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THE ANALYSIS AND INTERPRETATION OF CONTROL TESTS RESULTS , IN ORDER TO OPTIMIZE THE MARINE STUDENT'S OBSTACLE TRACK PERFORMANCE

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Abstract: *To assess the level of physical training, expression of the developing degree of each motric quality, in part this is achieved through international physical ability test samples (F.I.E.P), known under the name of "Standard Fitness Test". From the demonstraton of this test, we chose for our research: standing long jump, running strength (1000 m); pushups. Statistically processing the measured data characteristics (motor, functional and results in each sample obstacle separately) we see that they differ significantly from one test to another, the progress made in training having an upward trend.*
Keywords: *experiment, statistical tools, training, obstacle course, performance.*

This paperwork frames the training process streamlining, according to the contests requests for selecting the elite troups, to identify selection criteria in accordance with NATO. Pedagogical experiment was applied to a sample of 45 subjects – military athletes ages 20 - 25 years. Initially the experimental research consisted in testing the morphological development, functional capacity, general physical training and specific physical training. Afterwards, still in the experimental first stage, we tested the subjects psychomotricity parameters. Initial tests were conducted in order to find the level of training of representatives, both control sample and the experimental patterns. These tests allowed the completion of the experimental phase, which consisted in the application of a training process to the experimental group of a model of preparation with structure and content specific to the military pentathlon, for the experimental group. The test results were recorded, analyzed and statistically processed.

The preparation for the obstacle course must be streamlined and rationalized since it plays a distinguished importance in training military students for battles.

Upon this point of view the next speculations are emitted:

- If we analytically work for improving the technique of passing every osbtacle and then bonding more obstacles until the correct pass of all the obstacles is complete, then the results of all the military-marine students will be more improved;
- the military demonstration performances will increase if we configurate the practicing conditions and every obstacle specific solicitations;
- If we will improve the actuating and functional capacity of the military-marine students with the help of athletic sports specific training strategies, then the performance behaviour for the obstacle course test will be improved.

Homeland defense activities include among others in the content of training for the successful fulfillment of this duty and an amount of specific skills for this activity. In their structure, are included most of the basic motor skills like: running, jumping; and also applicative utilities like: escalading, equilibrium, climbing, crawling , that are investing due to the underlying mechanism, the superimposed motric structuresc that are arising from their practicality in specific preparation for homeland defense.

In order to be built or rebuilt in sociomotric skills, these basic skills must be learned perfectly, simultaneously with the perception forming of their use in diverse conditions which require prior mastery in basic motor skills perfectly

They are modeled after military test requirements tailored to overcome obstacles, the sample becomes very complex in terms of requests.

By extension, can be compared with the toughest tests of athleticism and other sports.

To assess the level of physical training, expression of the developing degree of each motric quality, in part this is achieved through international physical ability test samples (F.I.E.P), known under the name of "Standard Fitness Test". From the demonstraton of this test, we chose for our research: standing long jump, running strength (1000 m); pushups.

Within the experimental research for morphological testing it was proceeded to measure the following morphological parameters: height (waist) weight, size.

In experimental research to testing the functional capacity were used two measurement techniques:

- to respiratory system where to check: vital capacity;
- the cardiovascular system: heart rate.

In the statistical processing of corresponding data, measured within the research, we used the following statistical tools:

Statistical indicators of:

- central tendency (arithmetic mean, the median);
- dispersion (standard deviation, variance, average deviation, amplitude);
- consistency (coefficient of variation);

Comparative graphical representation of the data of each feature within each group and between the two groups, of the following elements:

- standard deviation, average deviation, amplitude, coefficient of variation, arithmetic mean, the median,)
- the results of measured characteristics - represented by histograms with Gaussian curve.

Hypothesis testing for acceptance or rejection of the null hypothesis.

Null hypothesis assumes that there are no significant differences between the means of the studied features in case of repeatedly testing the same sample (group) in different time intervals (initial testing - interim testing - final testing) or the two samples (experimental group and control group).

Alternative hypothesis is one that denies the null hypothesis. Statistical tools used in statistical hypotheses are:

- Test t (STUDENT) in case of testing the same sample for a given feature in different time periods.If the value of t, based on the sample data calculated under the statistical research is greater than the predefined tables t t, the differences between the results of two tests are statistically significant, rejecting the null hypothesis and accept the alternative hypothesis.
- ANOVA test, in case of testing the two samples, for a specific characteristic in a given moment. If the value of F, based on research data from samples submitted is greater than the value of F, the differences between the results of two tests are statistically significant, rejecting the null hypothesis and accept the alternative hypothesis.

