

THE COMPLEX TESTING CONTROL OF STUDENTS' MOTOR ABILITIES AGED 17-20 YEARS

Sergienko V.N.

Sumy state pedagogical university, named after A.S. Makarenko

Annotation. Directions of evaluation of motive capabilities of students are considered. It is used 12 ball sigmoid scale of the American test complex (YMCA). In research took part 1200 students up-diffused on according to ages 17, 18, 19, 20. It is marked a tendency to the decline of middle indexes of motive capabilities with the increase of age of students. The indexes of development of power capabilities, capacity for endurance and flexibility and their complex testing are described. Measures are offered on the increase of motivation of students to the improvement of results of motive preparedness in the process of physical education. The indexes of testing of the level of motive preparedness of students allow to compare them during all period of studies, to estimate and carry out their analysis. The method of complex estimation allowed high-quality estimate on «satisfactorily» motive preparedness of students of different age within the limits of 61,7-65,7%.

Keywords: motor skills, control, complex testing, sigmoid scale, preparation.

Introduction

The most important condition of physical education process's efficiency improvement is regular control of testing results' dynamics for methodologically correct construction of educational process. One of the most often used means of control, which permits to obtain grounded data about motion preparedness, is testing. Testing has been successfully applied in sports diagnostics for long time, but, unfortunately, the offered evaluation methodologies have great number of problems, namely, insufficiency of objective, prompt, unified and predicted means of control. There is no optimal and clear methodology of complex control, which would include basic factors of physical development, permitting to obtain actual objective data about students' physical state. Physical educative-training process shall be corrected, if 15% of students with low level of motion abilities' or their complex's development are found in an academic group or in several groups [5; 9].

As on to day, there is a significant quantity testing systems of motion preparedness for population's groups of different age, which help to solve practical and scientific tasks by the specialists in the field of physical education and sports [3; 7]. Foundation of pedagogical principles' dynamics control of studying youth motion preparedness, determination of the most reliable and objective criteria of different motion abilities' (especially of their complex) levels of development have not been studied sufficiently yet in the theory of physical culture. So, implementation of this knowledge in practice is important.

The research has been fulfilled as per the combined plan of scientific and research work in the sphere of physical culture and sports for 2011-2015 in direction "Methodological and organization-methodological foundations of rational training of sportsmen" as per scientific subject 2.18. "Improvement of sportsmen' motion activity's control mechanisms".

Purpose, tasks of the work, material and methods

The purpose of the research: to evaluate 17-20 years old students' motion preparedness level on the base of 12 point, sigmoid scale by American testing complex (YMCA).

The contingent of the tested included 1200 persons of 17-20 years old age (each age group consisted of 300 persons), who were 1st – 4th year students of higher educational institutions of Sumy. As per international standards the age of students was determined by decimal system, with consideration of testing date (12.05.2010) and birth date (17 years old – from 16,5 to 17,5 years; 18 years – from 17,5 to 18,5 years; 19 years – from 18,5 to 19,5 years; 20 years – from 19,5 to 20,5 years). All students related to main training group as the students, who do not go in for sports systematically.

In the process of research we processed the results by the methods of mathematical statistics with the help of Excel program.

Results of the research

Last time, a number of methodologies, which combined commonly known exercises and other different variants, have been used for complex evaluation of students' motion preparedness. As an example we can take The Tests of President Council of the USA, The tests of motion activity of European Council "Eurofit", The tests of mayor of Moscow, ICSPFT – International Committee on the Standardization of Physical Fitness Test [Trzeźniowski R., Pilicz S. Tabele sprawności fizycznej młodzieży w wieku 7–19 lat. Warszawa, Z warsztatów badawczych AWF, 1989, 127 p.]. But alongside with positive moments, the existing control exercises have certain disadvantages, which severely restrict their application in conditions of higher educational establishments. First of all they require application of complex equipment, less quantity of students in academic group, presence of medical worker during functional tests, Secondly, the mentioned above control exercises were created for main health group.

The testing of students is and element of physical education systems in higher educational institutions of Ukraine and, accordingly, it shall meet the requirements, reflecting legal, resources, organization and other aspects of

the functioning of these systems. By observing of this requirement we can formulate the following: quantity of testing exercises as minimal as possible; testing exercises shall be relatively simple; application of complicated technical equipment shall be excluded; execution of testing exercises shall not result in traumas; compulsory observation of safety regulations during testing.

