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# Study regarding learning tehnics of 50 m obstacle swimming in the military pentathlon

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**Abstract.** Military pentathlon is becoming more and more popular in the field of military sports competitions gathering students from all over the world in practicing sports activities. In our article we analyzed the technique of swimming in the military pentathlon race of 50 m with obstacle swimming. Also we analyzed the tehnicque factors that should be taken in consideration in training the military students for the 50 m swimming with obstacles.

We presented the entire composition of the race and also propose a specific training program that should improve the technique of swimming and passing the obstacles in the military 50 m swimming with obstacles.

## 1. Introduction

The concept of military physical ducation, materialized by a model of a complex and dynamic system has its own characteristics and particularities. Thus, by the wide range of specific means this discipline demonstrates its viability in the curricula of military higher educational institutions. Character flexible and permanent openness of physical education is given by the goals pursued the physical education and sports, namely regulation and self-regulation in psychomotricity plan; receiving, processing and issuing responses neuropsychomotor [1].

The area of the military pentathlon has developed spectacularly from one edition to the next. Today, more than 30 nations are present in the circuit of international pentathlon competitions. Most of the time the military pentathlon is included in the World Military Games [2].

Modern pentathlon is a combined athletic game in which final scores represent an aggregate of individual event scores from fencing, swimming, horseback riding, and pistol shooting, and running [3]. This game was initiated in ancient Greece with the purpose of testing the general physical strengths of Greek soldiers [4].

Swimming is a sport that brings a lot of physical, social and mental benefits. Swimming tones up the muscles and at the same time is a very good cardiovascular workout. Swimming increases heart rate and stimulates circulation, is a sport that involves all muscle groups. It is an ideal sport for a good overall health and fitness [5].

Swimming is the only sport to be recommended in more than 80% of the medical cases and to have a large target audience, accessible to both children and the elderly [6].

From a psychological perspective, swimming reduces the mental tensions and anxiety, caused by everyday stress and the competition one, while avoiding hostility and frustration in life, in a beneficial way [7]. So regular physical activity has benefits for both physiological and psychological health [8] [9].

## **2. Aim of the research**

The aim of our research was to present the 50 m obstacle swimming race in the military pentathlon and propose a specific training program to improve the technique of the students participating in this kind of race.

## **3. Methods of the research**

Psychomotor learning requires the student's personal participation, according to the requirements of modern didactics. The didactic design created the possibility of individual testing, facilitating the development of the psychomotor capacity specific to the applied swimming test in the military pentathlon. Psychomotor learning, the formation of the dynamic stereotype, requires the fixing of the analytical components of the specific motorsports. In solving the tasks and objectives of the lessons we applied the following methods:

Outward suggestion adjustment method - word-. Practically, all the basic aspects of psychopedagogical activity in the physical education process are related to the use of the word: knowledge communication, task designing, conducting their execution, assigning methodical indications, commands, analysis, and appreciation of the results.

An exact verbal explanation of the theme, the technique of the action, the rules of execution.

The accompanying explanation allowed the presentation of the intuitive materials that are used during the exercises.

Instructions and controls that had control over the operative direction of the activity.

Verbal appreciation, verbal encouragement, or disapproving (good, bad, etc.).

The mutual explanation, which consisted of verbal information from students at the teacher's request.

Intuitive methods that consisted in demonstrating analytical and global motor act or actions. At the same time, the study of movements and their executions was possible through the study of photographs, cinemas, videos, etc.

The practice method, through which the standard repeat exercise and then alternate repetition - (in action-changing conditions) is the most commonly used method in the learning process. For example, learning the analytical form, with the subsequent reunion of the parts, in the global practice was applied in the process of learning the technique of free swimming.

The methodical succession in swimming discipline led to the following methodological line:

1. Sliding (in water).
2. Joining the sliding with leg movements (swimming with help - raft).
3. Learning arm movements.
4. Combination of sliding with arm movements.
5. The same exercise combined with leg movements.
6. Coordination of arm movement with breathing.
7. Merge all items.
8. Learning the application route and passing obstacles (the technique of obstacle crossing: the stage of preparation for the attack, the passing of the obstacle, the completion phase - the removal of the obstacle).

