

Original Article

Optimization of special physical training of cadets in the specialty «Arms and Military Equipment» on performing professional military-technical standards

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Abstract

Data from 1999 till 2013 were collected to information processing. 15 groups with period of study 5 years were given to the static analysis, at total 304 persons. The results received by cadets (specialty "Arms and Military Equipment") during their study on subject matters gave in to static processing according to Student-Fischer's criterion: 1) physical training; 2) operation of armored arms and military equipment; 3) arms and firing.

The obtained data demonstrate that good physical training is not always a key to the successful performance of combat standards. In these situations it is necessary to consider the subjective factor of study which is possibly connected with motivation on the organization of effective process of physical training and achievement of real results of future military personnel in study profession. The established interrelation between separate indicators of combat and physical training allowed developing an algorithm of selection of physical exercises which promote improvement of indicators of combat training. The reliable improvement of combat preparedness of military personnel of the experimental group for 2,5% turned out to be consequence of the pedagogical experiment that is a reliable difference in comparison with the control group.

Keywords: physical and combat training, special physical training, individual exercises, statistical analysis, standards.

Introduction

New content of armed struggle provides in the modern conditions changes in tactics of conducting combat operations, quality of arms and military equipment, level of training and preparedness of staff. Activity of subsections in all spheres is one of the signs of guiding of such wars, as experience of conducting military actions in the east of Ukraine testifies. Changes of nature of conducting combat operations require specification of requirements to the level of physical preparedness of military personnel (Shlyamar, 2014).

For the purpose of improvement of physical fitness in the course of preparation for performance of missions, we consider necessary: to develop specific exercises for each type of military forces and specialty by profession; to give bigger attention to the exercises, creating ability of collective actions as a part of crew, platoon, and batteries; to consider seasonal climatic conditions and others [Nedatkivskiy, 2015].

Materials and methods

The static analysis of standards of physical and combat trainings of 304 cadets from 15 groups with period of study 5 years was carried out. Data from 1999 to 2013 were collected to information processing.

2 groups of cadets, who authentically didn't differ on physical indicators, were created for carrying out the experiment. Control and experimental groups in quantity on 20 servicemen in each educational group were created. The control group studied according to the program of study and the inspection of performance of standards of technical training was carried out within 6 weeks. Classes on 4 hours for a week by the technique of specially selected physical exercises and loads to military-technical standards were given in the experimental group, and also control over the performance of standards was carried out within 6 weeks. The special technique of use of the selected physical exercises was developed for training of the experimental group. The developed technique is applied according to the scheme of training of the military personnel by the professional direction with the certain aimed tasks, which is submitted on Fig 1.

These or those physical exercises, which are included into base "2" for improvement of quality of training to military-technical standards, from base "1", were selected for training of cadets within a month previously according to the scheme. Speed of performance of such military specifications was investigated in the experiment, such as: the standard that is characterized by masking of the car "Standard No. 1", the standard that characterizes updating works of a running gear of the car "Standard No. 2", the standard that characterizes

evacuation of the car Standard No. 3. Cadets trained with use of the chosen physical exercises in an individual order that contain power load within 6 weeks.

