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Professional paper

DIFFERENCES IN MOTOR ABILITIES WITH ATHLETES AND NONATHLETES AT THE AGE OF 9 - 11 YEARS

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Abstract

The main objective of the study was to prove differences in motoric ability between skiers, soccer players and non-athletes aged 9-11 years. The 9-11years old students of elementary schools in Tetovo, skiers of different clubs and football players of the "Shkëndija" -Tetovo football club, are included in the research. A total of 150 subjects, male athletes and non-athletes aged 9 - 11years old, were included in this research, in three subgroups: 50 skiers, 50 soccer players and 50 students. Total of 9 variables were applied. To determine and compare the indicators for assessment of the motor abilities among respondents dealing with athletes and non-athletes were used multivariant and univariant analysis of variance. Based on the statistical analysis of the data it can be concluded that there is statistically significant differences in the motor abilities between the applied variables and groups. There were differences in 4 motor variables: in Long Jump between, Test of maximum, Flamingo test and Illinois Agility Test.

Keywords: motoric ability, skiers, soccer players, non-athletes, anova, manova.

1. Introduction

The morphological development of the human, with all of his basic and special characteristics, has a significant role in the physical culture, mainly from two aspects: firstly, directing and prediction of the development of the morphological features and particularities and secondly, prediction and determination (selecting) of athletes for different sport disciplines, based on the morphological features, particularities and traits (Shakiri, et.al. 2015). The growth of the organism in children of this age takes place in height and width. Maturation occurs faster in women than in men. The growth rate of the circular (circular) dimensions is smaller compared to the growth of the longitudinal dimensions, so the body acquires an unpleasant appearance. The difference in the construction of the skeleton between the gender is pronounced. Due to the rapid growth of the bones and the lack of adequate education and stagnation in the development of the muscular system, in children of this age it can easily lead to body deformities and poor keeping of the body straight. The skeleton, vertebral rings and spine are especially sensitive. The muscle mass increases in pronounced way not only at the age of 10 but from the age of 9-11 years (but it still lags compared to bone growth), on average 32.6% of the total body mass. Skiing and soccer are sports that have approximately the same muscle load, during skiing and soccer the leg muscles are the muscles that are most active and in motion. Anthropometric characteristics have been proposed to contribute to improved performance in many sports (Carter, JEL, & Heath, BH 1990). Soccer is a high intensity sport that requires players with high

levels of aerobic and anaerobic ability, force, velocity, power, skill, coordination and flexibility so as to become competitive (Reilly, T., & Gilbourne, D. 2003). Soccer is characterized by short sprints, rapid acceleration or deceleration, turning, jumping, kicking, and tackling (Arnason A. et al 2004, Bangsbo, J., & Michalsik, L. 2002, Vescovi, J. D. et al 2011) and are directly related with the power production capacity of the neuromuscular system. Alpine skiing requires relatively slow eccentric and concentric movements that produce forces up to 3G, lasting from 40 seconds to over two minutes. As the ultimate control of snow contact and the ability to limit speed distance requires dynamic balance through a wide range of mobility of the lower limbs and hips. Endurance and preparation should focus on hypertrophy, maximal endurance development, balance, dynamic mobility and anaerobic capacity (Hydren, J. R. 2012). Soccer players, as well as many other athletes on the field and the court, execute multiple sprints during the course of a match (Newman, M. A. et al. 2004).

The capacity of soccer players to produce varied high-speed actions is known to impact a soccer match performance (Luhtanen, P. 1994), can be categorized into actions requiring maximum speed, acceleration, or agility (Little, T., & Williams, A. G. 2006, Vasilios, G., et al. 2017). and are critical to the outcome of the game.

2. Research methodology

Students from the age of 9 to 11 were included in this research, as well as the students of the elementary school "Liria" - Tetovo, the students of the elementary school "Istigball" - Tetovo, the football players of the soccer club "Shkëndija" - Tetovo. A total of 150 subjects, male athletes aged 9-11 years (± 6 months), were included in this research, divided into three subgroups of which: the first subgroup includes 50 subjects, athletes-skiers who have trained at least one year, the second subgroup included 50 athletes - football players who have been actively training for at least one year, and the third subgroup included non-athletes - students.

A total of 11 motor variables were applied. Variables 1. MKVL- High jump, 2. MKVGJ- Long jump, 3. MMB - Abdominal muscles, 4. MSR - SIT AND REACH Test, 5. MV30 - Running 30m high start, 6. MTPM – Maximum pumps test, 7. MHEX – Hexagonal agility test, 8. MFLSH – Shoulder flexibility, 9. MFLA – Flamingo test, 10. MTT – Agility test T-Test, 11. MTI – Illinois agility test. All tests are performed based on Eurofit Fitness Testing Battery standards.

