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DIFFERENCES IN DISPLAYING OF MOTOR ABILITY OF STRENGTH IN PRIMARY SCHOOL STUDENTS WHO ACTIVELY PLAY FOOTBALL AND THOSE WHO ARE NOT INVOLVED IN SPORTS ACTIVITIES

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Abstract
Man consists of different abilities and traits. The degree of development and the level of achievement, as well as their mutual relationship, are different from person to person. Morphological characteristics are the characteristics responsible for the dynamics of growth and development, as well as for the characteristics of the body structure. Motor abilities are features that participate in solving motor tasks and that can be developed to a greater extent. We will find out the difference in these abilities between students active in football and physically inactive students through the results of this master's thesis. The goal of the research is to determine the differences between students who are actively engaged in football and those students who are not active in sports. The research was conducted on 52 subjects, students of an elementary school.
Keywords: Motor abilities, elementary school, students

INTRODUCTION

Man consists of different abilities and traits. The degree of development and the level of achievement, as well as their relationship to each other, are different from person to person. Motor abilities are features that participate in solving motor tasks and that can be developed to a greater extent. What is the difference in strength between students active in football and physically inactive students, we will find out through the results of this scientific research work? The main task of the physical preparation of football players is the development of motor skills, among other motor skills we single out strength.
Strength is an athlete's ability that manifests itself in overcoming different types of resistance. It is developed and applied in various sports activities, which is why there are different types of action readings of this activity. According to Prskal from 2004, we differentiate:

1. Explosive power is the ability that allows an athlete to give maximum acceleration to his own body, an object or a partner. It manifests itself in activities such as throwing, jumping, kicking and sprinting;
2. Absolute maximum strength is the greatest force that an athlete can produce in a dynamic mode of muscle work, for example: lifting weights of heavy weights;
3. Elastic or plyometric strength enables the athlete to act effectively in conditions when, after cushioning, maximum reflection is required. An example of this is depth jumps, as the best way to improve this motor skill;
4. Repetitive strength represents the ability to work for a long time in which it is necessary to overcome a corresponding external load not exceeding 75% of the maximum. When an athlete repeatedly overcomes the weight of his own body, it is relatively repetitive strength;
5. Static strength is the ability that manifests itself in maximum isometric muscle contraction or in conditions of prolonged static work when a certain position or attitude is maintained by stress.

In the football game explosive strength dominates, and there is also repetitive strength, as well as elastic strength.

METHOD OF WORK

Sample respondents

52 students of Mujaga Komadina Elementary School participated in the research. Students were divided into 2 groups of 26 students each depending on their sports activity, i.e. 26 students who play football and 26 students who are not involved in sports activities were examined. The students of four grades (from the fifth to the ninth) were tested, so the examination was correct and followed the age of the students.

Sample variables

In this research, the motor ability of the students was measured:
Motor ability tests were performed individually one by one, only strength tests were performed at the same time, i.e. the following tests: push-ups, sit-ups and squats where we tested (repetitive) strength, where the students were expected to do the maximum number of repetitions in one set. The test of explosive strength was the long jump from a place, where the subjects made a two-legged long jump from the starting line.

Data processing method

For statistical analysis of the collected data Microsoft Excel 2016 (Microsoft Corporation) and IBM SPSS Statistics 25 (Armonk, NY: IBM Corp., 2017) were used. For all collected variables, the main descriptive indicators are presented: arithmetic mean as an indicator of central tendency, standard deviation and coefficient of variability as indicators of variability, and skewness and kurtosis as indicators of the form of distribution. The statistical significance of the observed differences between the two groups of students was checked by the t-test for independent samples and the Mann-Whitney U test, depending on whether the distributions of the results deviated from the Gaussian distribution. The limit of statistical significance was set at p=0.05. P values that could not be expressed to three decimal places are shown as p<0.001.

RESULTS AND DISCUSSION

Table 1 shows the arithmetic means and standard deviations for the variables examined in the framework of the motor ability of strength for the entire sample of children, regardless of their sports activities.

Table 1. Descriptive statistics of the motor abilities of the students involved in the research

	N	Min	Max	M	SD	Var
Sit-ups	52	14,00	68,00	32,21	13,46	181,07
Push-ups	52	4,00	31,00	16,98	7,17	51,47
Deep squats	52	24,00	71,00	47,15	11,61	134,80
Long jumps (cm)	52	147,00	212,00	184,98	16,11	259,47
Min – the lowest value; Max – the highest value; M – arithmetic average; SD – standard deviation; Var - variance						

Table 2. Coefficient of variability

	Variability coefficient
Sit-ups	41,8%
Push-ups	42,2%
Deep squats	24,6%
Long jump (cm)	8,7%

Based on the arithmetic mean and standard deviation, the coefficient of variability was calculated in order to check whether the arithmetic mean is a representative mean value for the variables under investigation. The results are shown in Table 2.
In the case of variables within motor skills, the obtained coefficients of variability are mostly below 30%, which shows that the arithmetic means are representative indicators of the central tendency of these variables. The value of the variability coefficient greater than 30% in this group of variables was determined for the sit-ups and push-ups variables.

