

COMPLEX ESTIMATION OF DEVELOPMENT OF POWER CAPABILITIES OF STUDENTS OF HIGHER EDUCATIONAL ESTABLISHMENTS

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Annotation. The features of development of complex of brief variant of development of power capabilities of students of basic educational separation are considered. In research took part 800 youths in age 17-20 years. The improvement of indexes is shown in test exercises (figure force; bendings and unbending of hands after 20 with; raising of trunk, hands on a breast) within the limits of 5,2-12,3%. The results of complex estimation of power capabilities are exposed to on to the 12-ball to the sigmoid scale in every age group of youths. It is set that a high-quality estimation fine is not fixed, estimation satisfactorily - within the limits of 52-62%, unsatisfactorily - within the limits of 28,5-31,5%, well - within the limits of 10-15% and badly - within the limits of 0,5-1,5%. Recommended on employments on physical education in a greater degree to spare attention physical exercises on development of speed force of students.

Keywords: speed capabilities, integrated assessment, sigmoid scale, standards, male students.

Introduction

Training and development of motion abilities are an integral part of students' physical education that facilitates solution of socially conditioned tasks, videlicet: comprehensive and harmonious development of personality, achievement of high stability in different ecological conditions, rising of organism's adapting abilities. With every year life and study of students are becoming still more intensive and require rational consumption of time and forces. In these conditions one of means of mental and physical workability's increasing can be physical culture and sports. Good motion condition, which is determined by level of main motion abilities' development, is the basis of high workability in all kinds of study, labor and sport activity of students, who study at higher educational establishments. Compulsory physical culture trainings finish before 4th year of study and for maintaining of high health's level and physical conditions in further professional activity different approaches of pedagogical control over motion abilities' development are offered [4,11,12].

Contradiction between theory of physical culture and practice of realization of motion abilities' evaluation at HEE results in demand in new methods, mathematically grounded technologies and perspective scientific ideas for using of pedagogical control. In spite of existence of a number of works, devoted to different approaches to complex testing of students' power abilities [1,2,3,5,8,9], the problem has been still remained unsolved [6,10].

That is why evaluation of students' motion abilities during their study at HEE and creation of stimuli for physical culture activity are urgent today.

The present work has been fulfilled in compliance with combined plan of scientific & research works in the field of physical culture and sports of Ukraine for 2011-2015 by subject 2.18 "Improvement of mechanisms of sportsmen's motion activity's control" of scientific direction "Methodological and organizational-methodic principles of sportsmen's rational training".

Purpose, tasks of the work, material and methods

The purpose of the work is determination of peculiarities of power abilities' level of development of higher educational establishments' students.

The tasks of the work:

- 1) to develop a complex of power abilities for boys of 17-20 years old age;
- 2) to evaluate development of students' power abilities by 12-points sigmoid scale.

800 students of 1st, 2nd, 3rd and 4th years of study, who were related to main health group, took part in the research. All students were distributed by age categories 17, 18, 19 and 20 years old (200 persons in each category), which were determined from testing date and birth-date (in decimal system, by International standards).

The methods of the research: study of literature sources, pedagogical observations, pedagogical testing, methods of mathematical statistics.

Results of the researches

During physical education trainings development of students' motion abilities was realized by means of outdoor games (volleyball, basketball, football), gymnastics, track and fields. For evaluation of power abilities' level we carried out students' testing, which permitted to determine indicators of effectiveness of traditional physical culture trainings. In the process of pedagogical testing students fulfilled complex of abbreviated variant of power abilities, which included the following tests: backbone strength (measurement of maximal strength of torso's extensors), arms' bending- unbending for 20 seconds (measurement of speed power of both arms' muscles), raising of torso from lying position with arms on breast (power endurance of abdomen's and torso's muscles) [7].

Statistical processing of data, obtained from testing of abbreviated variant of students' power abilities' development is given in table 1.

