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INFLUENCE OF MOTOR ABILITIES OF PUPILS IN ELEMENTARY SCHOOLS ON SUCCESSFUL PERFORMING ARTISTIC GYMNASTICS ON THE FLOOR

ABSTRACT

*The study was carried out in East Sarajevo (Mokro and Pale) on a sample of regular male pupils (48 boys) aged 12-14 years ±6 months. The aim was to determine the influence of motor abilities of elementary school pupils on the successful performing artistic gymnastics on the floor. Based on the values of multiple correlation coefficients (R_o=.56), it can be stated that motor abilities (as the system of predictors) at the multivariate level, give statistically significant explanation (p=.03) of the achieved results in the success of performing the elements of artistic gymnastics on the floor (TLO). The coefficient of determination criterion variables (DELTA) and system of motor variables have 32% of joint relations. The remaining 68% of common variance in explaining the criterion variables is included in other dimensions of anthropological space that were not the subject of the study in this paper. Results of partial regression coefficients (BETA) and its significance p (level) indicate that significant positive relations with criterion variables are determined with the speed and static power. **MTAPN** – foot tapping and **MVISZ** – bent arm hang. Thus, it can be stated that the boys who have better speed of the lower extremity movements and greater static strength, can better manage gymnastics tasks. Based on the interpretation of the results of the regression analysis it can be concluded that the success in carrying out artistic gymnastics on the floor can be best predicted by the speed of the lower extremity movement and static strength.*
Key words: *pupils, motor abilities, elements of artistic gymnastics on the floor*

1. INTRODUCTION

Physical education is a system of practices that cause a change of anthropological characteristics of young people in the form of certain qualitative change in general or in the form of changes in their mutual relations. Formal models of physical education classes provide a number of procedures which are all operational transformation of a large number of dimensions in the structure of pupil's personality. These changes occur in a premeditated, time-specific number of points which, when linked, give a picture of the deviation from predicted expectations. When physical education would not affect the change of anthropological characteristics, it would be socially irrelevant activity. (Najšteter, Đ. 1986).

In order to successfully realize objectives and tasks of teaching physical education, it is necessary to know motor abilities, the level of adoption of specific stylized movement structures (motor awareness) as well as other structures of the subsystem of personality,

which together compose a complex system of a man. Objectives and tasks of teaching physical education can be achieved only if the teaching process is planned and programmed.

Options of artistic gymnastics to answer the objectives of physical education are practically unlimited. All changes to abilities that are achieved using the gymnastics program are grateful fundament as movement experience, with great possibilities for realization, as in life activities and in other sports. This is, in particular, related to coordination to which it is possible to significantly affect only at the younger school age, at the time in which the contents from artistic gymnastics especially exercises on the floor should be largely applied. (Petrović, J & Associates 1995)

Former scientific researches (Buđa, 1981, Sedić, 1982, Petrović, 1984, Bala, 1993, Hmjelovjec, 2002.) confirmed that implementation of movement qualities of artistic gymnastics depends on several factors, among which the most important function has morphological characteristics, motor abilities, cognitive abilities, conative characteristics, motivational structure and pedagogical training process. (Tabaković, M.2008)

In this paper, we study the motor abilities of pupils of elementary schools in East Sarajevo, aged 12 to 14, healthy and covered by regular physical education and their impact on successful performing the elements of artistic gymnastics on the floor, which also makes the subject of this paper.

No doubt, this research will provide a modest contribution to the future development of artistic gymnastics in the Republic of Srpska as well as to the improvement of implementation of gymnastics contents in elementary schools. Research on this population will be limited to two segments as follows:
1. motor ability space and
2. space of success in carrying out the elements on the floor.

2. RESEARCH METHODS
2.1. Sample of participants

The study was carried out in East Sarajevo (Mokro and Pale) on a sample of regular male pupils (48 boys) aged 12-14 years ±6 months.

Only those participants, who were, on the day of measurement, healthy and who had no somatic defects and diseases, were measured. Pupils engaged in sports trainings outside of school have been extracted from the measurements.