Table 3. Indicators of symmetry and curvature of the researched variables

	Skjunis			Kurtosis		
	Stat.	SE	Z	Stat.	SE	Z
Sit-ups	,888	,330	2,7	,489	,650	0,8
Push-ups	,050	,330	0,2	-,582	,650	-0,9
Deep squats	,010	,330	0,0	-,582	,650	-0,9
Long jump (cm)	-,224	,330	-0,7	-,616	,650	-0,9
SE – standard error						

Table 4. Descriptive statistics of the motor skills of students who play football and students who do not play any sports

	Sportski aktivan	N	Mean	Std. Dev.	Std. Error Mean
Sit-ups	No	26	27,31	9,85	1,93
	Yes	26	37,12	14,91	2,92
Push-ups	No	26	15,08	6,90	1,35
	Yes	26	18,88	7,06	1,38
Deep squats	No	26	41,65	10,26	2,01
	Yes	26	52,65	10,33	2,03
Long jump (cm)	No	26	182,46	16,35	3,21
	Yes	26	187,50	15,77	3,09
N – number of respondents; Mean – arithmetic average; Std. Dev. – standard deviation No – do not play any sports; Yes – plays football					

Table 5. Results of the t-test for independent samples for the variables of students' motor abilities with regard to active sports

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Diff.	Std. Error Diff.
Sit-ups	EVA	2,746	,104	-2,798	50	,007	-9,81	3,50
	EVNA			-2,798	43,328	,008	-9,81	3,50
Push-ups	EVA	,118	,732	-1,967	50	,055	-3,81	1,94
	EVNA			-1,967	49,973	,055	-3,81	1,94
Deep squats	EVA	,533	,469	-3,852	50	,000	-11,00	2,86
	EVNA			-3,852	49,997	,000	-11,00	2,86
Long jump (cm)	EVA	,004	,948	-1,131	50	,264	-5,04	4,46
	EVNA			-1,131	49,934	,264	-5,04	4,46
EVA – Equal variances assumed; EVNA - Equal variances not assumed								

Deviation in the abs variable was recorded in terms of distribution symmetry. The distribution of the results for the abs variable is more stretched to the right compared to the Gaussian distribution. For other variables in the framework of motor abilities, the obtained indicators do not indicate a significant deviation from the normal, or Gaussian curve.

Table 4. shows the average values and standard deviations of the variables investigated in the framework of the motor skills of students who play football and students who do not play any sports.

Table 5 shows the results of the t-test for independent samples by individual variables of motor ability strength between students who play football and students who do not play any sports activities.

From Table 5, we see that there were statistically significant differences in a greater number of motor skills in favor of students who play football compared to students who are not involved in sports activities, namely the following skills: sit-ups, push-ups, deep squats. While there were no statistically significant differences in the long jump variable. In the case of sit-ups, it is assumed that there is a statistically significant difference because football players perform more exercises for strengthening and mobility of the trunk and strength training is mostly repetitive, while it is considered that children who are not involved in sports do not practice repetitive strength training or at least not as much amount as children who are involved in football.

Push-ups made a significant difference, but not to the same extent as sit-ups and squats, we assume that this is due to the lack of training of the upper body, which was not the case with squats, where it is considered that the lower extremities are much more involved in children who train soccer compared to children who are not in sports. When testing the long jump, we did not find a statistically significant difference, and the main reason is probably that with the long jump, we test explosive power, which is largely inborn, even 95%.

As a part of the variables used to examine motor abilities deviated from the normal or Gaussian distribution, the Mann-Whitney U test was performed to examine the significance of the differences with regard to the sports activity of the students. The results of the mentioned test are shown in table 6.

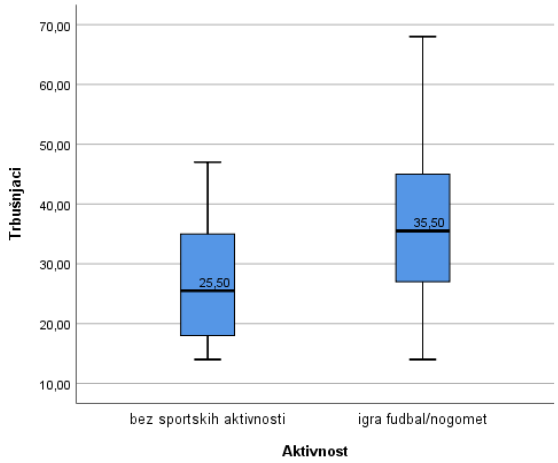
Table 6. Results of the Mann-Whitney U test for the variable "abdominals" of students with regard to active participation

	Mann-Whitney U	Z	P
Sit-ups	208,500	-2,372	0,018

In the rest of the paper, the average (arithmetic mean) or mean (median) values of individual indicators of motor ability are graphically presented (depending on whether they deviate from the Gaussian distribution or not), concerning active sports, and the statistical significance of the observed differences in the achieved results is analyzed.