The basic and statistical parameters in the motor and anthropometric space were calculated: Arithmetic Mean (Mean), Standard Deviation (St. Dev), Minimum Score (Min), Maximum Score (Max), Skewness, Kurtosis, Anova, Manova.

SPSSS 16.0 and Excel statistical software packages will be used for data processing.

3. Results

Table 1: Basic descriptive data of motor variables in soccer player

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
MKVL	50	124.00	210.00	188.6000	18.83982	-1.935	4.091
MKVGJ	50	68.00	195.00	126.0200	21.90750	-.425	2.377
MMB	50	1.00	60.00	18.1800	10.76785	1.798	3.974
MSR	50	8.00	32.00	17.9680	5.29900	.928	.838
MV30	50	5.80	8.54	6.8186	.52745	.595	1.099
MTPM	50	2.00	40.00	14.5800	7.18016	.961	2.103
MHEX	50	12.00	34.00	22.5168	4.37469	-.131	.262
MFLSH	50	1.00	2.00	1.3000	.46291	.900	-1.241
MFLA	50	1.00	30.00	16.3400	8.32653	.086	-.693
MTT	50	12.10	19.30	15.2466	1.59284	.633	.510
MTI	50	15.44	27.78	22.4266	2.04698	-.985	3.440

Table 2: Basic descriptive data of motor variables in skiers.

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
MKVL	50	125.00	219.00	190.3800	16.71110	-1.191	3.805
MKVGJ	50	30.00	198.00	128.0400	31.77148	.178	1.503
MMB	50	6.00	44.00	21.7800	8.12477	.701	.320
MSR	50	7.00	40.00	18.1584	6.72964	.877	1.245
MV30	50	5.43	8.25	6.6962	.60365	.539	-.018
MTPM	50	1.00	31.00	12.1200	6.73898	.743	.707
MHEX	50	15.04	27.60	21.5596	3.02636	-.350	-.511
MFLSH	50	1.00	2.00	1.2600	.44309	1.128	-.759
MFLA	50	1.00	30.00	15.2000	6.55588	.543	.734
MTT	50	12.50	20.25	15.3372	1.65477	1.193	1.593
MTI	50	19.13	27.38	22.3326	1.83957	.906	.656

Table 3: Basic descriptive data of motor variables in students (non-athletes).

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
MKVL	50	125.00	219.00	190.3800	16.71110	-1.191	3.805
MKVGJ	50	30.00	198.00	128.0400	31.77148	.178	1.503
MMB	50	105.00	212.00	182.6600	21.41010	-1.408	2.602
MSR	50	11.50	200.00	112.9600	29.86685	.241	4.267
MV30	50	8.00	38.00	18.3400	8.03718	1.039	.035
MTPM	50	9.50	35.00	19.9640	5.77368	.653	.520
MHEX	50	5.40	26.40	7.1244	2.87953	6.360	43.146
MFLSH	50	1.00	30.00	11.1400	6.39837	.591	.275
MFLA	50	12.31	30.16	23.1202	4.06839	-.274	-.172
MTT	50	1.00	2.00	1.4000	.49487	.421	-1.900
MTI	50	2.00	30.00	19.1600	7.91887	.039	-.944

Table 4: The results of multivariate (manova) and univariate (anova) analyzes of variance in motor space in the tested subjects:

Effect		Value	F	Hypothesis df	Sig.
Intercept	Pillai's Trace	.998	5834.964[b]	11.000	**.000**
	Wilks' Lambda	.002	5834.964[b]	11.000	**.000**
	Hotelling's Trace	468.501	5834.964[b]	11.000	**.000**
	Roy's Largest Root	468.501	5834.964[b]	11.000	**.000**

	Sum of Squares	Df	Mean Square	F	Sig.
MKVL	1634.173	2	817.087	2.244	.110
MKVGJ	6700.840	2	3350.420	4.221	**.017**
MMB	413.653	2	206.827	2.517	.084
MSR	121.341	2	60.670	1.706	.185
MV30	4.864	2	2.432	.817	.444
MTPM	314.093	2	157.047	3.416	**.035**
MHEX	61.930	2	30.965	2.071	.130
MFLSH	.520	2	.260	1.190	.307
MFLA	415.560	2	207.780	3.562	**.031**
MTT	12.330	2	6.165	1.766	.175
MTI	46.965	2	23.483	5.409	**.005**

In the univariate analysis of variance (ANOVA) of motor measurements in all groups of subjects, we can estimate that out of a total of 11 motor variables, significant statistical differences are presented in 4 variables and that in the variable Jump from a high place (MKVGJ) with sig= 0.017, Maximum pump test (MTPM) with sig= 0.035, Flamingo test (MV20) with sig= 0.31, Illinois MTI test with sig=0.05.