Table 1

Indicators of power abilities' complex development of 17-20 years old boys

Test exercises	Age, quantity							
	17 (n=200)		18 (n=200)		19 (n=200)		20 (n=200)	
	\bar{X}	$\pm S$	\bar{X}	$\pm S$	\bar{X}	$\pm S$	\bar{X}	$\pm S$
Backbone strength, kg	102.52	10.83	107.61	14.17	110.22	16.28	115.18	18.21
Arms' bending- unbending for 20 seconds , q-ty of times	22.47	3.64	23.94	4.91	24.56	4.76	23.66	4.29
Raising of torso from lying position with arms on breast, q-ty of times	34.17	4.53	35.26	4.69	38.29	4.55	37.67	5.02

Results of analysis witness about positive influence of physical culture trainings on boys of 17-20 years old, that is expressed in mean indicators. Maximal indicators of backbone strength have 20 years old boys (115.18±18.21 kg), than – 19 year old boys (110.22±16.28 kg), 18-years old (107.61±14.17 kg) and 7-years old boys (102.52±10.83 kg). The same trend is registered in other test exercises. From the table it is seen that improvement of mean-statistical values of 17-20 years old boys is observed in backbone strength – by 12.3%, by arms' bending-unbending for 20 seconds – by 5.2%, in raising torso from lying position with arms on breast – by 10.2%. Thus, we can say that traditional system of physical culture trainings increases first maximal strength and then power endurance and speed power abilities.

The obtained in the course of research statistic indicators, mean arithmetic values (\bar{X}) and standard deviations (S) of 17-20 years old boys' power abilities permitted to develop qualifying standards for every age group. Results were evaluated by 12-points sigmoid scale (differentiation from 2.5S to +2.5S), where step of evaluation was 0.5S. Value of result in test $\bar{X} \pm 0.5S$ is taken as a middle norm, $\bar{X} \pm 1.5S$ – lower than middle or higher than middle norm, $\bar{X} \pm 2.5S$ – low or high norm [7]. Depending on calculated values we determined the levels of development (low, lower than middle, middle, higher than middle, high).

In table 2 we present the data of development of 17-20 years old students' power abilities, calculated by 12-points sigmoid scale. Comparing indicators of backbone strength, we found that 2.5% of the tested 17 years old boys had low level of development, 1.5% of 18 years old and 19-20 years old boys – 1% every group. Results at the level lower than middle belong to 36.5% of 17 years old boys, 35% of 18 years old, 37% of 19 years and 38.5% of 20 years old students. Middle and higher than middle levels were showed by 17 years old students correspondingly by 31% and 24%, by 40% and 13.5% of 18 years old , by 37.5% and 13.5% of 19 years old and by 30% and 19.5% of 20 years old students. High level was shown only by 6% of 17 years old students, 10% of 18 years old, 11% - by 19 and 20 years old students (each group).

By indicators of arms' bending-unbending during 20 seconds it was found that low, lower than middle and middle levels were obtained accordingly from 7%, 28%, 33% of 17 years old students, 4%, 33.5%, 35.5%, - of 18 years old, 7%, 25%, 36%, - of 19 years old students and – 4.5%, 32%, 28% - of 20 years old students. About 24% and 8% accordingly of 17 years old boys 16% and 11% – of 18 years old boys, 21.5% and 10.5% – of 19 years and 26% and 9.5% – of 20 years old students have middle and high levels of development.

Studying indicators of torso's rising from lying position with arms on breast we can note: 1.5% of 17 years old students have low level of development, 10.5% of 18 years old students, 8.5%, of 19 years old and 14.5% of 20 years old students. Levels below middle and middle were found at 29.5% and 41.5% of 17 years old students, 15% and 39.5% of 18 years old students, 33.5% and 25% of 19 years 15.5% and 36.5% of 20 years old students.

