

Differences between the motor status of young prepubescent boys and girls

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Annotation:

A battery of tests was used on a sample of 78 preschool boys and 81 girls to evaluate the motor status. The aim of the study was to determine the differences in motor status in relation to gender. The results of the multivariate analysis of variance have indicated that significant differences exist in the entire system of variables. At the univariate level, differences were found in 5 of the 7 variables, where the boys scored higher values for the standing depth jump variable (MSDM), the 20 m run (TR20m), the polygon backwards (MPOL), while the girls showed higher values for the tests of hyper extensions (MDPK) and torso lifts for 60 sec (MPOD). The obtained results come as a consequence of biological factors on the one hand and sociological factors on the other.

Keywords:

boys, girls, motor status, gender.

Маркович С., Маркович К., Крамској С. Отличия между моторным статусом мальчиков и девочек в препубертатный период. Тестирования проводились у 78 дошкольников (мальчики и девочки) для оценки состояния моторного статуса. Целью исследования было определение различий в моторном статусе в зависимости от пола. Результаты многомерного дисперсионного анализа показали, что существуют значительные различия во всей системе переменных. Различия были обнаружены в 5 из 7 переменных, где мальчики набрали более высокие значения в прыжке в длину 20 м, в то время как девочки показали более высокие значения для испытания гипер расширения (MDPK) и поднятие туловища за 60 сек. Полученные результаты являются следствием биологических факторов, с одной стороны, и социологических факторов с другой.

мальчики, девочки, моторный статус, пол.

Маркович С., Маркович К., Крамској С. Відмінності між моторним статусом хлопчиків і дівчаток у препубертатному період. Тестування проводилися у 78 дошкільнят (хлопчики і дівчатка) для оцінки стану моторного статусу. Метою дослідження було визначення відмінностей в моторному статусі в залежності від статі. Результати багатомірного дисперсійного аналізу показали, що існують значні відмінності у всій системі змінних. Відмінності були виявлені у 5 з 7 змінних, де хлопчики набрали більш високі значення у стрибку в довжину 20 м, у той час як дівчатка показали більш високі значення для випробування гіпер розширень і піднімання тулуба за 60 сек. Отримані результати є наслідком біологічних факторів, з одного боку, і соціологічних факторів з іншого.

хлопчики, дівчатка, моторний статус, рід.

Introduction.

In any aspect of sport, a good knowledge of the characteristics which correspond to certain ages is necessary. Man's development from birth passes through numerous psychosomatic stages. The most important psychosomatic stage of development, after prenatal development, is the prepubescent period which encompasses the growth and development of the body from the age of 4 to the age of 7. This period is characterized by a further increase in the anatomical-physiological development of all the systems of organs with an increase in general abilities. The increase in body height (longitudinality) is no longer as intense and is mostly even, and the increase in width (transversality) is more intense, and is accompanied by an appropriate increase in body mass. In addition, the function of the respiratory system is stronger and coincides with the strengthening in the muscles of the shoulders and chest, thus enabling thoracic breathing to take place. The breathing is deep and the frequency lower, with an average of 23-25 respiratory movements per minute. The functioning of the cardiovascular system develops more and more, so the heart rate is slower, which at age 7 is on average 95 beats per minute. An interesting study related to the functioning of the respiratory and cardiovascular systems at this age was carried out by Astrand. He exposed children of this age on a bicycle ergometer to a maximum physical load exercise, and noted heart rate frequencies of 200-210 beats per minute. Simultaneously, maximum lung ventilation was 34-40 lit/min, and the maximum oxygen uptake was around 1 liter. The relative oxygen uptake per kilogram of body mass was 50 cm³/kg per minute. It showed that children at this age have similar oxygen uptake as adults (Đurašković, 1997).

Most authors who have dealt with this problem (Hottinger, 1983; Haywood & Getchell, N. 2001) cite two main factors which determine the development of children. One is biological (hereditary) and the other sociological. The influence of heritage does not end at birth, and instead lasts during one's entire life, and the influence of sociological factors does not start at birth, but during the prenatal phase. For this reason, it is important to analyze motor status by taking into consideration these two factors.

Many studies have shown that some motor skills increase with age. Results have shown that since early childhood differences can be noted in the motor behavior of children and their motor status. In most of the studies, the differences were determined by tests of strength, speed and coordination, all in favor of the boys, while young girls showed better results in tests of agility (Benenson et al., 1997; Bala, 1999; Rubin et al., 2006).

The subject matter of our research is motor status, and thus the differences between boys and girls. The basic aim was to determine the statistically significant differences in the motor status of boys and girls on a defined sample.

The method.

The sample of subjects

The study encompassed 159 preschool children (78 boys and 81 girls), aged 4 to 7, from the municipality of Foča. All of the children who participated in the testing were clinically healthy and did not suffer from any conditions or deformities in their psychological or physical development. The measuring lasted for 8 days and was carried out around noon in the children's kindergarten and their playground, lasting for a period of one school class.

