RELATION BETWEEN THE PHYSICAL WORKING CAPACITY (PWC170) AND STATIC RELATIVE STRENGTH

UDC: 796. 012.11-057.874
(Original scientific paper)

Abdulla Elezi

Univerzitet of Prishtina, Faculty of Sport Sciences, Prishtina, Kosovo

Abstract

The main objective of this research is to determine association and motor characteristics impact on functional abilities (physical work capacity). The sample is defined as a sample of 263 respondents drawn from the population of secondary schools. Nine tests were used to estimate motoric capabilities and a test of functional capacity of aerobic-type (physical work capacity). To determine the relation between the predictor (motor) variables and criterion variables (physical working capacity - PWC170) it is prepared the regression analysis of the manifest space. The connection of the entire system of variables static relative strength with a score of Physics working capacity (PWC170) on a bicycle ergo meter as aerobic type variable explains the coefficient of multiple correlations, which is RO 0.394. Regression analysis indicates that the better results on a bicycle ergo meter will have respondents who score better in tests of static relative strength of the leg (at the test isometric muscle contraction quadriceps thighs) and static tests of the relative strength of arm and shoulder area (at the test of isometric contraction triceps muscle circumference).

Keywords: *students, functional abilities, motor abilities, tests, regression analysis*

INTRODUCTION

Appropriate treatment in physical education and sport training attempts to make adaptive changes in some organic systems of organism, the intensity and character of physical load to achieve essential prerequisites for the Improvement of athletic performance.

Increasement of activity creates in big measure mobilizes the organic systems, especially those that deliver energy to the tissues.

The systems that perform the increased activity over a longer period of time, with appropriate intensity, generates optimal trend of increasing futional ability. For normal body function is necessary that some factors of inner circles maintain more consistently.

The most important of these factors are: temperature, acidity, oxygen and nutrient substances. The primary function of the cardiovascular system is to maintain blood circulation, which transports oxygen, nutrient substances and hormones to the tissues and removes them from degradation products and excess heat, and thus maintains the aforementioned factors within certain limits.

Even it is confirmed that the execution of static strength (isometric contraction) it is necessary for anaerobic energy sources, this is an attempt to certify the impact and the relationship between test scores of relative static strength and physical working capacity (PWC) on a bicycle ergo meter as aerobic type variable to continue research in this direction.

MATERIAL AND METHODS

The sample of respondents

The sample is defined as a sample taken from the population of secondary schools, Gymnasium Zenel Hajdini, Marin Barleti and Mehmet Isai; of Gjilan city.

The sample included 263 students, male subjects aged 18 years, with a range of ± 6 months.

The only conditions used in determining the

sample were: that the students to be included in physical education, and that the days of measurement to be healthy.

Sample of variables

Pattern of predictors consisted of nine static motor measures the of relative strength were selected to allow a good estimation of the three latent motor dimensions of topological types and: static relative strength of arm and shoulder area, the relative strength of the static forces and static relative strength of the legs (Gredelj, M., Metikoš, D., Hošek, A. & Momiroviè, K. (1975). Gredelj, M., Metikoš, D., Hošek, A. & Momiroviè, K. (1975). A sample of the criterion variable consisted of only one type of aerobic physiological test, a test for analyzing physical working capacity (PWC170) on a bicycle ergo meter.

Predictive variables

Tests to assess the relative strength of the static arm and shoulder area (SRA).