Table 2

Indicators of power abilities evaluated by 12-points sigmoid scale (boys of 17-20 years old age, %)

Age	Points, levels of development													
	1	2	3	4	5	6	7	8	9	10	11	12		
	Low			Lower than middle			Middle			Higher than middle			High	
Backbone strength														
17	–	–	2.5	6.5	30	13.5	17/5	17	7	2.5	–	3.5		
	2.5			36.5			31			24			6	
18	–	–	1.5	10	25	21	19	7	6.5	4	3.5	2.5		
	1.5			35			40			13.5			10	
19	–	–	1	9	28	26	11,5	7	6.5	5	4.5	1.5		

	1			37		37.5		13.5		11		
20	–	–	1	18	20,5	19	11	10.5	9	7	4	–
	1			38.5		30		19.5		11		
Arms' bending-unbending during 20 seconds												
17	–	–	7	10	18	17	16	20	4	6	–	2
	7			28		33		24		8		
18	–	–	4	22	11.5	85	27	8.5	7.5	11	–	–
	4			33.5		35.5		16		11		
19	–	–	7	17.5	7.5	10	26	14.5	7	10.5	–	–
	7			25		36		21.5		10.5		
20	–	–	4.5	18	14	11	17	17	9	9.5	–	–
	4.5			32		28		26		9.5		
Torso's rising from lying position with arms on breast												
17	–	1	0.5	22.5	7	20.5	21	11.5	1.5	14.5	–	–
	1.5			29.5		41.5		13		14.5		
18	–	–	10.5	15	–	21.5	18	15	17	2.5	0.5	–
	10.5			15		39.5		32		3		
19	–	–	8.5	–	33.5	8.5	16.5	16.5	16.5	–	–	–
	8.5			33.5		25		33		–		
20	–	–	14.5	–	15.5	18	18.5	19	10	4.5	–	–
	14.5			15.5		36.5		29		4.5		

Higher than middle and high levels were registered at 13% and 14.5% of 17 years old students, 32% and 3%, of 18 years old students, 33% and 0% of 19 years old, and 29% and 4.5% of 20 years old students.

In the process of studying of 17-20 years old students' power abilities we also fulfilled complex evaluation (in points and qualitative evaluation) of abbreviated variant of power abilities' development by three indicators (backbone strength, arms' bending-unbending during 20 seconds and torso's rising from lying position with arms on breast, which were calculated by 5 points and 12 points sigmoid scales (see table 3).

Table 3

Complex evaluation of power abilities' development by results of 3 test exercises, calculated by 5- and 12-points sigmoid scales

Quantitative evaluation, points		Qualitative evaluation
calculated by 5-points sigmoid scale	calculated by 12-points sigmoid scale	
By 3 indicators		
14–15	30 and <	excellent
11–13	24–29	good
8–10	18–23	satisfactory
5–7	12–17	unsatisfactory
2–4	11 and >	bad

The data of complex evaluation of 17-20 years old students power abilities' development (abbreviated variant), calculated by 12-points sigmoid scale are given in fig. 1.