As on to day, two essentially different approaches to evaluation of a persons motion activity have been known: 1) for every testing the norms, in accordance to which development level is evaluated, are established; 2) integral evaluating of a person's motion preparedness is being developed. This evaluating is based on transferring of multi dimensional measuring system (seconds, meters, quantity of repetitions) into one-dimensional (points, scores).

Most of specialists in the sphere of theory and methodology of physical education in higher educational institutions are the supporters of complex approach to evaluation of students motion preparedness, though there is no unanimous opinion concerning the quantity and quality of the required indicators [1; 2; 4; 6; 10].

For controlling the complex of 17-20 years old students' motion abilities' development American testing complex (YMCA) was offered, which was recommended by professor B.D. Franks, the headmaster of school of health, physical education, recreation and dances at Louisiana (USA) university, [Franks B. D. Test sprawności fizycznej dzieci i młodzie y YMCA. Poznan, 1994. – 58 p.] at the end of XX century (see table 1).

Table 1

Complex testing of Male students' motion abilities (YMCA)
($\bar{X} \pm S$)

Nos	Test exercises	Age, quantity, results			
		17years old <i>n</i> =300	18 years old <i>n</i> =300	19 years old <i>n</i> =300	20years old <i>n</i> =300
1	I mile run (1609 m), <i>s</i>	478,32±17,12	483,97±11,84	489,08±11,62	493,04±14,72
2	Sitting bending of body, <i>cm</i>	25,17±3,53	25,73±3,67	25,06±3,92	24,88±3,93
3	Lying raising of body, <i>times</i>	38,07±13,61	35,66±9,71	37,57±13,47	35,54±12,52
4	Half lying pulling up, <i>times</i>	24,22±6,52	26,63±7,82	27,74±7,76	25,04±6,69
5	Total thickness of skin-fat folds (triceps +hip), <i>mm</i>	11,67±5,07	12,12±6,08	12,96±7,33	14,31±7,05

Testing complex included: I mile running (1609 m) (cardiac & respiratory endurance); sitting bending of body (active flexibility); lying raising of body (dynamic strength of prelum abdominale and back muscles), measurement of two skin-fat folds' thickness: on shoulder and shank (parts of body).

The above described test stipulates evaluation of three motion abilities' development and determination of body composition, i.e. five measurements. The development of strength abilities is evaluated by two tests: flexibility and endurance – one test for each. Comparative analysis of data, reflecting motion abilities' development of 17-20 years old students (table 1) witnesses that in majority of tests exercises optimal indicators were manifested by 17-18 years old students but not 19-20 years old ones. Comparing total thicknesses of two skin-fat folds (on shoulder and on shank), we noted the increase of fat component in every age group and it is a negative prognosticating factor of possible obesity and lipotropic abnormalities.

For development of norms for evaluation of motion abilities' development with complex testing, we determined typical indicators (\bar{x}) and quadratic deviation (*S*) of test exercises for every age group. Calculation of limits and norms of test exercises' evaluation were carried out by 12 point, sigmoid scale, which was recommended by Bologna system of education and permitted to determine the availability of corresponding level of students' motion abilities' development. 12 point, sigmoid scale takes test result $\bar{x} \pm 0,5S$ as a medium norm, $\bar{x} \pm 1,5S$ – lower or higher than medium norm, $\bar{x} \pm 2,5S$ –low or high norms. Let us take 0,5*S* as evaluated step. Depending on the calculated values it is possible to determine the levels of development (low, lower than medium, medium, higher than medium, high) [8].

As per the data, give in table 2, in 1 mile running of male students it was registered: low and lower than medium levels were manifested by 0.3% and 37.3% of 17 years old students, 3% and 41.3% of 18 years old students, 0% and 41% of 19 years old students, 43.3% of 19 years old students Higher than medium and high levels were shown by 14.4% and 10.7% of 17 years old students, 32.3% and 4.7% of 18 years old students, 19.3% and 10.7% of 3a 19 years old students, 26.7% and 4% of 20 years old students. Besides, they correspondingly showed higher than medium and high levels of cardiac & respiratory endurance.