All the tests for the assessment of the relative static strength of arms and shoulders forearm and upper arm angle is 90^0

1. Endurance in a push-up on the ground (SRA1)

2. Endurance in a push-up on the beam to balance the height of 50 cm face-up (SRA2)

3. Endurance in Pull-ups (SRA3)

Tests to assess the relative strength of static forces (SRC)

1. Endurance outstretched feet above the medical ball (SRC1)

2. Endurance of body in a horizontal position (SRC2)

3. Endurance of body in the horizontal in face down position (SRC3)

Tests to assess the relative the leg static strength (SRL)

1. Endurance on one leg in half seat position (SRL1)

2. Endurance to angle of the lower leg and upper leg 90^0 (SRL2)

3. Endurance with fixed legs of a chair, the initial position of the knees (SRL3)

Criterion variable

1. Physical working capacity (PWC) on a bicycle ergometer as a variable of aerobic type.

In accordance with the objectives of this research, proccedings of the data included several stages, which are generally held to solve the following tasks:

1. Establishment the the basic statistical characteristics such as arytmectical mean (AS), standard deviation (SD), minimum (MIN) value, the maximum (MAX) of the results. Normality distribution of variables was tested using the Kolmogorov-Smirnov.

2. The correlation between individual variables to assess the relative strengths of static.

3. For determining the relation between the predictor (motor) variables and criterion variables (physical working capacity-PWC170) was applied the regression analisysis of the manifest space.

RESULTS AND DISCUSSION

The obtained value of fixed dispersive and central parameters (Table 1) allow the conclusion that the manifest variables applied static relative strengths and Physical working capacity (PWC170) on this study normally distributed.

The values of Kolmogorov-Smirnov's test based on the calculation of the maximum absolute difference between real and theoretical cumulative frequency (D MAX) and maximum permitted size difference (TEST) indicate that all variables are approximately normally distributed, since the values of MAX D in all variables significantly lower than the constant values of the test.

The inter-correlation matrix (Table 2) are coefficients which are about medium high and with significant value, which indicates the possibility that all manifest variables generated by a regulatory mechanism, or a latent ability of the action type.

This accordingly suggests the possibility of substantial reduction rank matrix R.

Notable is the equitable distribution of correlation coefficients in all over the space correlation matrix. However, the highest correlation in the systems are: the variable SRA1 SRA2 and SRA3, then variable with SRA1 SRC1, SRC2 and SRC3 and variable SRL1 with SRL2 and SRL3, which could indicate the existence of possible topological definition of intentional objects of measurement of these variables.

The connection of the entire system of variables static relative strength with a score of Physics working capacity (PWC170) on a bicycle ergo meter as aerobic type variable explains the coefficient of multiple correlation, which is RO

Table 1. Distribution and basic parameters of the results of the static relative strength and maximum relative receiving oxygen

Variable	AS	SD	MIN	MAX	MAX D	TEST
SRA1	47,02	15,06	14,80	91,20	,0577	,1005
SRA2	17,75	4,85	9,60	32,50	,0411	
SRA3	59,81	19,96	16,40	118,10	,1002	
SRC1	31,01	11,77	12,00	79,80	,0692	
SRC2	42,91	14,44	10,00	87,40	,0236	
SRC3	78,19	27,35	20,60	168,10	,0653	
SRL1	85,62	24,96	14,00	23,80	,0483	
SRL2	25,04	5,11	10,70	37,10	,0231	
SRL3	15,62	3,55	9,00	28,20	,0753	
FIZASD	889,56	219,80	436	1945	,0616	

Table 2 Inter-correlations of variables static relative strength

Variable	SRA1	SRA2	SRA3	SRC1	SRC2	SRC3	SRL1	SRL2	SRL3
SRA1	1,00	,55	,51	,51	,36	,38	,27	,20	,26
SRA2	,55	1,00	,51	,41	,24	,29	,22	,25	,30
SRA3	,51	,51	1,00	,41	,31	,40	,30	,31	,27
SRC1	,51	,41	,41	1,00	,47	,45	,24	,28	,39
SRC2	,36	,24	,31	,47	1,00	,47	,16	,21	,24
SRC3	,38	,29	,40	,45	,47	1,00	,16	,29	,31
SRL1	,27	,22	,30	,24	,16	,16	1,00	,26	,32
SRL2	,20	,25	,31	,28	,21	,29	,26	1,00	,26
SRL3	,26	,30	,27	,39	,24	,31	,32	,26	1,00

