

ABSTRACT

Health and lifestyle are associated with physical activities that should constitute the daily routine of everyone. It is believed that physical activity is now more important than ever, especially if we bear in mind the increased occurrence of obesity and the diseases that accompany it. Within the project “Anthropological status and physical activity of the population of Vojvodina” various surveys have been carried out among pre-school and school-age children in Vojvodina from March to June 2006. In a sample of 844 male respondent (aged between 6-10) motor characteristics measurements have been carried out. The study also includes the comparison of the following motor abilities – strength, speed, agility and coordination by using certain tests, between children engaged in extracurricular sports activities and children who are active only in classes of physical education. The results show that children with additional sports activities achieved better results than children who do not engage in sports.

Keywords: *motor abilities, extracurricular sports activities, physical education classes, boys*

ÖSSZEFOGLALÓ

Az egészség és életstílus összefüggésben van a fizikai aktivitással, amely a mindennapok részét kellene, hogy képezze. A fizikai aktivitás jelentősége megnövekedett, ha figyelmebe vesszük az elhízást és a betegségeket, amelyek társulnak hozzá. Az “Antropológiai állapot és fizikai aktivitás Vajdaságban” elnevezésű projektum részeként óvodáskorú és alsós gyerekeket mértek fel Vajdaságban 2006 márciusától - júniúsig. A munkában 844, 6-10 éves vajdasági fiú motoros fejlettségét vizsgálták. A következő motoros képességeket vizsgálták: erő, gyorsaság, mozgékonyaság és koordinációt az iskolán kívüli sporttevékenységet folytató és csak testnevelés órákra járó gyerekeknél. Az eredmények azt mutatják, hogy az iskolán kívüli sporttevékenységet folytató fiúk motoros képességeik a fejlettebbek.

Kulcsszavak: *motoros képességek, iskolán kívüli sporttevékenység, testnevelés órák, fiúk*



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ANALYSIS OF MOTOR ABILITIES IN TERMS OF ENGAGEMENT IN EXTRACURRICULAR SPORTS ACTIVITIES OF YOUNGER SCHOOL-AGE CHILDREN

*A motoros képességek fejlettsége az iskolán kívüli
sporttevékenységet folytató alsós gyerekeknél*

*Razvijenost motoričkih sposobnosti kod dece mlađeg
školskog uzrasta koje se bave vanškolskih sportskih
aktivnostima*

Introduction

The aim of any society is to incorporate as many positive characteristics and abilities into young people as possible, through education. Physical education is a significant factor in this chain. Physical activity is positively associated with academic achievement (Coe et al., 2006), cognitive abilities (Ellemborg, 2010), and general physical self-validation (Crocker, Kowalski & Hadd, 2008). It is highly required to incorporate the integral personality development into pre-school education, and with the cooperation of families the desired goals would certainly be achieved. Such tendencies in our society do exist. Physical activity is an option that should be part of pupils' free time activities, however current trends do not show such development. As part of the school curriculum and leisure time, physical activity, unlike other subjects, does not involve reproductive learning of facts, but emphasizes physical growth and development (Prskalo, 2004).

Physical activity is a complex multifactorial behavior under the influence of environmental and biological factors (Thorburn & Proietti, 2000). It represents every movement of the body caused by the activity of skeletal muscles, which leads to greater energy consumption in comparison to the state of inactivity (Casparsen, Powell & Christenson, 1985; Bouchard, Shepard & Stephens, 1993).

The lack of physical activity and poor eating habits have been identified as causes of obesity (Goran & Treuth, 2001; Karsai et al., 2013), which was detected among almost one-fifth of children and youth in Serbia (Institute of Public Health "Dr Milan Jovanović Batut", 2006).

However, only in the higher grades of primary school children through physical education and extracurricular activities are able to fully exercise their physical development (Kalajdžić, 1996). The question is what about younger school-age children?

The aim of this study is to analyze the trend of motor abilities development among younger school-age children (6-10 years old), who attend only physical education classes versus children engaged in some extracurricular sports activities. The survey was conveyed within the research program titled “Anthropological status and physical activity of the population of Vojvodina”, which was co-financed by the Provincial Secretariat for Science and Technological Development, and was realized by the Faculty of Sport and Physical Education in Novi Sad.