2.2. Sample of variables

Variables to assess motor skills that have been applied in this study were selected on the basis of factor analysis and validity and reliability assessment of the results obtained by Momirović and associates (1969), Kurelić and associates (1971), N. Viskić (1972), Kurelić and associates (1975) and Petković, D. (1984 & 1989).

Based on these models, in this study the total system of tests to assess motor abilities is made up of 8 variables, which have presented the following measures:

I Structuring mechanism of movement
1. Agility on the floor   **MONAT**
2. Foot Tapping   **MTAPN**
II Mechanism of functional synergy and tonus regulation
1. Standing transversally on the bench   **MPSNK**
2. Deep forward bend on the bench   **MDPNK**

III *Mechanism of regulation of excitation intensity*
1. Standing triple jump   **MTRSM**
2. 20m run – flying start   **M20LS**
IV Mechanism of regulation of excitation duration
1. Bent arm hang   **MVISZ**
2. Body lift on the bench   **MDTNK**

2.3. Sample of criterion variables

The success in performing the elements on the floor was evaluated on the basis of achieved results (score) after holding 24 hours of exercises of artistic gymnastics on the floor during the regular physical education classes.

Sample of criterion variables to assess success in performing the elements of artistic gymnastics on the floor is composed of eight (8) elements on the floor.

In order to facilitate the procedure of processing, the results of criterion variables to assess success in performing artistic gymnastics on the floor are encrypted so that the first two letters (TL) indicate the floor and other letters are elements on the floor.

Criterion variables to assess success in performing the elements of artistic gymnastics on the floor are as follows:
TLKNAP – forward roll, **TLKNAZ** – back roll, **TLKLET** – dive roll, **TLPRST** - cartwheel, **TLPRSO** – round-off (rondat), **TLSTNG** - headstand, **TLSTUU** – handstand and **TLSUKN** – handstand forward roll.

The evaluation of the performance of elements on the floor was carried out by the Commission of three competent experts, and based on the Book of Rules on evaluation and judging. Elements on the floor were performed in the combination one after the other, so in the case of error the participant could repeat the same element once again and the Commission would take into account the better executed attempt. By posting the Commission's scores, the scorekeeper recorded the scores in the participant's card.

The grade received is the result of the technical evaluation of the exercise i.e. the grade of biochemical correctness of the exercise, obtained from a subjective assessment by the Commission. Possible technical errors during the performance of artistic gymnastics on the floor are manifested by deviation of body posture and parts of body during exercise.

3. RESULTS AND DISCUSSIONS

Table 1.Basic statistical parameters of motor abilities in boys

Variables	Mean	Min	Max	SD	Error	Skewn.	Kurtos.
MONAT	16.23	10.93	24.58	3.32	.48	.55	-.32
MTAPN	50.60	39.00	66.00	7.16	1.03	.37	-.81
MPSNK	15.87	12.28	31.02	3.28	.47	2.37	8.73
MDPNK	41.85	15.00	54.00	6.99	1.01	-1.58	3.94
MTRSM	5.82	4.32	7.10	.62	.09	-.49	-.08
M20LS	3.07	2.64	3.66	.23	.03	.28	-.21
MVISZ	47.79	8.56	96.56	27.10	3.91	.41	-1.13
MDTNK	10.46	.00	24.00	7.13	1.03	.26	-.92

Legend: Mean - arithmetic mean, Min – minimal values of the results, Max – maximal values of the results, Std.Dev. - Standard deviation, St.Error - standard error, Skewn. – Skewness, Kurtos. - Kurtosis

Table 1 shows the basic statistical parameters of motor abilities in boys. Looking at the results in tests of normality of skewness and kurtosis distribution it can be noted that

distribution in almost all variables is normal. Something more significant asymmetry and kurtosis of Gaussian curve can be seen in the variable of *standing transversally on the bench.* (**MPSNK**) *and deep forward bend on the bench* (**MDPNK**). Mean values for most motor variables indicate standard and balanced scheduling results of the participants except in the mentioned variables. The largest standard deviation was obtained in the variable *bent arm hang* (**MVISZ**). In this measure mean was **27,10** with a wide range of results as it can be seen from *Table 1* with maximum of 96.56 and minimum of 08.56. Thus, the participants were very heterogeneous while the other variables were quite balanced.