Table 3 Influence of static strength relative to the physical work capacity (PWC)

Variable	R	PART-R	BETA	P	Q (BETA
SRA1	,245	,045	,057	1,406	,466
SRA2	,318	,151	,180	5,755	,015
SRA3	,293	,123	,148	4,345	,048
SRC1	,184	-,018	,022	-,418	,767
SRC2	,075	-,071	-,079	-,596	,256
SRC3	,172	,024	,028	,486	,695
SRL1	,105	-,048	-,049	-,597	,443
SRL2	,174	,056	,057	1,000	,369
SRL3	,252	,152	,163	4,116	,014

DELTA	RO	F	DF1	DF2	Q
,155	,394	5,187	9	253	,000

0.394 to the common variability between systems, and the criterion variable is 15% (delta = 0.155). These are low values ??that participate in the explanation of the variance criteria and predictors.

The remaining 85% of the total variability in explaining the physical working capacity (PWC170) on a bicycle ergo meter as a variable of aerobic type Maze overwrite other characteristics and abilities of the respondents but which were not included in the study (the other motor, morphological, Functional, cognitive, co native, etc..) and conditions during testing.

Viewed as a whole, physical working capacity (PWC170) has little of the variance with the variables which assessed the ability of static relative strength.

We understand that the Physical working capacity (PWC170), performing the work lasted two to five minutes, which is sufficient to fully activate the mechanisms of oxidative processes.

While at the relative strength of the static tests, performing the work is much shorter, the predominant role systems have no oxidative processes.

Coefficient between the results of parallel projections Physical working capacity (PWC170) on a bicycle ergo meter and motor variables static

relative strength has a maximum value of the static test of the relative strength of legs (SRA2) and amounts to 0.180, and (SRA3), which is 0.148. Probably the association should look at the role of arm triceps as stabilizers forces at work on a bicycle ergo meter.

The third-largest correlation coefficient with the criterion of a static test has the relative strength of legs (SRL3). of 0163. Correlation is reasonable, because the isometric contraction of leg muscles quadriceps is responsible for its operation on a bicycle ergo meter.

Correlation coefficients tested by t-test are significant at the level of p = 0.05 for predictor variables static relative strength of the legs (SRL3) predictor variables and static relative strength of arms and shoulders (SRA2 and SRA3). It is clear that the parallel projections are in average lower than the results of orthogonal Physical working capacity (PWC170) and motor variables static relative strength.

Regression analysis indicates that the better results are on a bicycle ergo meter will have those respondents who have better scores in tests of relative strength of the leg (at the isometric test of muscle contraction quadriceps) and static tests of the relative strength of arm and shoulder area (at the test of isometric contraction of the muscle circumference of arm triceps).

CONCLUSION

The survey was conducted on a sample of 263 male patients of Gjilan city population aged 18 years.

There were applied nine static motor tests relative strength and a test to assess the maximum of receiving the oxygen.

Relationships between the system predictor measures the relative strength of the static and the criterion variable of instruments to assess the maximum relative receipt of oxygen were determined by regression analysis.

Regression analysis indicates that the predictor variables do not affect the criterion variable and if the criterion variable in the system had a statistically significant predictor multiple correlation coefficient at p = 0.01, which is tested by F-test, with degrees of freedom df1 and DF2.

A significant multiple correlation coefficient indicates that isometric muscle contraction quadriceps thighs and isometric contraction of muscle circumference of arm triceps are more responsible for execution of physical working capacity (PWC170) more because of the role they have in the execution of tasks then of that they affect the metabolism of the aerobic type.

REFERENCES

Bala, G. (1973) O nekim testovima psihomotorike [On some psychomotor tests. In Serbian.] *Športno-medicinske objave,* Ljubljana, *10*(1-3), 80-97.

DeVries, H. A., & Housh, T. J. (1994). *Physiology of exercise:* For physicalEducation, Athletics and Science. Medison,WI: Brovn &Benchmark.