Table 2

Complex testing indicators of motion abilities (YMCA), which were calculated by 12 point sigmoid scale. (17-20 years old students) %.

Age	Points, levels of development											
	1	2	3	4	5	6	7	8	9	10	11	12
	low			lower than medium		medium		higher than medium		high		
One mile run (1609 m), <i>s</i>												

17	–	–	0,3	14	23,3	11,6	25,7	10	4,4	5	3	2,7
	0,3			37,3		37,3		14,4		10,7		
18	–	–	3	13	28,3	12	6,7	18	14,3	1,7	1	2
	3			41,3		18,7		32,3		4,7		
19	–	–	–	18,3	22,7	21,3	7,7	5	14,3	9,3	0,4	1
	–			41		29		19,3		10,7		
20	1	3	6	6	10	26,6	16,7	6,7	20	4	–	–
	10			16		43,3		26,7		4		
Sitting body bending, <i>sm</i>												
17	13,6	8,7	–	–	15,3	19,4	0,3	10,7	4,3	16	11,7	–
	22,3			15,3		19,7		15		27,7		
18	–	9,7	3	4	–	26	26,3	15	7,7	8,3	–	–
	12,7			4		52,3		22,7		8,3		
19	2	2	10,3	0,7	6	27,7	28,3	10,3	7	5,7	–	–
	14,3			6,7		56		17,3		5,7		
20	2	2,3	10	1,7	5,3	10,7	36	21	5,7	5,3	–	–
	14,3			7		46,7		26,7		5,3		
Lying body raising, <i>times</i>												
17	–	–	14	6,6	0,7	22,3	13,7	29,4	13,3	–	–	–
	14			7,3		36		42,7		–		
18	–	1,7	4,3	9,7	22,3	11,4	17,3	9	19,7	3,6	1	–
	6			32		28,7		28,7		4,6		
19	–	–	14	7,3	0,7	22	16	25,3	14,7	–	–	–
	14			8		38		40		–		
20	–	–	14	7,3	2,7	23,3	13,4	21	17,7	0,6	–	–
	14			10		36,7		38,7		0,6		
Half lying pulling up, <i>times</i>												
17	–	–	11,3	6,7	11,6	3,4	35	21	6,3	3,7	1	–
	11,3			18,3		38,4		27,3		4,7		
18	–	1	7	10,3	15,3	10,4	22,3	17,3	10,4	5	1	–
	8			25,6		32,7		27,7		6		
19	–	4,7	5	8,7	12,6	12	22	21,3	9	3,7	0,3	0,7
	9,7			21,3		34		30,3		4,7		
20	–	–	8,7	15	4,7	9,3	33	14	12	3	0,3	–
	8,7			19,7		42,3		26		3,3		

The obtained data of sitting body bending of 17-20 years old students have been distributed as follows: low level was shown by 22.3% of 17 years old students; 12.7% of 18 years old; 14.3% - of 19-20 years old students. Low than medium level was manifested by 15.3% of 17 years old students; 4% - by 18 years old students; by 6.7% of 19 years old and by 7% of 20 years old students. Medium, higher than medium and high level of development was showed by 19.7%, 15%, 27.7% of 17 years old students; by 52.3%, 22.7%, 8.3% of 18 years old students; by 56%, 17.3%, 5.7% of 19 years old and by 46.7%, 26.7%, 5.3% of 20 years old students.

As per the comparative analysis results of lying body bending indicators it was found out that low, lower than medium and medium levels for 17 years old students were correspondingly: 14%, 7.3%, 36%.; for 18 years old students: 6%, 32%, 28.7%; for 19 years old students: 14%, 8%, 38% and for 20 years old students: 14%, 10%, 36.7%. Nearly 42.7% and 0% of 17 years old students, 28.7% and 4.6% of 18 years old students, 40% and 0% of 19 years old and 38.7% and 0% of 20 years old students manifested higher than medium and high levels of development.

Generalizing the obtained data on half lying pulling up it should be noted that low level of development was observed in 11.3% of 17 years old students, in 8% of 18 years old students, in 9.7% of 19 and in 8.7% of 20 years old students. The results also witness the level lower than medium was showed by 18.3% of 17 years old students, by 25.6% of 18 years old students, by 21.3% of 19 and by 19.7% of 20 years old students. Medium and higher than medium levels were determined for 38.4% and 27.3% of 17 years old students, for 32.7% and 27.7% of 18 years old students, for 34% and 30.3% of 19 and for 42.3% and 26% of 20 years old students. With high level 4.7% of 17 years old students, 6% of 18 years old students, 4.7% of 19 and 3.3% of 20 years students comply.