Method

The sample of respondents consisted of 844 boys who were attending junior section of primary school on the territory of Vojvodina, in the following municipalities: Novi Sad, Bačka Palanka, Sremska Mitrovica, Sombor and Zrenjanin. The age of the respondents was defined in the form of decimal years and based on that eight age groups were formed. Two groups were formed on the basis of engagement in some extracurricular sports activities; one group included boys engaged in such activities (3 times a week, 4 hours) (Athletes) and the other included boys who attended only physical education classes (Non-athletes).

Table 1 Age groups of boys and the number of respondents

Boys (decimal years)	Group	Number of respondents (N)
6.00-6.49	1	160
6.50-6.99	2	156
7.00-7.49	3	105
7.50-7.99	4	88
8.00-8.49	5	89
8.50-8.99	6	114
9.00-9.49	7	68
9.50-10.00	8	64
Total		844

The battery of motor tests based on experiences with adult respondents was applied and modified for children (Bala et al., 2007).

These were the following:

1. test for the assessment of explosive strength of legs – 20 meters dash
2. test for the assessment of body coordination – obstacle course backwards
3. test for the assessment of movement frequency – hand tapping

4. test for the assessment of flexibility – seated straddle stretch (seat-and-reach)
5. test for the assessment of explosive strength of legs – standing broad jump
6. test for the assessment of static strength of arms and shoulders – bent arm hang
7. test for the assessment of repetitive strength – sit-ups in 60 seconds.

The following basic parameters were calculated for each motor variable and for each age group: arithmetic mean (AM), standard deviation (SD). The significance of differences between arithmetic means for each variable in relation to the age groups of the respondents within the groups of athletes and non-athletes was determined by using the univariate analysis of variance. The trend of development of motor abilities among boys of younger school-age is shown graphically for each motor ability separately.

Results

Table 2 presents basic descriptive statistics for all motor tests in all age groups for athletes and non-athletes. Application of ANOVA test showed that in all motor tests among both athletes and non-athletes there are statistically significant differences between age groups, at the level of $p \leq 0.05$.

Table 2 Differences in motor variables between age groups

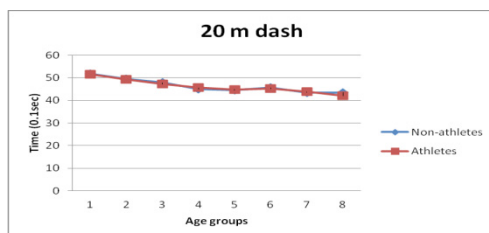
Variable	NON-ATHLETES						ATHLETES					
	Age groups	n	Mean	SD	f	p	n	Mean	SD	f	p	
20m dash (0.1s)	1	44	51.77	4.97	13.44	0.00	116	51.67	5.20	38.27	0.00	
	2	43	49.44	4.99			113	49.41	5.84			
	3	25	47.96	4.24			80	47.18	4.93			
	4	15	45.00	3.54			73	45.60	4.05			
	5	21	44.57	3.07			68	44.85	3.69			
	6	20	45.65	3.37			94	45.16	4.05			
	7	14	43.50	4.12			54	43.87	3.47			
	8	13	43.54	2.78			51	42.08	3.40			
Obstacle course backwards (0.1s)	1	44	287.45	87.56	2.71	0.01	116	299.33	113.07	12.32	0.00	
	2	43	264.09	102.12			113	267.12	100.29			
	3	25	243.04	63.32			80	240.57	89.73			
	4	15	241.40	76.28			73	237.99	99.57			
	5	21	253.86	66.71			68	231.54	96.16			
	6	20	256.50	116.83			94	223.91	74.42			
	7	14	234.07	71.26			54	208.69	66.36			
	8	13	178.00	31.95			51	181.67	50.44			