In order to improve motor skills, to educate motor skills and to functionally adapt the body to a certain activity, the method of repeating under standard conditions was applied on the basis of supramaximal, maximum and submaximal effort in swimming. Also, the method of repetition in

continuous effort - was applied to educate the general resistance (moving in a certain time, at a uniform tempo - swimming for 30 '). The method of standard exercises with intervals has been applied in educating the strength qualities, in which the effort alternates with normal rest periods. At the same time the training method was applied in the circuit, according to the method of repeating with normal resting intervals, for the training of strength and speed qualities. The competitive method has helped solve various pedagogical tasks - educating the motor skills, volitional, moral qualities, improving the motor skills, capacities and the qualities to use them in difficult conditions, specific to the applied swimming. Competition is part of widespread social phenomena, a means of stimulating activity, confronting forces under conditions of regulated rivalry, struggle for pride, all of which determine a particular emotional and physiological background. The importance of the race method is important in educating moral-volitional qualities: perseverance, initiative, determination, firmness, ability to overcome hardship, sacrifice spirit. To improve the motor activity in difficult conditions, favoring the improvement of specific psychomotor qualities, we used elements specific to the 50m test with obstacles in the military pentathlon. The verification and evaluation methods consisted of the initially applied test batteries at the beginning of the experimental stage 1, intermediate - at the end of the experimental stage 1 and at the end of the experimental stage 2.

The standard measurement of the researched sample aimed to highlight the evolution of the functional, physical parameters, techniques and psychomotor specific to obstacles for the military students of the "NicolaeBalcescu" Land Forces Academy.

The purpose of the evaluation is to determine the extent to which the objectives have been achieved, the progress towards the results of the entrance to the faculty, the quality and the efficiency related to the rational use of time and the efforts made by the military students in the specific training process. In designing the experimental program we include the specific means of technical training and psychomotor evaluation.

The analytical program applied for the 2014-2017 series is aimed at learning the technical procedures, strengthening and refining them, as well as training the psychomotor qualities specific to the 50m obstacle swimming. Its realization is possible based on the methodology of intensifying the educational process (2-3 lessons per week). In order to meet the objectives of military higher education and in accordance with the staggered distribution of the hours of the calendar plans, the following typology of the themes in the didactic technology projects was established: varied terrain, fast displacement and throwing of hand grenades (5 lessons - 1st year, 2 lessons year II); (3 lessons - 1st year, 7 lessons - 2nd year); weapon specific exercises (4 lessons - 1st year, 5 lessons - 2nd year); gymnastics (4 lessons - 1st year); skiing (7 lessons - 1st year, 7 lessons - 2nd year); swimming and water-specific application of swimming pentathlon (24 lessons - 1st year, 25 lessons - 2nd year); testing (1 lesson for each year of study). The specific means selected for the realization of the didactic project theme, according to the objectives of the analytical program, ensure the realization of the objectives of the military university physical education and contribute essentially to the technical and psychomotor training specific to the applied swimming test in the military pentathlon.

Table 1. Orientation model of the didactic technology project at the level of military students with the specific theme of the obstacle crossing technique in the 50m swimming speed test

	Activities	Intensity and volume
1-2 min.	Gathering - communication of the training lessons	
10 min	Preparing the organism for effort (walking and running exercises, specific exercises, articular mobility exercises);	
15 min.	Running semi fond with uniform tempo;	Tempo imposed 4min./1000m; 3x; pause 1min;
10 min.	<i>1.1. Changing the venue (swimming pool - stadium);</i>	

<b>(i) Specific preparatory training for obstacle swimming</b>		
10 min.	Exercises on land, exercises of articular mobility, body accommodation with water;	
	<i>i. Speed development exercises</i>	
10 min.	- Crawl; pause between repeats 2min.;	tempo 4/4, 3 x 15m.;
	- Crawl; pause between repetitions 3min.;	tempo 4/4, 2 x 25m.;
8 min.	Obstacle technique 1	
	- jump from the block start and attack the first obstacle;	4x - 6x;
	The technique of crossing the second obstacle	
8 min.	- Swimming between obstacle 1 and obstacle 2, with self-control of the number of arms and entry under the raft;	2x - 3x
	The technique of crossing the obstacle 3	
12 min.	- Attack of the table and jump on it;	8x - 10x;
	The technique of crossing the obstacle 4	
5 min.	- the obstacle attack, pushing it and finishing;	2x - 3x;
8 min.	Passing the complete obstacle course	tempo 4/4;
1 - 2 min.	Appreciation of how the training lesson has been	

Table 2. Orientation model of the didactic technology project at the level of military students with specific theme of the obstacle crossing technique in the 50m swimming pool