In the experimental research we used the next methods:

- Special literature analysis;
- Pedagogical observation
- Measuring methods

- test for checking the morphological development;
- test for checking the functional capacity;
- test for checking the general physical training;
- test for checking the specific physical training;

- Pedagogical experiment;

- Comparative method;
- *Mathematical Methods* of *Statistics for processing and* executing assignments;
- Graphical representation method

Statistically processing the measured data characteristics (motor, functional and results in each sample obstacle separately) we see that they differ significantly from one test to another, the progress made in training having an upward trend.

Measured data in tests are homogeneous in all statistical indicators observing the upward trend.

T value, calculated on the basis of the sample data, subjected to statistical research is greater than the t valuea predefined in the table t. It follows that the the differences between the tests results are statistically significant, rejecting the null hypothesis and accept the alternative hypothesis (calculated t> critical t).

	EXPERIMENT	**WITNESS**
1000 m	Calculated t (18,08) > critical t (2,02)	Calculated t (13,44) > critical t (2,02)
Obst. track	Calculated t (22,59) > critical t (2,02)	Calculated t (15,05) > critical t (2,02)
Press-ups	Calculated t (20,40) > critical t (2,02)	Calculated t (16,84) > critical t (2,02)
long jump without momentum	Calculated t (16,95) > critical t (2,02)	Calculated t (17,48) > critical t (2,02)
Vital capacity	Calculated t (19,45) > critical t (2,02)	Calculated t (16,62) > critical t (2,02)
Heart rate	Calculated t (8,79) > critical t (2,02)	Calculated t (13,38) > critical t (2,02)

Comparing the measured characteristics of the three tests (initial - Intermediate - Final) in the experimental group and control group (ANOVA) note the following:

- Final testing results (1000m, press-ups, obstacle track, vital capacity) significantly differ.
- Calculated F>Critical F. The null hypothesis is rejected

- 1000m – calculated F (34.66) > critical F (3.95)Press-ups
- Calculated F (10.77) > Critical F (3.95)Obstacle track
- Calculated F (27.00) > F critic (3.95)Vital capacity
- Calculated F (12.56) > Critical F (3.95)

- Long jump without momentum and heart rate results, although much better at the experimental group, they do not differ significantly and therefore the null hypothesis is accepted. Calculated F < critical F.

- Long jump without momentum – calculated F(0.22) < critical F (3.95)
- Heart rate - calculated F (0.73) < critical F (3.95)

Anthropometric measurements taken at the beginning and end of the experiment, don't bring any significant changes, at this age the growth process is almost complete. For this reason no differences between the two groups are not spectacular. If, at the beginning of the experiment there was recorded a height difference of 3,4 cm, at it's end this difference was only of 3,2 cm.

These small differences, both during the same group of students as well as between the two samples, does not effect the performance, unable to interefere too much to significantly improve these indicators.

Experimental group

Crnt. issue	Initial testing						Final testing					
	T.	E. tor.	D.ac.	D.bit.	G	Anv.	T.	E. tor.	D.ac.	D.bit.	G	Anv.
Avrg	178,5	5.4	42,22	33.91	82	177.8	179.0	6,68	43.6	32.0	82.06	177.7

Witness group

Crnt. issue	Initial testing						Final testing					
	T.	E. tor.	D.ac.	D.bit.	G	Anv.	T.	E. tor.	D.ac.	D.bit.	G	Anv.
Avrg	175.1	5.45	43.91	33.77	77.66	174.0	175.8	6.655	44.68	32.13	74.62	174.4

Regarding the physiological indicators testing we can say that following the experiment they grew significantly, having an uptrend, especially in the experimental group. This is explained, mainly due to the use of training methods and ways, rigorously selected trained athletes, which created the premises (besides technical and tactical training) of improving the results of the obstacle track (statistical interpretation of the results to allof these measurements, comes to confirms this).

Experimental group

	Initial testing		Interim testing		Final testing	
	Vital capacity	Heart rate	Vital capacity	Heart rate	Vital capacity	Heart rate
Avrg.	4675,5	78,11	4897,7	76,60	5395,5	72,48

Witness group

	Initial testing		Interim testing		Final testing	
	Vital capacity	Heart rate	Vital capacity	Heart rate	Vital capacity	Heart rate
Media	4393,3	78,75	4606, 6	77,29	5015,5	73,66

Most spectacular results were recorded in motor capacity measurements where their upward trend at 1000 m, from (3:12,97) to the initial testing at 3.01,57 at the final testing (experimental group) confirms the very good physical training, especially in the preparatory period. At Long jump without momentum, although the difference between the two groups at the final testing is very small, only 0.9 cm, relevant is that the 248.7 cm, at the initial testing, the experimental group progressed by 12.6 cm, while the witness group, only 9.76 cm.