The sample of variables

A total of 7 tests were used to evaluate motor status, all of them taken from the battery of tests used in the research

Table 1

The multivariate analysis of variance

Wilks' Lambda	F	df 1	df 2	p-level
.673	24.532	7	152	.001

Table 2

The univariate analysis of variance

		Mean	Std.Dev	F	p-level
MTR20M	M	51.02	7.12	12.64	.000
	F	54.76	7.30		
MPOL	M	290.76	111.96	13.35	.003
	F	338.43	121.23		
MTAP	M	15.08	3.46	2.15	.605
	F	14.98	3.78		
MDPK	M	36.21	5.34	11.54	.001
	F	39.32	6.14		
MSDM	M	111.23	20.45	23.15	.021
	F	100.65	21.94		
MIZDR	M	105.54	112.31	6.34	.004
	F	103.67	104.33		
MDT60	M	19.80	7.81	7.64	.001
	F	21.00	7.98		

of Grdelj et al., 1975, and which included the following:

1. The 20m run (MTR20m)
2. The polygon backwards (MPOL)
3. Hand tapping (MTAP)
4. Hyper extensions (MDPK)
5. The standing depth jump (MSDM)
6. Hanging pull-ups (MIZDR)
7. Torso lifts for 60 sec (MDT60)

The results.

By analyzing the results in Table 1, obtained by means of the multivariate analysis of variance (MANOVA), we can conclude that there are statistically significant differences between the preschool boys and girls in terms of the applied motor tests (p .001).

By analyzing Table 2 we can conclude that the boys achieved better results in 4 of the 7 tests including: the 20 m run with a flying start (MTR20), hand tapping (MTAP), the standing depth jump (MSDM), hanging pull-ups

(MIZDR), and the girls achieved better results in three tests: the polygon backwards (MPOL), hyper extensions (MDPK), torso lifts (MDT60).

The analysis of the results in Table 2 leads to the conclusion that statistically significant differences can be found in six of the seven variables. The only variable for which no statistically significant difference was found was hand tapping (MTAP). In the remaining 6 variables (MTR20, MPOL, MDPK, MPRET, MSDM and MDT60), statistically significant differences were found at the $p > .00$ level.

The discussion.

The statistically significant differences obtained in this study confirm the results from previous studies which indicate the existence of a difference in the level of motor status of boys and girls from a very early age.

The differences in the tests of strength are explained primarily by the differences in the anthropometric measures

and the size of muscle mass between boys and girls (Benenson et al., 1997; Pišot, 2000). These differences are explained by the difference in the structure of muscle fibers as well as muscle synchronization. In addition, there are differences in the structure of the motor area of boys and girls precisely in terms of the aspect of motor tasks which contain explosive movements such as jumps (Pišot, 2000). Even though the cited research indicates the significance of the hereditary component in the existing differences in the motor status of preschool boys and girls, we should by no means neglect certain sociological factors which also contribute to that difference. Some authors (Archer & Lloyd 2002, Haywood & Getchell, 2001) cite that there is a wide range of social factors which have a significant influence on the differences in terms of motor status between the sexes. As an explanation of this fact they cite the activities of boys who took part in activities which demand movements of the entire body before they reached the age of two, while girls took part in activities involving fine motor coordination. This trend continues during the entire preschool age, which results in greater activity on the part of the boys during this period. The results from this research even though derived from a smaller sample, confirm the results of similar research to a great extent (Bala, 1999; Kulić, 2005; Rubin et al., 2006), results which using the same battery of tests gave almost identical results. We can conclude that during this period, differences in motor status do exist, which marks the beginning of a further differentiation between boys and girls which is still prominent during the preschool age, and when some functional changes are also evident. These are primarily types of breathing, so in the case of the girls, thoracic breathing occurs, and abdominal breathing in the case of the boys, which also has a great influence on vital lung capacity at this age.

Conclusion.

Even though the research was carried out on a relatively small sample of subjects, the obtained results give us an insight into the differences in terms of the motor abilities of boys and girls. With the help of a multivariate and univariate analysis of variance, the

differences in the motor area of preschool boys and girls were confirmed. Similar results were obtained by various authors in previous studies, which dealt with the same subject matter. The results of the multivariate analysis of variance have shown that there are significant differences in the entire system of variables. At the univariate level, the differences are evident in 5 of the 7 variables, where the boys showed higher values for variables including the standing depth jump (MSDM), the 20m run (TR20), the polygon backwards (MPOL), and the girls showed higher values for the hyper extension test (MDPK), and torso lifts for 60 sec (MPOD). The obtained differences occur as a consequence of biological factors on the one hand, and sociological factors on the other.

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