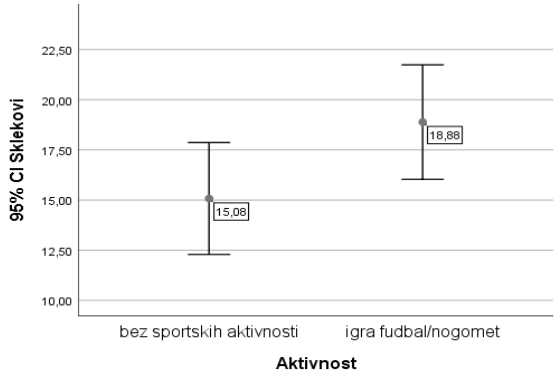
Graph 1 shows the average number of sit-ups done by students who play soccer and students who do not do any sports activities. The graph shows that students who play football did more abs than students who do not do any sports activities. The conducted test showed that the observed difference in the average number of sit-ups considering the sports activity of the students is statistically significant (p=0.018; table 10). This suggests that students who play football can do significantly more sit-ups than students who do not play any sports.

Graph 1. - average number of sit-ups performed by students who play football and students who do not participate in any sports



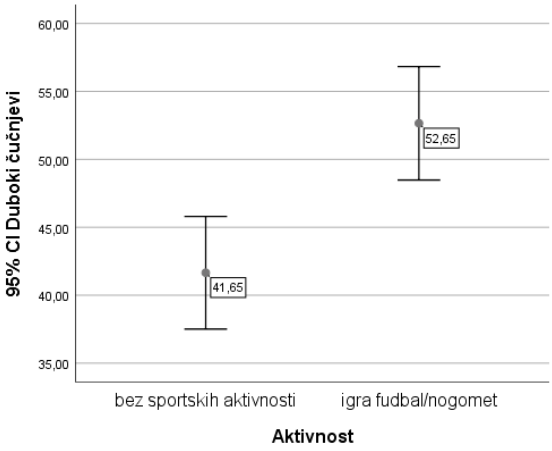
Graph 2 shows the average number of push-ups made by students who play football and students who do not do any sports. The graph shows that students who play football did more push-ups on average than students who don't do any sports. The conducted t-test for independent samples showed that the observed difference in the average number of push-ups considering the sports activity of the students is not statistically significant (t=-1.967; p=0.055; Levene's test on equality of variance p=0.732; table 8).

Graph 2. - average number of push-ups made by students who play football and students who do not do any sports



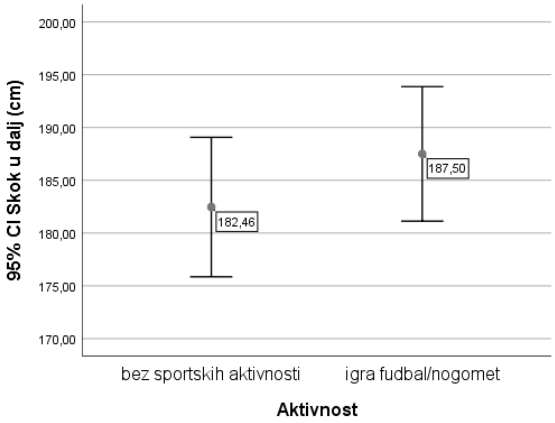
Graph 3 shows the average number of deep squats performed by students who play football and students who do not participate in any sports. It shows that students who play football did more deep squats on average than students who don't do any sports activities. The conducted t-test for independent samples showed that the observed difference in the average number of deep squats with regard to the sports activity of the students is statistically significant (t=-3.852; p<0.001; Levene's test on equality of variance p=0.469; table 8). This suggests that students who play football can do significantly more deep squats on average than students who do not play any sports.

Graph 3. - average number of deep squats performed by students who play football and students who do not participate in any sports activities



Graph 4 shows the average length of the long jump expressed in centimeters for students who play football and students who do not participate in any sports. It shows that students who play football jumped farther on average (had a longer jump on average) than students who don't do any sports. The conducted t-test for independent samples showed that the observed difference in the average length of the long jump with regard to the sports activity of the students is not statistically significant (t=-1.131; p=0.264; Levene's test on equality of variance p=0.948; table 8).

Graph 4. - the average length of the long jump of students who play football and students who do not participate in any sport



CONCLUSION

The research conducted showed that a significant difference in motor skills between students who play football and students who do not play sports exists in the variables: sit-ups and deep squats. Better results for all variables were found in students who play football - in students who play football, a greater number of sit-ups and a greater number of deep squats were found. While specifically for the push-up variable, no statistically significant difference was found with regard to the sports activity of the students involved in the research.

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