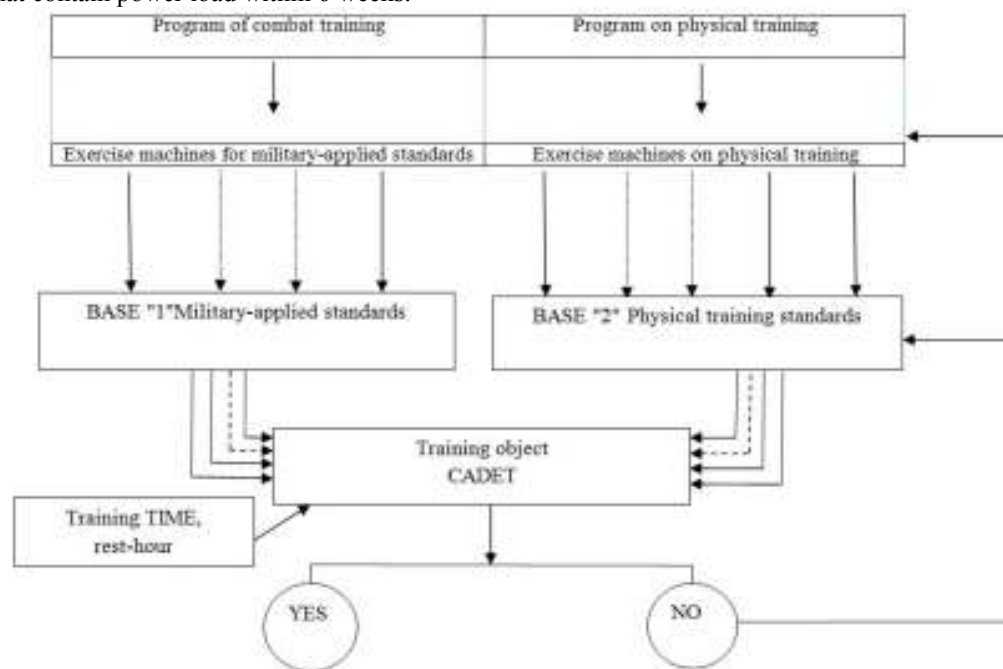


Fig 1. The logical scheme of training of the military personnel in the professional direction with the certain aimed tasks.

The standard: No. 1: 1) Rise by force on a crossbeam; 2) Pulling up on a crossbeam; 3) Raising of two weights on the long cycle; 4) Deadlift.

The standard: No. 2: 1) Rise by force on a crossbeam; 2) Snatch of the weight of 8, 16, 24 kg; 3) Bending and extension of hands in an emphasis on bars; 4) Complex power exercise; 5) Draft to stomach sitting on the exercise machine

The standard: No. 3: 1) Pulling up on a crossbeam; 2) Raising of two weights on the long cycle; 3) Bending and extension of hands in an emphasis lying; 4) Deadlift; 5) Complex exercise on dexterity.

Results

The estimates, received by the cadets (the specialty "Arms and military equipment") during their study on physical training, exploitation of BTFP, arms and firing, were given to the analysis. The obtained data on progress of study by cadets were divided into 2 subgroups (Table 1). The reliability of the received results was $p \leq 0,05$ (Kogan,2007). The obtained data demonstrate that good physical training is not always a key to the successful performance of combat standards. In these situations it is necessary to consider the subjective factor of study which is possibly connected with motivation on the organization of effective process of physical training and achievement of real results. The special attention is deserved by the group of cadets which received "excellent" on physical training and "satisfactory" on combat training. This fact demonstrates that the existing number of standards for physical training is organically unconnected to improvement of combat training of cadets in the specialty "Arms and military equipment". The psychological factor is also excluded (Manopurin, 1973; Puni, 1956; Rudik, 1967).

Table 1. The data on progress of study by cadets.

I subgroup				II subgroup			
5-5	4-4	4-5	5-4	3-4	4-3	3-3	5-3
58 pers.	86 pers.	12 pers.	15 pers.	26 pers.	40 pers.	44 pers.	12 pers.
% relation				% relation			
171 cadets				122 cadets			
59,3%				46,1%			

Note. I-subgroup progress on physical and combat training: (excellent-excellent) – 58 cadets, (good-good) – 86 cadets, (good-excellent) – 12 cadets, (excellent-good) – 15 cadets, in general 171 cadets that makes 59,3%; II-subgroup (satisfactory-good) – 26 cadets, (good-satisfactory) – 40 cadets, (satisfactory-satisfactory) – 44 cadets, (excellent-satisfactory) 12 cadets, in general 122 cadets that makes 46,1 %.

The correlation between physical training and combat training is observed for cadets of the II subgroup (53,9 %), so good physical training answers high-quality performance of combat standards. The others (46,1 %) point to complexity of understanding of the system of physical training is that it is the subsystem (component) of bigger systems: combat training of military personnel, combat improvement of troops, physical training of all citizens of the country. In general physical training of troops is the ordered system (Veydner-Dubrovin, 1986; Veydner-Dubrovin, Mironov, Shevchenkov, 1992; Romanchuk, Boyarchuk, Romanchuk, 2010).

But according to the research results, the content of physical training of cadets in the specialty not fully meets the requirements in the specialty "Arms and military equipment". Means of special physical preparedness were selected, technique of their use in the process of training of cadets was developed and efficiency of the developed technique was carried out on the basis of determination of interconnection of indicators of special physical training with technical training standards. The received by us results testify to the insufficient role of physical training to high-quality performance of military and technical standards by cadets in particular by the profession "Arms and military equipment". The results are presented in tables 2, 3. The probability of obtaining results was $p \leq 0,05$.

