DIFFERENCES IN SOME ANTHROPOLOGICAL DIMENSIONS BETWEEN 11 - 13 YEAR OLD ATHLETE BOYS AND NON-ATHLETE BOYS

Adi Mujičić[1], Edin Užičanin[2], Vlatko Šeparović[2], Fuad Babajić[2]

[1]High School "Žepče", Bosnia and Herzegovina
[2]Faculty of physical education and sport, Tuzla University

Original scientific paper

Abstract
The main aim of this research was to determine the differences between 11 to 13 year old athletes and non-athletes. The study was conducted on a sample of 110 boys aged 11.7 ± 2.5, divided into two sub-categories: The first sub-sample of 50 boys - athletes (body height: 153.6 ± 9.9, body weight: 46, 3 ± 10.6, body fat percentage: 15.9 ± 7.9), who in addition to regular physical education classes had additional physical activities, i.e. were the basketball school attendees. The program was realized from April to September (six months), twice a week for 1.5 hours. The second sub-sample of 60 non-athlete boys, (body height: 152.3 ± 7.9, body weight: 46.1 ± 10.3, body fat percentage: 15.9 ± 6.6), who had regular physical education classes but have not had any additional organized physical activity. T-test results for the independent samples showed a significant difference between athletes and non-athletes in two applied tests: MAGTUP - running in a rectangle and MFESDM - long distance jump in favor of athletes.
Key words: basketball, motor skills, development, additional activities

INTRODUCTION

Today, physical activity is one of the most important factors for normal development of the organism as a whole. Tracking and evaluating the qualities and abilities is extremely important for optimal growth and development as well as for each person's health. The modern way of life turns children, students and youth into sedentary civilization with countless negative effects, most common one being the growing percentage of obese children and adults, with a tendency of early registration and monitoring of chronic diseases. Unfortunately, such a trend continues even though the positive effects of regular physical activity were proven and consolidated in the Declaration of the World Health Organization WHO.

According to the definition of the World Health Organization, a person who during one week devotes less than 30 minutes to activities that elevate heart rate, cause heat exhaustion and shortness of breath, is physically inactive. Modern public health approaches encourage at least 30 minutes of physical activity per day.

It is noted that children and youth do not spend the time estimated for psychophysical rest and recovery as best as they should, that is, they spend most of their time in sedentary inactivity, which can lead to unwanted consequences for the functionality and health of the organism. (Užičanin, 2012).

According to the results of the survey on the health behavior of schoolchildren, conducted in 2002 (Federation of BiH), the rate of physically inactive students between 11-13 years old is 27.2%. The rate is lower for boys (21.3%) than for girls (33%). Physically inactive students are defined as those who are never active or are active two days per week or less.
Students should be offered as much attractive contents as possible, adapt them to their age, the degree of their characteristics and abilities, the level of their motor skills and achievements or, in simple terms, enable each student to take the teaching process in accordance with the current state of their anthropological status (Ozdirenc 2005) .

It is known that the use of motor stimuli just within the regular physical and medical education classes is in most cases insufficient to cause significant improvements to anthropological status. Therefore, it is necessary to constantly encourage students to engage in additional sports activities outside the regular classes according to their preferences. (Bratičević 2008).

Recent research on ontogenesis of schoolchildren and youth shows that the development of particular anthropological abilities and characteristics, especially the motor skills, should begin as early as possible, that is, during the periods when there are optimal endogenous and exogenous conditions, based on planning, programming and implementation of control of the physical exercise process (Breslauer 2008).
The main goal of this research is to identify differences in certain anthropological dimensions of 11 to 13 year old athlete boys.

RESEARCH METODOLOGY

Sample of respondents

Tests were conducted on a sample of 110 boys aged: 11,7± 2,5, who were divided into two sub-samples:

- Sub-sample of 50 boys - athletes (body height: 153.6 ± 9.9, body weight: 46.3 ± 10.6, body fat percentage: 15.9 ± 7.9), who in addition to regular physical education classes had additional physical activities, i.e. were the basketball school attendees. The program was implemented from April to September (six months), twice a week for 1.5 hours.
- Sub-sample of 60 boys, non-athletes (body height: 152.3 ± 7.9, body weight: 46.1 ± 10.3, body fat percentage: 15.9 ± 6.6), who had regular physical education classes but had no additional organized physical activity.

The sample was conceived so that all children (respondents) were treated as non-athletes at the initial testing.

A criterion for inclusion in the study was that the respondents did not have any bodily injuries or psychological disorders that would impede with their performance in the experiment. All respondents as well as their parents were familiar with the experimental design of the study, testing, and the potential risks and benefits of the research. Everyone was told that they could leave the research at any time, without any sanctions. After that, the respondents who volunteered to participate in the research, have their parents sign a written consent for participation in the research, which was carried out according to the principles of the Helsinki Declaration on experimentation on living subjects (WMADH, 2000).