	Activities	Intensity and volume
1-2 min.	Gathering - communication of the training lessons	
10 min	Preparing the organism for effort (walking and running exercises, specific exercises, articular mobility exercises);	
20 min.	Running on varied terrain, maximum level difference of 12 degrees (changing the group leader every 1000m);	Tempo imposed 4min.30"/1000m;
10 min.	Changing the place of training (stadium - swimming pool);	
10 min.	Exercises specific to the land, joint mobility exercises, body accommodation with water	
	<i>ii. Exercises for strength development</i>	
15 min.	- Small and medium weight exercises	6x - 10x;
	- Exercises for pushing from lying dorsal	4x - 6x/40 - 80kg.;
	- Weight lifting exercises	10x - 15x/40 - 50kg.;
6 min.	The technique of passing the first obstacle	
	- lifting on the fixed beam of the first obstacle;	4x - 6x;
	- jumping from the fixed beam of the first obstacle;	4x - 6x;
	The tehnic of passing the second obstacle	
7 min.	- entry under the raft by turning the trunk around the center axis	5x - 8x
8 min.	The technique of passing the third obstacle	
	- jump on the obstacle by using the first method	8x - 10x;
4 min.	The technique of passing the forth obstacle	
	- swimming with self-control of the number of arms	4x - 6x;

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between third obstacle and fourth obstacle

6 min. Passing the obstacles equipped with training materials  
1 – 2 min. Appreciation of how the training lesson has been

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2x; tempo 4/4;

The 50m obstacle swimming test, the third of the five tests of the military pentathlon, is the best-rated performance result (Figure 1).



Fig. 1. The general presentation of the obstacles

In the instructive-educational process, it is obligatory to observe the gradual learning steps in order for the student to learn correctly the technical procedures for the obstacles crossing.

**a. The first obstacle - the gate**

In order to achieve directed learning, the teacher has to pursue the use of the specific means of swimming with obstacles on the 50m distance, observing the specific of general principles of physical education and sports - from simple to complex - from individual to general - from easy to hard. The following algorithmic operational system will be applied in the stage of motor skills training - in the first phase:

- jumping from the block start with medium diving;
- jumping from the block start with the successive increase of the length;
- climbing in squat support on the fixed beam of the first obstacle by using a gradual increase of water depth from 10cm to 10cm in a value range of 1.20m - 2.00m;
- lifting in orthostatic position on the fixed beam with the median point of the feet sole on the transverse axis of the beam;
- jumping from the fixed beam under the second beam that is mobile (figure 2);



Fig. 2. The jump on the fixed beam

*b. The second obstacle - raft*

Before learning the technical process to pass this obstacle, the student must practice the crawl swimming style between the first obstacle and second obstacle to achieve a dynamic stereotype on the number of optimal arms for the attack (Figure 3).



Fig. 3. The attack of the second obstacle – the raft

For the correct learning, the following algorithmic operational system will be used:

- going under the raft in the bras style with the eyes open;
- crossing under the raft in the over-open style;
- flexible foot flexing exercises at the edge of the swimming pool;
- exercises pushing the leg in flexion in the fourth obstacle;
- raft attack exercises by using a gradual increase of water depth from 10cm to 10cm in a group of values between 1.20m - 2.00m;
- at low depth (1.20m - 1.50m), impulse exercises on the edge of the line;

*c. The third obstacle - the table*

The third obstacle is the most difficult and at the same time the most important, because by using the correct technical procedures there is a plus in the ergonomics of the time for the final result. For the correct learning, the following algorithmic operational system will be used:

- table attack exercises by using a gradual increase of water depth from 10cm to 10cm in a group of values between 1.20m - 2.00m (Figure 4);



Fig. 4. Jumping on the third obstacle – the table

- jumping exercises on the table, from the lower edge to the upper one, for the climbing on the table in the force of the arms supporting the squatting;
- walking exercises on the table, from the lower edge to the upper one, for the climbing on the table by the escalation method;
- jumping on the table for the two options for passing the obstacle;

*d. The fourth obstacle - transverse beam*

The last obstacle is essential to achieving a correct finish. In the learning phase it is essential to observe the following operational algorithmic system:

- rotation exercises around the center line for entering the obstacle;
- traction exercises with a handy arm at the entrance to the obstacle (fig.5);

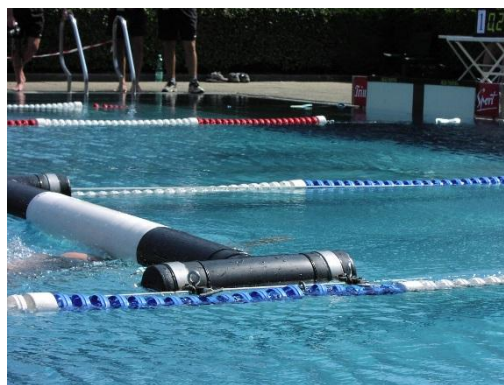


Fig. 5. The attack of the fourth obstacle

- foot flexing exercises at the edge of the swimming pool.