Table 2. Basic statistical parameters of applied variables to assess success in performing artistic gymnastics on the floor

Variables	Mean	Min	Max	SD	Error	Skewn.	Kurtos.
TLKNAP	3.83	1.00	5.00	1.10	.16	-.66	-.44
TLKNAZ	3.40	1.00	5.00	.96	.14	.01	-.25
TLKLET	3.75	1.00	5.00	1.06	.15	-.46	-.48
TLPRST	2.79	1.00	5.00	1.25	.18	.28	-.80
TLPRSO	2.90	1.00	5.00	.66	.06	.04	.09
TLSTNG	3.19	1.00	5.00	1.16	.17	-.04	-.89
TLSTUU	3.67	1.00	5.00	1.14	.16	-.30	-.95
TLSUKN	3.25	1.00	5.00	1.12	.16	-.05	-.52

Table 2 shows basic statistical parameters of variables to assess success in carrying out artistic gymnastics on the floor in boys. Observing the results of normality of skewness and kurtosis distribution it can be noted that those distributions are normal in all variables. Mean values for most of variables indicate standard and balanced distribution of the results of participants. So, marks given by the Commission to verify the acquisition of gymnastics elements on the floor are with no significant discrepancies.

Table 3. Regression analysis of prediction system of motor abilities and criteria of success in carrying out the elements of artistic gymnastics on the floor

	R_o	Delta	F - test	p
1	.56	.32	2.33	.03

Based on the values of multiple correlation coefficients (R_o=.56) in Table 3, it can be concluded that motor abilities (as the system of predictors) on the multivariate level, in statistical way, significantly explain (p=.03) achieved results in success of performing elements of artistic gymnastics on the floor (TLO).

Coefficient of criterion variable determination (DELTA) and the system of motor variables have 32% of joint relations. The remaining 68% of common variance in explaining criterion variable is included in other dimensions of anthropological space that were not the subject of this paper.

Table 3.1. Regression analysis of prediction system of motor abilities and criteria of success in carrying out the elements of artistic gymnastics on the floor

Variables	R	Part - R	Beta	Std.Err	t	p
MONAT	-.01	-.04	-.04	.16	-.25	.81
MTAPN	.04	.34	.33	.14	2.28	.03
MPSNK	.02	.09	.08	.14	.57	.57
MDPNK	.01	.08	.07	.14	.51	.61

MTRSM	-.11	-.06	-.08	.20	-.39	.70
M20LS	-.80	-.17	-.22	.20	-1.11	.27
MVISZ	.01	.31	.31	.15	2.08	.04
MDTNK	.00	.01	.02	.15	.10	.92

Results of partial regression coefficients (BETA) and its significance p (level) indicate that significant positive relations with the criterion variable are determined in speed and static strength. **MTAPN** – foot tapping and **MVISZ** – bent arm hang. Thus, it can be concluded that the boys who have better speed of the lower extremity movement and greater static strength can better manage gymnastic tasks.

Based on the interpretation of results obtained by the regression analysis it can be concluded that success in carrying out elements of artistic gymnastics on the floor can be best predicted by the speed of the lower extremity movement and by static strength.

4. CONCLUSION

Motor abilities significantly affect the success in performing elements of artistic gymnastics on the floor and therefore deserve proper attention. It was found that the speed of movement of the lower extremities and static strength positively influence the success in performing elements of artistic gymnastics on the floor, which indicates that those boys who have better speed of the lower extremities movement and greater static strength can better manage gymnastic tasks on the floor. Also in the process of selection of children to exercise on the floor, care should be taken to choose the boys with natural skills for expression of speed because it is known that it can be least influenced during the training process and teaching process as well. In addition, during the teaching process in schools and wherever the program from artistic gymnastics on the ground is applicable, it should be taken care to work on achieving as highest static strength as possible.

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