Sample of Variables

The variable sample consisted of 5 variables for evaluation of morphological characteristics: (AVISTJ - body height, AMASTJ - body weight, FAT% - body fat percentage, BMI - body mass index, FATMASS - total weight of fat mass), and 10 variables for evaluation of motor skills: MBFTAR - hand tapping, MFLPRK - forward bow, MKOOSS - figure eight with crouching, MAGTUP - rectangular run (envelope test), T-test - agility test, CMJ - standing vertical jump with preparatory phase, MBAFLA - flamingo balance test, MESBML - throwing medicine ball while lying, MRSPTL - sit ups, MFESDM - standing long jump).

Test protocol

On the first day of the study, in addition to familiarizing the respondents with the tests, the measurements were taken of the height (by anthropometer), the weight, and the percentage of fat tissue by Tanita scale (Tanita TBF-300 precision 0.1%, Tokyo, Japan) and circumferences. After ten-minute general warm-up protocol (walking, running, jumping, dynamic stretching) and a two-minute break, motor skills testing was carried out. The order of motor skill testing was such that it was impossible to sequentially activate the same set of dimensions in order to avoid the effects of the oversaturation and possible negative transfer. Each test was performed the same way, giving respondents verbal instructions to give their maximum during the tests. All tests were performed in sports halls in the afternoon hours during physical education classes.

Methods for data analysis

T-test for independent samples was used to determine the statistical significance of the differences between the groups in all variables. The Kolmogorov-Smirnov test was used to check the normality of the data distribution. All statistical analyses were done with the statistical data processing software package IBM SPSS (Version 24.0).

RESULTS AND DISCUSSION

Kolmogorov-Smirnov test was used to estimate the normality of distribution. Given the obtained values, it is notable that the results on all dependent variables for both groups were normally distributed ($p > 0.05$).

The results of the T-test for independent samples (Table 1) showed that there is a significant difference between athletes and non-athletes in some anthropological dimensions. There was a significant difference in the two variables: MAGTUP - envelope test (athletes: $M = 7.70$; $t(108) = 3.73$; $p = 0.01$; non-athletes: $M = 8.67$; $T(107.3) = 4.23$; $p = 0.01$) and MFESDM - standing long jump (athletes: $M = 196.7$; $t(108) = 2.41$; $p = 0.18$; non-athletes: $M = 186.1$; $t(82.1) = 2.41$; $p = 0.18$). Based on the arithmetic mean values obtained, we can conclude that the athletes achieved better results in the aforementioned tests, since they had lower results in the co-ordination evaluation test (inversely proportional variables), and in the test for the lower extremity explosive strengths evaluation such as the high jump they had higher numerical values. The difference between the initial mean values per group was very high (Cohen $d = 0.78$) for the MAGTUP variable and

with the MFESDM variable was moderate (Cohen d = 0.47).

In other variables for estimation of anthropological characteristics, no significant difference was obtained, but it is noticeable that athletes achieved better numerical values in almost all variables.

According to the obtained results, we can say that the basketball program has produced significant changes in the motor skills such as coordination and explosive power, which is precisely one of the basic features of the basketball game. Šeparović (2001) investigated the influence of programmed training on the level of adoption of technical elements of basketball on boys aged 11 to 13 years. After the program was concluded, there were changes in the structure of motor dimensions, and in the performance of the technical elements of basketball. Užičinin (2012) also confirmed the impact of the basketball program on the development of some motor skills, where athletes from rural areas achieved better results in almost all tests of motor skills evaluation in relation to non-athletes from urban areas. The greatest differences were found in variables for evaluation of coordination, explosive power of lower extremities and flexibility. Koprivica (1996) conducted a survey on a sample of 274 pupils, 136 of whom were basketball players aged 12 to 15 years. He applied 21 variables for the evaluation of body development, and he concluded that according to physical development, basketball players differ in all examined variables (except for the circumference of the forearm) from non-athletes. And that, under the influence of systematic basketball training, there are positive changes in the physical development of young basketball players, fat tissue percentage decreases, and body weight increases as well as the circumference of extremities.
In contrast to athletes, non-athletes prefer the sedentary lifestyle Ozdirenc and associates (2005), where in addition to physical education classes they do not have additional physical activities, which results in a considerably pronounced body mass index. In addition, flexibility and muscular endurance are considerably weaker with non-athletes. In the study where the anthropological markers of boys training Judo, boys non-athletes and boys athletes aged 13 years, Vračan and associates (2006) have concluded that boys training Judo achieve statistically better results in 7 out of 11 variables for evaluation of the anthropological status.

It is obvious that an additional content of sports activities is needed for significant transformation in motor space, preferably one sport if possible, because it is assumed that when motor knowledge level is higher that the transformation of motor skills is higher, which requires further research Ivković (2007). The differences between non-athlete students and the average results of students who are involved in some sport activities pose a question, is two hours a week of PE classes really enough, Prahović and Protić (2007). This research has undoubtedly proved that two hours of PE classes are not enough to induce quality changes on an anthropological status of children and that it is not sufficient to improve health and working abilities. It is indisputable that engaging in any sport activity improves and develops motor and functional abilities (Batričević 2008).