So, complex testing as per American series of tests (YMCA) permitted to determine individual level of every student's motion abilities' development both: by age and by sex. On the base of all indicators, with the help of complex evaluation it is possible to determine general level of motion preparedness of a certain contingent. Complex evaluation stipulates determination of every motion ability in points; then total indicator for the whole complex is calculated; as per generalized scale – qualitative value of development is determined (see table 3).

Table 3

Complex evaluation of motion abilities' development with the help of YMCA series of tests.

Quantitative evaluation (points)		Qualitative evaluation
Calculated by 5- points sigmoid scale	Calculated by 12- points sigmoid scale	
By four indicators		
18–20	40 i <	excellent
14–17	32–39	good
10–13	24–31	satisfactory
6–9	16–23	unsatisfactory
2–5	15 i >	bad

Indicators of students' motion preparedness level's testing permit to compare them during the whole period of studying, to evaluate and analyze them; besides, to determine advantages and disadvantages of the applied means, methods and forms of physical training organization; to correct curriculums for the next year on the base of analysis.

So, the next stage of our research was determination of motion abilities development's complex evaluation by 12-point sigmoid scale with the help of four tests of YMCA methodology applied for 17 -20 years old students (see fig.1).

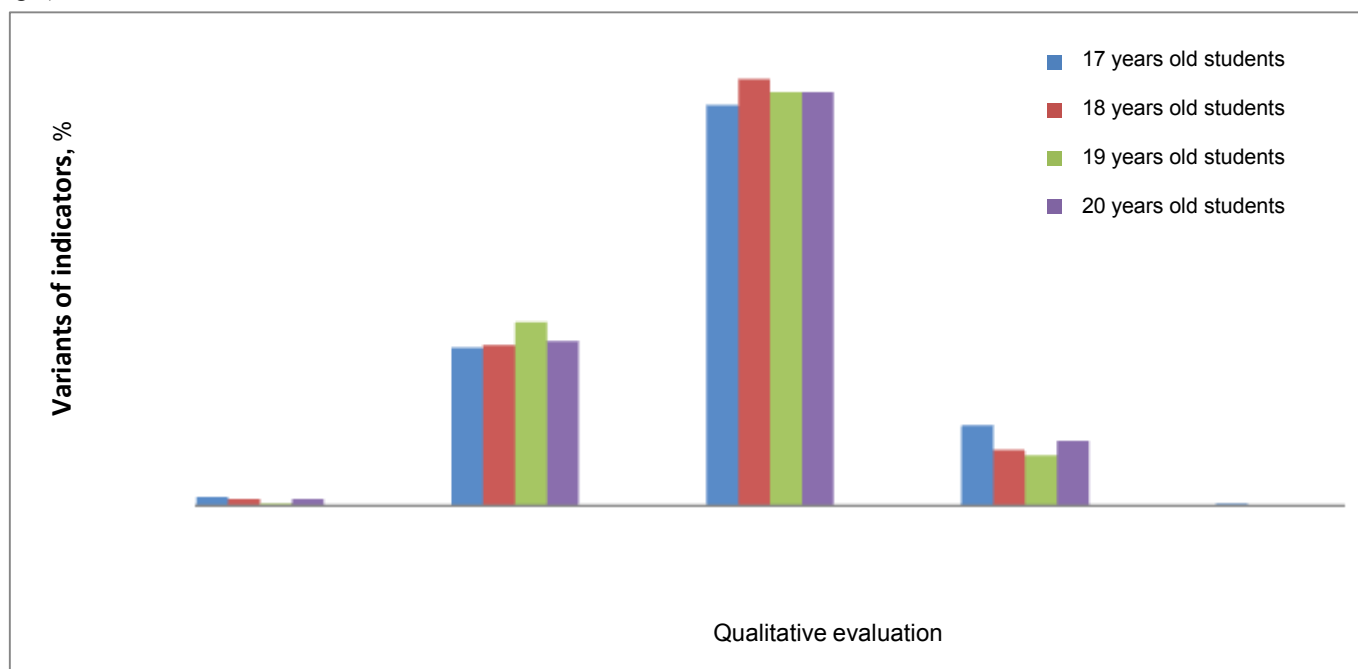


Fig. 1. Indicators of complex evaluation (YMCA), calculated by 12-points, sigmoid scale for 17-20 years old students