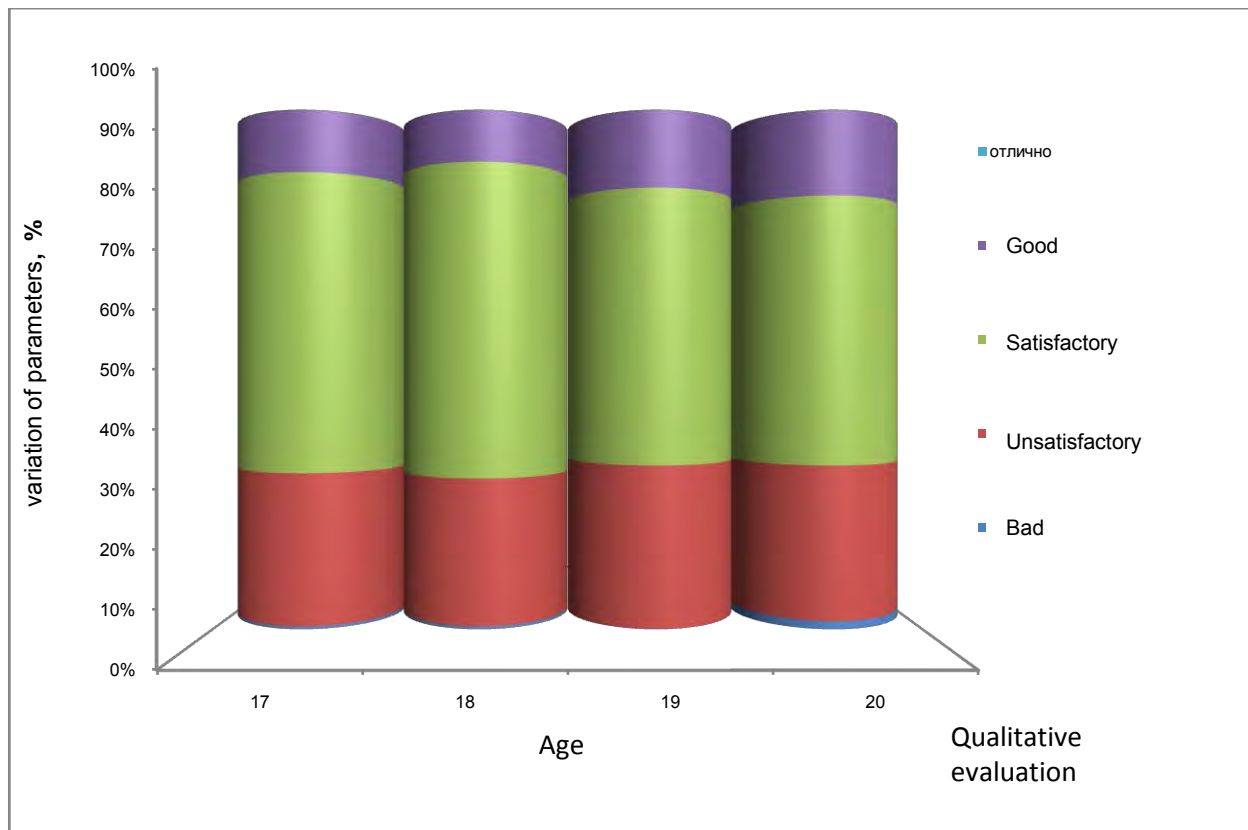


Fig.1. Indicators of complex evaluation of 17-20 years old students power abilities' development, calculated by 12 points sigmoid scale

The obtained indicators of complex evaluation by 3 test exercises for power abilities' development show that 0.5% of 17-18 years old students and 1.5% –of 20 years old students have mark “bad”; “unsatisfactory” was put to 29.5% of 17 years old and to 28.5% of 18 years old students; to 31.5% of 19years old and to 30% of 20 years old students. “Satisfactory” was put to 58% of 17 years old students, to 61% of 18 years old, to 53.5% of 19 years old students and to 52% of 20 years old students. Mark “good” received 12% of 17 years old boys, 10% of 18 years old, 15% of 19 years old and 16.5% of 20 years old students. Marks “excellent” and “good” are absent at all.

In the process of physical culture training it is necessary to carry out permanent pedagogical control and stage-by-stage evaluation of motion level of trainees that will permit for instructor to have objective information, which, in its turn, will permit to analyze and control the process of physical education, to determine urgent measures on prevention from negative after-effects and their elimination, to follow the growth of organism's physical condition, to know its response to certain kinds of physical exercises.

Conclusions:

1. It has been found that at physical culture trainings at HEEs it is necessary to accentuate attention to development of speed-power abilities.
2. Results of complex evaluation of 17-20 years old boys' power abilities, calculated by 12-points sigmoid scale, witnessed that development of power abilities by rating of increment is as follows: “satisfactory” mark within 52-62%, “unsatisfactory” - within 28.5–31.5%, “good” – within 10–15% and “bad”- within 0.5–1.5%.
3. Introduction of system of complex control over motion preparedness in academic process will permit for student to have objective information about level of power abilities' development in general. He will be able follow the changes of his physical condition under influence of trainings and compare his condition with physical level of other students. It will undoubtedly change students' attitude to their health and life style, increase their interest to testing and to will serve as a stimulus to physical self-perfection. For instructor it will give opportunity to realize individual approach in the process of physical education.

The prospects of further researches imply carrying out of pedagogical control of the same complex of 17-20 years old girls' power abilities' development.

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Cite this article as: Sergiienko V.N. Complex estimation of development of power capabilities of students of higher educational establishments. *Physical education of students*, 2013, vol.5, pp. 83-87. doi:10.6084/m9.figshare.771211

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Received: 27.04.2013
Published: 10.09.2013