As one of the main goals of Physical education in school is a positive impact on all basic motor skills. Additional physical activity in the form of systematic training, according to most of the previous studies, increases the positive effects of physical education (Uzhicanin, 2012). Therefore, children need to be included in some form of programmed physical activity as soon as possible in order to properly develop anthropological dimensions and to meet basic needs for movement.

Table 1. T-test results for independent samples

	Levene's Test for Equality of Variances					Group Statistics	
	F	Sig.	t	df	Sig. (2-tailed)	Group	Mean
AVISTJ	2.407	.124	.776	108	.440	**Athletes**	153.685
			.731	68.044	.467	**Non-athletes**	152.343
AMASTJ	.051	.822	.124	108	.901	**Athletes**	46.395
			.123	79.277	.902	**Non-athletes**	46.137
BMI	.263	.609	.007	108	.994	**Athletes**	19.728
			.007	76.180	.995	**Non-athletes**	19.723
FAT%	1.320	.253	.360	108	.720	**Athletes**	15.923
			.342	69.767	.733	**Non-athletes**	15.414
FATMAS	.434	.511	.204	108	.839	**Athletes**	7.765
			.198	74.962	.843	**Non-athletes**	7.560
MBFTAR	2.609	.109	-.076	108	.940	**Athletes**	27.65
			-.070	65.098	.944	**Non-athletes**	27.70
MFLPRK	.436	.510	1.971	108	.051	**Athletes**	21.763
			2.057	91.956	.043	**Non-athletes**	19.671
MKOOSS	.509	.477	-.447	108	.656	**Athletes**	19.5043
			-.440	77.108	.661	**Non-athletes**	19.6991
MAGTUP	19.225	.000	-3.738	108	.000	**Athletes**	7.7048
			-4.236	107.384	.000	**Non-athletes**	8.6754
T-test	1.337	.250	.949	108	.345	**Athletes**	12.6080
			.911	71.759	.365	**Non-athletes**	12.4163
CMJ	.019	.891	.152	108	.879	**Athletes**	23.4600
			.149	76.898	.882	**Non-athletes**	23.3231
MBAFLA	5.580	.020	1.080	108	.283	**Athletes**	17.0975
			.948	55.329	.347	**Non-athletes**	14.9240
MESBML	.848	.359	1.564	108	.121	**Athletes**	681.50
			1.518	74.137	.133	**Non-athletes**	641.14
MRSPTL	.095	.758	-.265	108	.792	**Athletes**	56.13
			-.273	89.117	.785	**Non-athletes**	58.13
MFESDM	.000	.988	2.411	108	.018	**Athletes**	196.77
			2.419	82.132	.018	**Non-athletes**	186.10

CONCLUSION

It has been previously known that the use of motor stimuli only within regular physical and medical education classes is in most cases insufficient to cause significant improvements to anthropological status. Therefore, it is necessary to constantly encourage students to engage in additional sports activities according to their preferences outside regular classes. Based on everything provided in this study, we can conclude with certainty that regular physical activity can greatly contribute to the development of anthropological dimensions in children, and therefore it is necessary to offer children (students) as many attractive contents as possible, to adapt them to their age, the degree of their characteristics and abilities, the level of heir motor skills and achievements or, simply put, enable each student to take the teaching process in line with the current status of his anthropological status, all with the aim of positive transformation and building a complete personality.

BIBLIOGRAPHY

1. Bratičević, D. (2008). Discriminatory analysis of the motor and functional skills between active and inactive students, Sport Science 1,str 50-53,Travnik.
2. Breslauer, N., Marši, T., Mesarić, I. (2008). Development of some anthropological characteristics in grade 4 students, Zagreb.
3. Ivković, G. (2007). Differences in some motor skills between thirteen and fourteen-year-old girls who are systematically engaged in basketball and those who are not systematically involved in any sport, Anthology of the 16th Summer School of Kinesiology of the Republic of Croatia.

4. Koprivica, V. (1996). Physical development of basketball players aged 12-15 years, Physical education, Belgrade.
5. Ozdirenc, M., Ozcan, A., Akin, F., Gelecek, N. (2005.). Physical fitness in rural children compared with urban children in Turkey. Pediatrics International. Vol. 47. Str. 26-31.
6. Prahović, M., Protić, J. (2007). Differences in anthropological features between fourteen-year-old football players, basketball players, handball players and non-athletes, Anthology of the 16th Summer School of Kinesiology of the Republic of Croatia.
7. Šeparović, V. (2001). The influence of programmed work on the level of adoption of thechnical elements of basketball for boys aged 11-13 years, thesis, Faculty of Physical Education and Sports, Tuzla.
8. Užičanin, E. (2012). Differences in certain anthropological dimensions of athlete and non-athlete boys aged 11 to 13 from urban and rural environments, Master's thesis, Faculty of Physical Education and Sports, Tuzla.
9. Vračan, D., Sertić, H., Segedi, I. (2006). Differences in some anthropological features among thirteen-year-old boys training judo, non-athletes and boys training some other sport, Anthology of the 15th Summer School of Kinesiology of the Republic of Croatia.

Corresponding author:
Edin Užičanin, PhD.
Faculty of physical education and sport, Tuzla University
e-mail: edin.uzicanin@untz.ba