Table 2. The consolidated table of the experimental group concerning performance of standards of technical training

№	Standard №1 (group)							Standard №2 (group)							Standard №3 (group)						
	Performance control (week)							Performance control (week)							Performance control (week)						
	1	2	3	4	5	6	a.v.	1	2	3	4	5	6	a.v.	1	2	3	4	5	6	a.v.
1	179	177	175	170	165	166	13	198	190	185	182	181	182	16	401	400	395	390	388	379	22
2	188	182	183	179	177	176	12	200	195	190	193	188	186	14	450	448	449	436	433	429	21
3	181	180	179	170	165	166	15	201	193	190	188	184	182	19	423	415	410	408	401	395	28
4	179	175	171	170	166	168	11	199	196	191	185	186	182	17	400	390	388	378	363	365	35
5	177	175	169	167	165	167	10	188	190	185	181	177	170	18	432	412	395	391	385	379	53
6	198	187	185	181	177	169	29	188	187	185	182	183	181	7	437	428	416	408	401	400	37
7	205	200	201	197	194	194	11	208	199	199	195	194	193	15	405	400	399	397	398	399	6
8	172	169	173	165	163	163	9	198	190	191	184	181	183	15	399	400	389	390	388	377	22
9	184	179	175	169	165	161	23	202	196	189	185	186	187	15	433	425	427	422	421	422	11
10	170	175	171	169	165	160	10	170	174	170	169	166	165	5	455	432	447	436	422	421	34
11	179	177	175	170	165	166	13	198	190	185	182	181	182	16	401	400	395	390	388	379	22
12	188	182	183	179	177	176	12	200	195	190	193	188	186	14	450	448	449	436	433	429	21
13	181	182	179	170	165	166	15	201	193	190	188	184	182	19	423	415	410	408	401	395	28
14	179	175	171	170	166	168	11	199	196	191	185	186	182	17	400	390	388	378	363	365	35
15	177	175	169	167	165	167	10	188	190	185	181	177	170	18	432	412	395	391	385	379	53
16	198	187	185	181	177	169	29	188	187	185	182	183	181	7	437	428	416	408	401	400	37
17	205	200	201	197	194	194	11	208	199	199	195	194	193	15	405	400	399	397	398	399	6
18	172	169	173	165	163	163	9	198	190	191	184	181	183	15	399	400	389	390	388	377	22
19	184	179	175	169	165	161	23	202	196	189	185	186	187	15	433	425	427	422	421	422	11
20	170	175	171	169	165	160	10	170	174	170	169	166	165	5	455	432	447	436	422	421	34
a.v.	183,3	183,3	178,2	173,7	170,2	169		195,2	191	187,5	184,4	182,6	181,1		423,5	415	411,5	405,6	400	396,6	

Table 3. The consolidated table of the control group concerning performance of standards of technical training

№	Standard №1 (group)							Standard №2 (group)							Standard №3 (group)						
	Performance control (week)							Performance control (week)							Performance control (week)						
	1	2	3	4	5	6	a.v.	1	2	3	4	5	6	a.v.	1	2	3	4	5	6	a.v.
1	178	177	175	171	170	170	8	188	190	185	181	177	170	18	429	428	416	418	404	406	23
2	188	186	186	184	182	182	6	195	197	198	196	195	193	2	450	448	449	436	433	429	21
3	179	175	171	170	166	168	11	199	196	195	190	191	192	7	400	390	388	378	363	365	35
4	198	187	185	181	181	175	23	188	187	185	182	183	181	7	437	428	423	421	425	422	15
5	172	169	173	165	163	163	9	198	195	196	193	194	191	7	399	400	394	396	391	393	6
6	181	180	179	170	168	166	15	201	202	200	198	196	195	6	423	422	420	419	415	416	7
7	170	175	172	174	175	174	-4	170	174	171	174	170	170	0	455	448	447	441	439	432	23
8	179	177	175	170	165	166	13	198	190	185	187	184	186	12	401	400	395	390	388	379	22
9	180	179	180	177	174	175	5	196	190	189	190	186	184	12	401	400	395	390	388	379	22
10	205	206	204	205	201	202	3	208	196	199	197	195	194	14	399	400	399	397	398	399	0
11	188	182	183	179	177	176	12	200	201	198	196	194	192	8	450	448	449	436	433	429	21
12	179	177	178	175	176	175	4	199	196	191	185	186	182	17	400	390	388	378	363	365	35
13	198	195	194	195	191	193	5	188	187	187	185	183	181	7	437	428	416	408	401	400	37
14	205	203	206	202	202	201	4	208	202	199	201	199	196	12	405	400	399	397	398	399	6
15	184	183	184	182	181	179	5	198	198	190	193	192	193	5	428	425	427	422	421	422	6
16	172	169	173	165	163	163	9	198	190	191	184	181	183	15	399	400	389	390	388	377	22
17	181	180	179	177	173	170	11	201	193	190	188	184	182	19	423	421	422	425	420	422	1
18	184	179	180	178	172	173	11	202	199	195	194	191	189	13	433	431	430	429	428	429	4
19	177	175	169	167	165	167	10	187	190	185	181	177	170	17	432	430	429	427	429	426	6
20	170	175	171	169	165	160	10	170	174	170	169	166	165	5	455	432	447	436	422	421	34
a.v.	183.4	181.5	180.9	177.8	175.5	174.9		194.6	192.4	189.9	188.2	186.2	184.5		422.8	418.5	416.1	411.7	407.4	405.5	