The data, obtained by complex evaluation of four test exercises of motion abilities' development witness that "bad" mark was received by 1.3% of 17 years old students, by 1% of 18 years old students, by 0.3% of 19 and by 1% of 20 years old students; "unsatisfactory" mark was given to 24.3% of 17 years old students, to 24.7% of 18 years old students, to 28.3% of 19 and 25.3% of 20 years old students. "Satisfactory" was given to 61.7% of 17 years old students, to 65.7% of 18 years old students, to 63.7% of 19-20 years old students. 12.4% of 17 years old students, 8.6% of 18 years old students, 7.7% of 19 and 10% of 20 years old students have "good" mark. "Excellent" mark was given only to 0.3% of 17 years old students.

Summary

One of the most important means of improvement of students' motion activity and training efficiency is an adjusted system of objective control and evaluation of motion abilities' complex testing. Such system, on the one hand, expands possibilities of educational training process and on the other hand, every student can receive objective information on different stages of his activity, that permit to significantly raise his motivation for improvement of motion preparedness results in the process of physical education in higher educational institution.

The further researches are planned to be conducted in direction of determination of motion abilities and physical development interconnection, considering students' age aspect.

References:

- 1 Volkov V., Gniniuk O. *Teoriia i metodika fizichnogo vikhovannia i sportu* [Theory and methods of physical education and sport], 2006, vol.2, pp. 35–39.
- 2 Gumennyj V. S., Loshickaia T. I. *Fiziceskoe vospitanie studentov tvorceskih special'nostej* [Physical Education of the Students of Creative Profession], 2003, vol.5, pp. 49–54.
- 3 Krucevich T. Iu., Vorob'ev M. I. *Kontrol' v fizicheskom vospitanii detej, podrostkov i iunoshej* [Control in physical education of children, teenagers and youths], Kiev, NUPES, 2005, 195 p.
- 4 Landa B. Kh. *Metodika kompleksnoj ocenki fizicheskogo razvitiia i fizicheskoi podgotovlennosti* [Method of complex estimation of physical development and physical preparedness], Moscow, Soviet sport, 2006, 208 p.
- 5 Romanenko V. A. *Diagnostika dvigatel'nykh sposobnostej* [Diagnostics of motive capabilities], Donetsk, DONNU, 2005, 290 p.
- 6 Semenova O. IE., Afonin V. M. *Pedagogika, psihologia ta mediko-biologicni problemi fizichnogo vikhovannia i sportu* [Pedagogics, psychology, medical-biological problems of physical training and sports], 2010, vol.12, pp. 129–131.
- 7 Sergiienko L. P., Sharij D. V. *Teoriia ta metodika fizichnogo vikhovannia* [Theory and methods of physical education], 2010, vol.5, pp. 3–12.
- 8 Sergiienko L. P. *Sportivna metrologiia* [Sporting metrology], Kiev, KNT, 2010, 776 p.
- 9 Sokolov A. S. *Uchenye zapiski universiteta imeni P. F. Lesgafta* [Scientific messages of university of the name of P. F. Lesgaft], 2007, vol.9 (31), pp. 87–92.
- 10 Reiman M. P., Manske R. C. *Functional testing in human performance*. Champaign IL, Human Kinetics, 2009, 308 p.

Information about the author:

Sergiienko V.N.: gnilica@mail.ru; Sumy State Pedagogical University; Romenskaya str. 87, Sumy, 40002, Ukraine.

Cite this article as: Sergiienko V.N. The complex testing control of students' motor abilities aged 17-20 years. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2013, vol.3, pp. 52-56. doi:10.6084/m9.figshare.647326

The electronic version of this article is the complete one and can be found online at: <http://www.sportpedagogy.org.ua/html/arhive-e.html>

This is an Open Access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited (<http://creativecommons.org/licenses/by/3.0/deed.en>).

Received: 13.02.2013

Published: 31.03.2013