily apparent in dynamic physical coordination, simultaneous coordination, the coordination of fine motor performance, balancing and strength abilities and the rapidity of the movement of the hand and fingers. It is evident from this that organic brain damage is always accompanied by defects (a milder qualitative change in movement) or defects in coordination (a major, pathological change in the quality of movement). While coordination defects, which occur more frequently among pupils at practical elementary schools, may, according to Kiphard (1990), be caused by inadequate stimuli for movement in their environment, and by constitutional, biological and psychological factors, or due to delayed maturity and light brain dysfunction, for coordination dysfunction it is always necessary to anticipate pathological factors in the central nervous system. In both cases the dynamic, swing and strength movements of the body and limbs are limited. There is often a marked deficiency in strength abilities, especially "jumping" abilities, which is documented in our study by the high values for the *d* index, pointing to a considerable substantive difference in the scores for the standing broad jump between groups 2 and 1. According to the author, injury to the cerebral cortex is often responsible for that quantitative loss of strength and rapidity.

CONCLUSION

Our study at practical elementary schools in Prague confirmed the dependency between the level of selected fitness abilities and the aetiology of pupils' intellectual disabilities. That fact was unambiguously demonstrated by a comparison of the scores achieved by pupils with polygenetically-determined lower intellectual abilities combined with an unstimulating upbringing and pupils with multiple disabilities, who achieved the worst results in the tests. The scores achieved in motor tests by neglected pupils and pupils with simple, or rather non specific, intellectual disabilities did not differ significantly. We found substantively significant differences in all tests between pupils with multiple disabilities and pupils with simple intellectual disabilities (with the latter group always achieving better scores), with the exception of the repeated sit ups test.

The research results highlight the urgent need to devote adequate attention to the motorics of practical elementary schoolchildren. In particular, the motor shortcomings identified in children with multiple disabilities may be considered a barrier to their mobility training when instilling basic work and life habits, and consequently in social adaptation, or integration; there is no doubt, however, that they too have sufficient prerequisites for development of their motor abilities, within the context of their disability.

The low level of motor performance among these pupils is primarily apparent in their soon becoming fatigued during practical activities that are part of the curriculum for practical elementary schools, and during any later vocational training. It is necessary to be aware of the importance of transferring fitness abilities to daily life, where they have a very broad application, and therefore should be adequately developed among this group of the population.

We cannot view the low standard of motor performance in the studied children merely from the viewpoint of the aetiology of intellectual disability; it should also be seen in terms of their personality and external conditions represented by, for example, the physical education process at practical elementary schools, the family, etc. The emphasis in educational work should therefore be placed not only on practical activity and assimilation of the practical skills necessary for involving these children in the ordinary life of society, on manual dexterity and work habits; emphasis should also be placed on the overall development of motorics in physical education. As a final point, we would like to point out that children's motor abilities are not the only precondition of movement activity in an occupation or sport; success in these areas is also conditional on prerequisites such as constitution, personality qualities and performance motivation.

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ÚROVEŇ VYBRANÝCH KONDIČNÍCH SCHOPNOSTÍ ŽÁKŮ ZÁKLADNÍCH ŠKOL PRAKTICKÝCH V ZÁVISLOSTI NA ETIOLOGII JEJICH INTELEKTOVÉHO POSTIŽENÍ

(Souhrn anglického textu)

Cílem realizované studie bylo zjistit úroveň vybraných kondičních schopností 153 žáků středního školního věku (10,62 ± 0,56 roků) na základních školách praktických v Praze s ohledem na etiologii jejich intelektového postižení. K posouzení úrovně motorické výkonnosti se zřetelem ke kondičním schopnostem byla použita testová baterie Unifittest (6–60). Zcela jednoznačné diference byly zjištěny mezi žáky s polygenně podmíněným nižším intelektovým nadáním v kombinaci s výchovnou nepodnětností, popř. zanedbaností, kteří dosáhli nejlepších výkonů, a žáky s multihandicapem, u nichž byly naopak zaznamenány nejnižší motorické výkony.

Klíčová slova: intelektové postižení, etiologie intelektového postižení, základní školy praktické, kondiční schopnosti.

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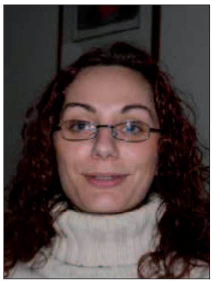

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Scientific orientation

Scientific-exploration activity in the field of special education and kinanthropology with focus on motoric and adapted physical education and sport in persons, especially children with intellectual disabilities, learning disabilities, attentional deficits and children of Romany origin.

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