Following the results of performance control of technical standards of control and experimental groups, we constructed graphics of success dynamics of performance of technical standards which are provided in Fig. 2, 3, 4.

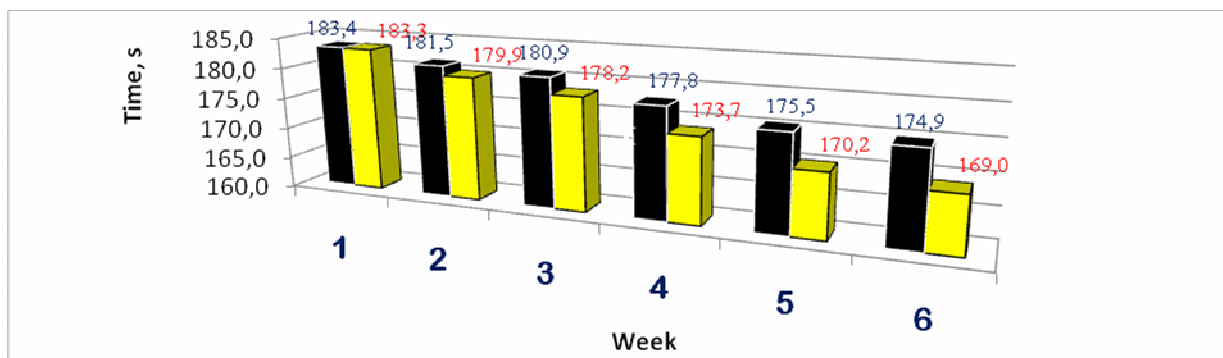


Fig 2. "Standard No. 1"
Note: Black – control group, Yellow – experimental group.

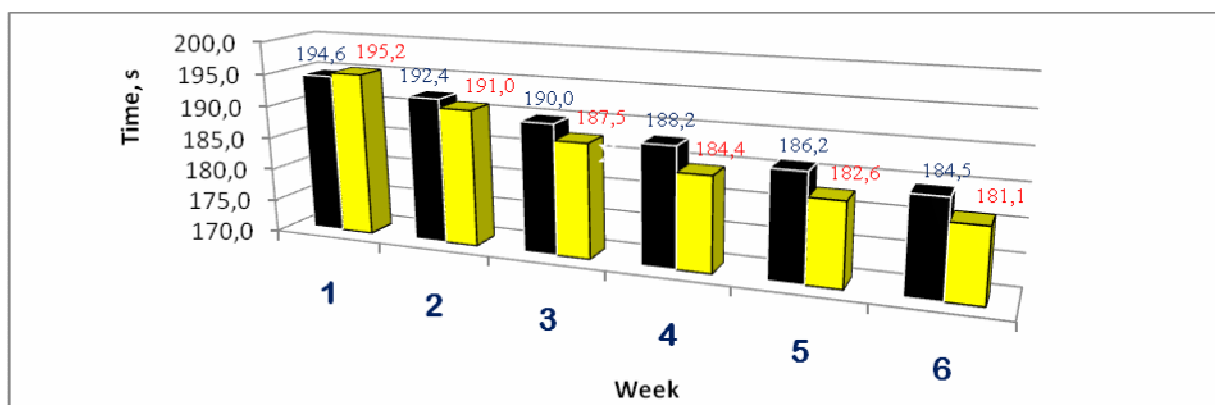


Fig 3. "Standard No. 2"
Note: Black – control group, Yellow – experimental group.