Hand tapping (freq.)	1	44	16.41	3.67	10.74	0.00	116	16.48	3.34	30.85	0.00
	2	43	16.56	3.56			113	17.78	3.36		
	3	25	19.40	3.27			80	19.19	3.29		
	4	15	19.60	3.31			73	19.15	3.54		
	5	21	18.62	2.92			68	19.79	3.42		
	6	20	21.55	3.10			94	20.39	3.63		
	7	14	21.36	3.56			54	22.13	3.80		
	8	13	22.00	2.44			51	23.35	3.35		
Seated straddle stretch (cm)	1	44	37.82	8.40	5.67	0.00	116	39.54	8.11	13.61	0.00
	2	43	40.30	8.58			113	40.36	7.25		
	3	25	46.00	10.59			80	42.16	8.08		
	4	15	40.33	7.36			73	42.14	7.45		
	5	21	45.33	8.42			68	44.66	9.16		
	6	20	43.85	7.61			94	47.45	8.60		
	7	14	47.50	9.99			54	46.98	7.96		
	8	13	50.62	6.71			51	47.98	9.58		
Standing broad jump (cm)	1	44	109.09	18.50	5.81	0.00	116	111.90	16.94	26.56	0.00
	2	43	118.93	19.90			113	119.06	17.38		
	3	25	125.40	22.73			80	126.78	18.59		
	4	15	120.73	21.45			73	129.25	22.87		
	5	21	129.38	19.48			68	132.72	20.32		
	6	20	131.60	20.22			94	136.17	20.29		
	7	14	135.50	25.93			54	139.70	22.11		
	8	13	137.85	15.55			51	145.71	19.49		
Hang arm bent (0.1s)	1	44	134.09	119.67	1.56	0.14	116	129.34	105.31	4.81	0.00
	2	43	159.47	152.95			113	157.60	125.69		
	3	25	163.20	161.33			80	185.19	162.62		
	4	15	188.87	153.72			73	214.62	170.90		
	5	21	209.00	190.12			68	217.94	191.50		
	6	20	163.90	145.81			94	208.60	193.20		
	7	14	190.86	187.49			54	227.35	233.72		
	8	13	20.77	16.55			51	25.71	23.04		

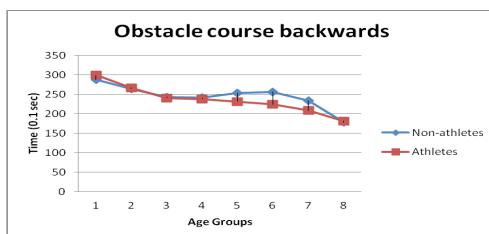
Sit-ups (freq.)	1	44	23.34	10.15	3.49	0.00	116	23.15	9.43	19.11	0.00
	2	43	26.37	8.41			113	24.74	8.15		
	3	25	27.28	9.73			80	27.41	7.85		
	4	15	29.80	5.06			73	29.51	9.07		
	5	21	28.10	7.64			68	29.53	7.89		
	6	20	30.15	6.94			94	30.61	8.12		
	7	14	29.71	7.66			54	33.41	6.78		
	8	13	34.54	8.55			51	35.14	6.64		
			F=0.53	P=0.00			F=8.53	P=0.00			

Legend: *N* – number of respondents; *AS* – Arithmetic mean; *S* – Standard deviation; *f* – univariate ANOVA *f*-test; *p* – statistical significance of *f*; *F* – Multivariate MANOVA *F*-test; *P* – statistical significance of *F*

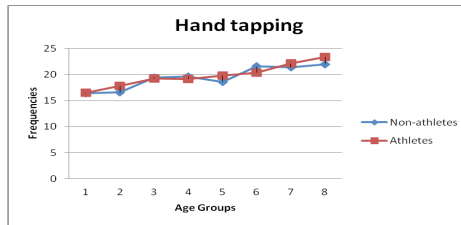
The analysis of the arithmetic means in all variables in both groups shows improved results with age.



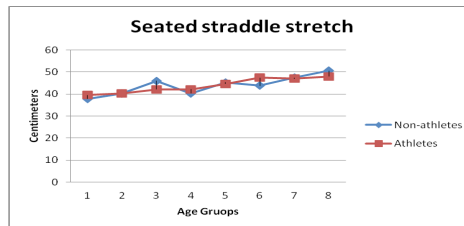
The slight trend of improvement of results can be observed for both groups regarding the 20 meters dash test (Chart 1). Only very small differences were observed, the results are almost identical.