Gredelj, M., Metikoš, D., Hošek, A. & Momirovič, K. (1975). Model hijerarhijske strukture motoričkih sposobnosti [The model of hierarchical structure of motor abilities. In Croatian.] *Kineziologija, 5*(1-2), 7-81.

Guyton, A.C., Hall, & J.E. (2006). *Medicinska fiziologija* [Medical Physiology. In Croatian.] Zagreb: Medicinska naklada.

Hagerman, F.C. (1984). Applied physiology of rowing. *Sports Medicine,* (1), 303-326.

Karpman, V. H., Z. B. Belecerkovski & A. Gudkov. 1975) *Ispitivanje fizicke radne sposobnosti srca sportista* [Examination of physical work capacity of athletes hear. In Serbian.] Savez za fizicku kulturu Jugoslavie, Beograd.

Kurelić, N., Momirović, K., Stojanović, M., Šturm, J., Radojević, Đ., & Viskić-Štalec, N. (1971) *Praćenje rasta, funkcionalnih i fizičkih sposobnosti djece i omladine SFRJ*. [Monitoring of growth, functional and physical abilities of children and youth Yugoslavia. In Serbian.] Beograd: Instituta za naučna istraživanja Fakulteta za fizičko vaspitanje Univerziteta u Beogradu.

Royce, J. (1958). Isometric fatigue curves in human muscle with normal and occluded circulation. *Research Quarterly for Exersise and Sport, 29*, 204-212.

Secher, N.H. (1975). Isometric rowing strength of experienced and inexperienced oarsmen. *Medicine and Science in Sports*, (7), 280-283.

Solomonovič, V. F. (1972). *Fiziologija sporta* [Physiology of Sport. In Serbian.] Beograd: Jugodlavenski savez organizacija za fizičku kulturu.

Start, K. B., & Holmes, R. (1963). Local muscle endurance with open and occluded intramuscular circulation. *Journal of Applied Physiology,* 18, 804-07.

Corespondence:
Abdulla Elezi
University of Pishtina
Faculty of Sport Sciences
Mother Theresa Strit, 10000, Kosovo
E-mail: dr.abdullaelezi@hotmail.com

РЕЛАЦИИ МЕЃУ ФИЗИЧКИОТ РАБОТЕН КАПАЦИТЕТ (PWC170) И РЕЛАТИВНАТА СТАТИЧКА СНАГА

УДК: 796. 012.11-057.874
(Оригинален научен труд)

Абдула Елези

Универзитет во Косово, Факултет за спорт и науки, Приштина, Косово

Апстракт

Основната цел на истражувањето беше да се утврди поврзаноста и влијанието на моторните врз функционалните карактеристики (физичкиот работен капацитет). Примерокот на испитаниците беше дефиниран со 263 испитаници од популацијата на ученици од средните училишта. Применети се 9 тестови за проценување на моторните способности и еден тест за проценување на функционалните способности од аеробен тип (физичкиот работен капацитет). За утврдување на релациите меѓу предикторските (моторни) варијабли и критериумската (физичкиот работен капацитет – PWC170) варијабла, е применета регресивна анализа во манифестен простор. Поврзаноста на целокупниот систем на статичката релативна снага со резултатите на физичкиот работен капацитет (PWC170) на бицикл ергометар како варијабла од аеробен тип, е објаснета со коефициентот на мултиплата корелација RO кој изнесува .394. Според таа поврзаност и другите податоци од регресивната анализа, утврдено е дека испитаниците со постигнати подобри резултати на бицикл ергометарот, би имале подобри резултати во статичката релативна снага на нозете (кај тестот изометриска контракција на четириглавиот мускул на надколеницата) и тестовите на статичката релативна снага на рацете и раменот појас (кај тестот на изометриската контракција на триглавиот мускул на надлактицата)

Клучни зборови: *ученици, функционални способности, моторни способности, тестови, регресивна анализа*