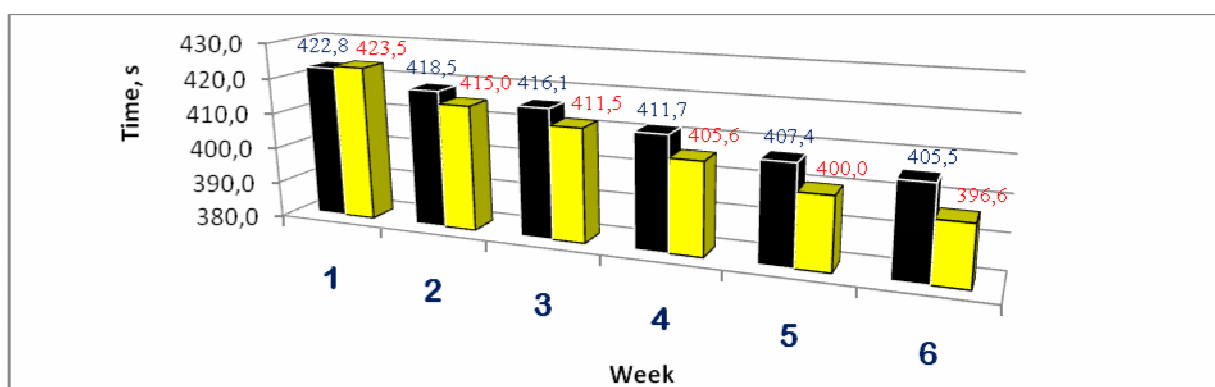


Fig 4. "Standard No. 3"
Note: Black – control group, Yellow – experimental group.

It leaves the provided graphics that success of performance of this or that military specification can be provided at the expense of precisely chosen additional or purposeful physical exercises [5]. The greatest increase in speed of performance of military specifications as for the whole group, and each cadet was separately observed at performance of the technical standard No.1.

The received smallest results on performance of standards No. 2 and No. 3 are possible to explain because these standards demand sharpness of time for considering but other factors for its performance, for example: "Sequence of performing the standard and other".

Discussion

The essence of optimization of special physical training concerning implementation of military specifications by the professional direction is considered from the different parties by many authors. So, inventors (Veydner-Dubrovin, Mironov, Shevchenkov, 1992) define insufficiency of physical training to the level of performance of combat tasks in their works.

Also it is brought by scientists (Artur Oderov et al., 2017) that the system of assessment and check of physical qualities of military personnel plays a significant role in vocational training of military experts. To estimate military-applied skills of military personnel by means of the corresponding standards. Practical results allowed authors to specify that use of individual protection equipment and weapon promotes professional development of military personnel.

Authors (Alexander Bolotin, Vladislav Bakayev, 2017) show that great attention should be given to the complex use of technical, tactical, moral, psychological and physical training during formation of preparedness of a shooter for competitions. Also it was shown by inventors (Ruslan Kropta et al., 2017) that technique of performance of competitive exercises at the stage of the maximum realization of individual opportunities is formed on the basis of interaction of functional systems which support activity of muscles, is the dynamic organization and is in the formation stage, proceeding from the requirement for the subsequent sports improvement.

The work of authors is of great interest (Anatolij Lopatiev et al., 2017) which purpose is to show foundation of methodology of system approach and mathematical modeling in studying of processes in physical education and sport. Thus, optimization of special physical training promotes formation of high level of reliability of professional skills in the conditions of combat application, development of complex of psychophysiological qualities of a serviceman, defines adaptation opportunities of his organism to educational and combat activity and prevention of mistakes and adventures as in peace and wartime (Verkhoshansky, 1988).

Taking into account of results of modern scientific developments of highly skilled specialists in the field of physical education and sport, combat and physical training of military personnel, allowed developing an advanced technique of physical training of cadets.

Conclusions

1. The offered and developed by us technique of optimization of special physical training has a positive influence on dynamics improvement of performance of technical standards on military training.

2. The selected physical exercises positively influenced improvement of military-technical standards on combat training. Improvement of performance of standards in the experimental group is observed: by 7,8% to the standard No. 1; by 7,2% to the standard No. 2; by 6,4% to the standard No. 3. In the control group: by 4,6% to the standard No. 1; by 5,2% to the standard No. 2; by 4,1% to the standard No. 3. The difference made 2,5% that is a reliable difference.

3. The obtained results of the research allow recommending the advanced technique of physical and combat training and introduction it in the educational-training process of cadets in the direction of preparation "Arms and military equipment".

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