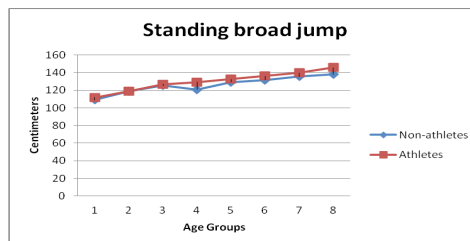
Regarding the Obstacle course test (Chart 2) reverse trend of results for athletes follows the line of improvement. While for non-athletes stagnation can be observed for groups 5 and 6, and a sudden increase or acceleration for group 8, i.e. 9.50-10.00 decimal years.



Regarding the Hand tapping test (Chart 3) a slight continuous improvement is observed among athletes, while there is a small stagnation among non-athletes from groups 2 and 5, while in group 6 they even have a small advantage.



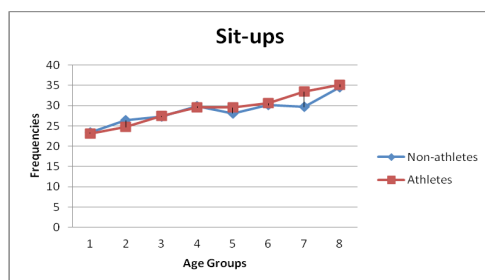
Regarding the Seated straddle stretch test (Chart 4) athletes achieve continuous development of flexibility, while non-athletes have lower results in groups 1, 4 and 6, while their results are better in groups 3 and 8.



A slight improvement both among athletes and non-athletes was observed with only a small stagnation in group 4 for non-athletes. Athletes achieved better results in all age categories regarding the Standing broad jump test (Chart 5).



Regarding the Bent arm hang test (Chart 6), the situation is specific. In the very beginning, among the youngest respondents average values for athletes and non-athletes are almost identical. In the groups 3 and 4 difference was significantly greater in favor of athletes, and the same difference remains almost until the end.



Regarding the Sit-ups test (Chart 7) the youngest athletes achieve higher results, then the results decrease a bit, and for the group 4 results rise to the same level of the number of sit-ups. Athletes achieve better results. Continuous slight improvement was observed among athletes, and only for groups 6 and 8 a stagnation was found.

Discussion

The trend of motor skills development in this study is, with minor deviations, very similar in both groups, which confirms earlier research.

Data from the study provide the opportunity to rethink about the needs of children. It is encouraging that there is a desire and interest of children to exercise beyond physical education classes. This phenomenon is highly useful. Primarily we need to react, because we have the opportunity to influence the growth and development of children through good curriculum. During this period, certain motor skills, such as explosive strength, speed, balance, can be influenced the most, while endurance, coordination, accuracy, agility and balance are developed constantly (Gužalovski, 1984). Physical activity is an important characteristic of the physical education class, and it must be fully adapted to pupils. Teachers are the ones who must focus their full attention, more as a precondition than a condition, on achieving high-quality physical education class. In physical education classes male and female pupils are equally active, but it is observed that the intensity of the classes is generally low. This is probably a consequence of the physical education curriculum, which, in elementary school, is largely focused on training or elementary acquisition of motor skills, so that children in the period of intensive growth are deprived of intense physical effort (Djokić, 2014). A motivation is needed for children to be active during the classes. Motivation, for each individual, is an important psychological component that determines life goals. As an integrative segment, it must be incorporated in the entirety of human being with all other characteristics, so the ultimate goal can be

achieved. Inevitably, motivation is an important segment of the teaching process and therefore physical education.

The study results showed improvement in all performed tests in both groups. Of course, what was to be expected, the athletes performed better in the tests, also has been proven, with some exceptions: e.g. flexibility. The greater the muscle mass the lower flexibility, which means that athletes have more developed muscles. Notwithstanding the improvement, it would be very wrong to let the realization of motor potential of children to maturation. The obligation of every parent or guardian, school and all those who deal with pupils, is to create favorable conditions in order to fill part of the pupils' free time with some form of physical exercise, and certainly the organized form of physical exercise would be the best one.

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