Table 5. LSD - Long jump (MKVGJ)

Dependent Variable			Mean Difference (I-J)	Sig.
MKVGJ	Football P	Skiers	-2.0200	.720
		Students	13.0600*	.022
	Skiers	Football P	2.0200	.720
		Students	15.0800*	.008
	Students	Football P	-13.0600*	.022
		Skiers	-15.0800*	.008

In table 5 shows the differences in the Long Jump variable (MKVGJ) between the groups included in the research. It can be concluded that there is a statistically significant difference between football players and students at the level of .022 [p<.05], in favor of football players. Statistically significant differences were presented between skiers and students at the .008 level [p<.05], in favor of skiers.

Table 6. LSD – Maximum Push up Test (MTPM)

Dependent Variable			Mean Difference (I-J)	Sig.
MTPM	Football P	Skiers	2.4600	.072
		Students	3.4400*	.012
	Skiers	Football P	-2.4600	.072
		Students	.9800	.471
	Students	Football P	-3.4400*	.012
		Skiers	-.9800	.471

In table 6 shows the differences in the Maximum Push up Test (MTPM) variable between the groups included in the research. It can be concluded that there is a significant statistical difference between football players and students at the level of .012 [p<.05], in favor of football players.

Table 7. LSD - Flamingo test (MFLT)

Dependent Variable			Mean Difference (I-J)	Sig.
MFLA	Football P	Skiers	1.1400	.457
		Students	-2.8200	.067
	Skiers	Football P	-1.1400	.457
		Students	-3.9600*	.010
	Students	Football P	2.8200	.067
		Skiers	3.9600*	.010

Table number 7 shows the differences in the Flamingo test (MFLT) variable between the groups included in the research. It can be concluded that there is a statistically significant difference between skiers and students at the .010 level [p<.05], in favor of the skiers.

Table 8. LSD - Illinois Agility Test (MTI)

Dependent Variable			Mean Difference (I-J)	Sig.
MTI	Football P	Skiers	.0940	.822
		Students	-1.1372*	.007
	Skiers	Football P	-.0940	.822
		Students	-1.2312*	.004
	Students	Football P	1.1372*	.007
		Skiers	1.2312*	.004

Table number 8 shows the differences in the Illinois Agility Test (MTI) variable between the groups included in the research. It can be concluded that there is a statistically significant difference between football players and students at the level of .007 [p<.05], in favor of football players. Statistically significant differences were presented between skiers and students at the .004 level [p<.05], in favor of skiers.

4. Discussion

The measurements were held in the city of Tetovo at the football academy near the football club "Shkëndija" - Tetovo, as well as among the students of the elementary school "Liria" - Tetovo and the elementary school "Istigball" - Tetovo, where the students who were engaged in the club were classified or ski school for at least one year and students who do not actively participate in sports. A total of 150 students aged 9-11 years (± 6 months) were included in this research, including 50 skiers, 50 football players and 50 students not active in sports, in total we performed 11 motor variables, all standardized on the basis of Eurofit Fitness Testing Battery. Based on the results obtained in these groups, there are significant differences. Based on this conclusion, it is preferable that children of this age, that is, of an early age, start training in certain sports because it is an early age and the body at that age is undefined, where, based on the results, it can be seen that there are big differences in between the groups that participate in sports and those who do not participate in sports. We came to this conclusion with the fact that during multivariate (MANOVA) and univariate (ANOVA) analyzes of the variance of motor measurements in all groups of subjects tested in the space multivariate (MANOVA) there are significant statistical differences

with significance Sig.=0.00, among others with values of Wilks' Lambda 0.02, Pillai's Trace 0.998, Hotelling's Trace 468.501, Roy's Largest Root 468.501. While in the univariate analysis of variance (ANOVA) of the motor measurements in all groups of subjects, we can estimate that out of a total of 11 motor variables, significant statistical differences are presented in 4 variables and that in the variable Jump from a high place (MKVGJ) with sig= 0.017, Maximum pump test (MTPM) with sig= 0.035, Flamingo test (MV20) with sig= 0.31, Illinois MTI test with sig= 0.05, and all these differences are in favor of soccer players and skiers which means that these groups have been shown to be more successful in accomplishing tasks.

Researches with similar themes have been carried out by other authors who have reached approximately the same conclusions, for example: Giovanis V, Vasileiou P, Bekris E. (2017), Diagnosis and comparison of physical skills in skiers and soccer players.

5. Conclusion

Based on the achieved results, we can come to the conclusion that:

It's preferred that children of this age, that are on early age to start training in certain sports because it is an early age and the body at that age is undefined, where based on the results, it can be seen that there are big differences between the groups that train in certain sports and those who do not participate in sports, as well as in the sample of those tested in the research, significant statistical differences in motor skills have been proven between skiers, soccer players and students (non-athletes) aged 9-11 years, which means that athletes have the highest values in arithmetic.

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