Experimental group

	Initial testing			Interim testing			Final testing		
	1000m	L.j without m.	Press-ups	1000m	L.j without m.	Press-ups	1000m	L.j without m.	Press-ups
Avrg.	3:12,97	248,7	39,22	3:08,93	252,7	40,88	3:01,57	261,3	44,44

Witness group

	Initial testing			Interim testing			Final testing		
	1000m	L.j without m.	Press-ups	1000m	L.j without m.	Press-ups	1000m	L.j without m.	Press-ups
Media	3:21,73	250,66	38,44	3:18,75	253,95	40,06	3:15,25	260,40	42,20

EXPERIMENT CONCLUSIONS

The hypothesis in which the manipulated arguments led to the experimental group is confirmed with the help of the next results:

❖ military students functional capacity grows, obtaining a growth of:

- vital capacity from 4675,5(I.T.) to 5395,5 (F.T.) with over 620 units and in the same time they situate over the witness group with 380 units;
- heart frequency from 78,11 (I.T) to 72,48(F.T.), with over 5.53 heartbeats/min, and in the same with 1.18 better than the witness group;

❖ actuating capacity grows

- 1000 m. – from 3:12,97 to 3:01,57 with 11,40 sec, and with over 13,68 seconds better than the witness group;
- long jump - from 248,7 to 261,3 cm, with over 12,6 cm, and with 0.90cm over the witness group;
- floatings – from 39,22 to 44,44 exec, with 5,22 better, and with 2,22 more than the witness group.

The analytic work for improving passing each obstacle and bonding more obstacles technique, till the correct passing of each obstacles technique made the marines performances grow:

- from 3:17,15 to 2:58,44 with 18,61 sec. from the initial testing to the final one, and with 13,12 better than the witness group of which result is 3:11,56 sec.

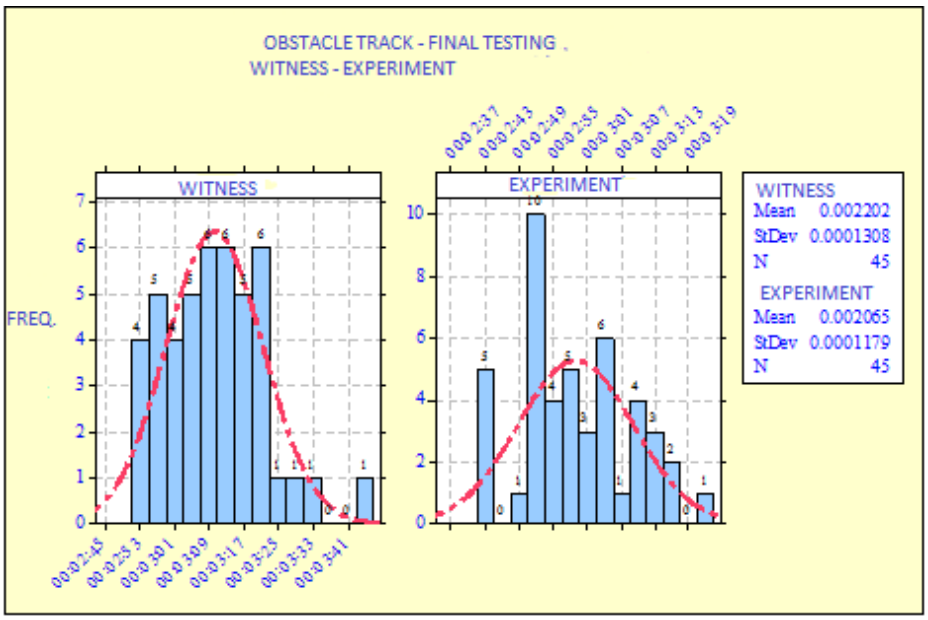
OBSTACLE TRACK
Final testing
Witness – experiment

Testing	Arith mean	Median	Approach	Standard Deviation	Avrg Dev	Er.std	Disp.	Ampl.	Coef. of var.
Witness	03:10	03:10	02:58	00:11	00:09	00:02	00:00	00:53	5.94
Experiment	02:58	02:56	03:03	00:10	00:08	00:02	00:00	00:41	5.71

Anova test

hypothesis test			Calculated values			F table
H0	H1	α	Df1	df2	Calculated F	Critical F
m1=m2	m1‡m2	0.05	1	88	27.00	3.95

Calculated F>= Critical F. Statistically, the results of the two test significantly differ. Null hypothesis is rejected (H0)



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