The methodology of teaching the main technical elements of the 50m swimming with obstacles from the military pentathlon, within the physical education and sports lesson, from our experimental research was staggered according to the methodology of didactic design elaboration. From the analysis of the descriptive form of the completed calendar plans, based on the specific technology of elaboration of the didactic design and in accordance with the instructional objectives established by the military-specific physical education methodology, in the first and second-year students' educational process study plans were developed for each weekly cycle. Based on the longitudinal study and the criteria for the elaboration of the didactic design, units of learning by cycle of lessons were established. In this aspect, the themes with objectives and instructional tasks were set for each weekly cycle (Table 3). Thus, the lessons approached a logical succession of the objectives of the didactic technology projects. The theme with specificity from varied terrain running, quick movement and hand grenades was implemented in the first unit of learning (session, lesson). The theme specific to the teaching-learning methodology for swimming, specific swim of the pantathlon applied swimming was the second unit of learning. As for the mass sports activity and independent work, this context is the form of the optional activity of the military students from the Land Forces Academy "NicolaeBalcescu".



First week – March

Table 3. Weekly training cycle model for students from the first year

<i>Lesson</i>	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
1-2 08.00 – 10.00	RVT, FM, THG, S				RVT, FM, THG, S	MSA IT	MSA
3-4 08.00 – 10.00			RVT, FM, THG, S				
5-6 08.00 – 10.00							
9 – 10 16.00 – 18.00		IT		IT			

- LEGEND:**
- RVT,FM,THG - Running in varied terrain, fast moving and throwing hand grenades
  - S - Swimming and swim application specific to the military pentathlon
  - MSA – Mass sport activity
  - IT – Independent training

### The model of the experimental analytical program

The efficiency of the analytical program focused on the technical and psychomotor training specific to the swimming test with obstacles in the military pentathlon

In the specialized literature, the problem of modeling the instructive-educational process of physical education and sports subsystems is an important research subject. In this context, starting from the definition of the model and its general typology, "(...) the simplified system of a phenomenon from the natural and social reality, a system that contains the defining elements in terms of content, structure, and functionality" (Cârstea, 2000) represents the conceptual definition of the general model, which can be adapted to the field of physical education and sport, regardless of the subsystem. In our research, we proposed to develop the analytical curriculum specific to military higher education, in line with the requirements of military sports. Starting from these prerequisites, that the university analytical curriculum of physical education discipline will address the theme of the 50m swimming test with obstacles in the military pentathlon, in accordance with the planning and structure of the academic year specific to military education. Thus, the model of the analytical program fits into the typology of the final models - ideal - theoretical. The issue of the physical education discipline curriculum in the subsystems of this field is always perfectional due to the open and dynamic character of the precise quantification of the quantitative and qualitative indicators. The reconsideration of the model and the elaboration of the analytical curriculum specific to physical education in military higher education becomes a necessity, as it is necessary to connect the military higher education institutions with the Euro-Atlantic requirements. Thus, the specific military educational process needs to be updated through the following directions:

1. Implementation of the specific theme of swimming and application of swimming according to the requirements of the applied swimming in the military pentathlon in the didactic design for military students of the first and second year of study.

2. Streamlining and algorithmizing in the system of the technologies of action for the specific means of swimming, as well as their programming according to the objectives of military physical education.

3. Modeling the disciplinary educational process - physical education and sport - by maintaining the general physical training means and the means of technical and psychomotor training specific to the applicative swimming test. The analytical study program that we propose was elaborated following the study of the specialized literature, the longitudinal study of the performances achieved so far in this test from the military pentathlon, the analysis of the current program and the experimental use of the indicative analytical program, used on during the experiment. The new analytical program supports the realization as a professional, both in terms of the motor and psychic qualities, of the future officer, by achieving the following goals and accomplishing tasks such as:

- Transmitting accessible knowledge in the field of physical education and learning them by students;
- Improvement of motor skills and abilities acquired in the previous stage, starting from the increasing level of the functional possibilities of the body and enriching the motor experience by learning new motor actions provided by the program and by the initial specialization in the chosen sporting branches;
- Forming and enhancing skills that contribute to compliance with personal and collective hygiene rules;
- Formation and consolidation of correct attitude under various conditions of motor activity and correction of certain features of body conformation (body weight);
- Strengthening the health of students, increasing the body's resistance to environmental factors, by quenching and enhancing the physical and intellectual work capacity;
- Stimulation of the growth process and assurance of harmonious physical development in order to improve the somato-functional indexes and to prevent the installation of physical attitudes, formation, and maintenance of the correct body attitude;
- Education of body aesthetics and expressiveness of movements;
- Development of basic motor skills: strength, speed, coordination, resistance, mobility, and flexibility;
- Training and improvement of basic and applicative motor skills, development of the ability to use it in professional activity and other social activities;
- Initiation in the practice of sports field and branches;
- Stimulating students' interest and capacity building for systematic and independent exercise of physical exercise;
- Widening the knowledge horizon by acquiring a system of values and norms

Table 4. – Distribution of themes and sessions on semesters and hours of the first year

No. Chr.	The theme name	Distribution on semesters		Total of the year	Observatio ns
		Sem. I	Sem.II		
1	Running in varied terrain, fast moving and throwing hand grenades	---	10	10	
2	Body-to-body combat with individual weapon equipment. Judo and Jiu jitsu	6	---	6	
3	Specific physical exercises with weapons	---	8	8	
4	Gymnastics	8	---	8	
5	Skiing	14	---	14	

6	<b>Swimming and swim application specific to the military pentathlon</b>	14	34	48
7	<b>Tests</b>	---	2	2
	<b>Total of hours</b>	42	54	96

Table 5 – Distribution of themes and sessions on semesters and hours of the second year

No. Chr.	The theme name	Distribution on semesters		Total of the year	Observatio ns
		Sem. I	Sem.II		
1	Running in varied terrain, fast moving and throwing hand grenades	4	---	4	
2	Body-to-body combat with individual weapon equipment. Judo and Jiu jitsu	16	---	16	
3	Specific physical exercises with weapons	---	10	10	
4	Gymnastics	---	---	---	
5	Skiing	14	---	14	
6	<b>Swimming and swim application specific to the military pentathlon</b>	20	30	50	
7	<b>Tests</b>	---	2	2	
	<b>Total of hours</b>	54	42	96	

## Conclusions

The lesson of military physical education keeps the methodological line of physical education and sports lessons from other subsystems of the field. From the literature, the development of training units (sessions/lessons) follows typical moments or structures. Sometimes, depending on the objectives of the training process and the theme proposed, the structures are merged into parts or sequences. In fact, the lesson of physical education specific to physical education and military sport pursues a similar succession, in which the structures highlights the following lines in a classic way: organizing the collective; preparing the body for effort; selective influencing of the locomotor apparatus; developing a basic motor skill or combined motor skills; a theme of learning-consolidation, or consolidation-improvement of proposed motor skills; recovery of the body after effort; evaluating goal achievements and recommendations for next activity.

In experimental research, according to the structure of the academic year, we have developed the specific analytical program. At the same time, we set the themes, objectives and tasks of each unit of the instructive-educational process. The moments(s) of the lesson were held cumulatively, by parts of instructional units.

The first part of the lesson (organization of the collective, selective influence of the locomotor apparatus) represents 12-15% of the total volume of the lesson. Work is done to prepare the body for exercise by applying a specific exercise system, gymnastics, as well as stretching exercises. Special exercises of psychomotor character are introduced. Pauses between repetitions are active. The algorithms that made up the optimal training system had special tasks for each component of the technical training specific to 50m of obstacle swim and psychomotor training. Quantitative new algorithms, which intervened in the didactic technology project of the experimental group occupied 15% of the volume of this part. The methodical line used included the means of specific technical and psychomotor training.

The second part of the lesson represents 70-80% of the total volume. Considering that most of the lessons (60%) are bi-sport lessons, we introduced in this part the aerobic, anaerobic and mixed exercises specific to 50m of obstacle application in the military pentathlon. Also in this part of the

lesson, we introduced the special exercises appropriate to psychomotor training for both breath control in psychomotor relaxation as well as breath control and excitement of emotions performed before the start. The progressive relaxation exercises described by Bernstein and Borkovec adapted to obstacle swimming were used. At the end of this part, we introduced the activation exercises by which we combined relaxation with muscular strain and breathing under controlled conditions.

The third part of the lesson, the ending, represents 10-15%. Taking into account the fact that in this part we sought the relaxation after the effort and the rest after the effort of the subjects we chose the optimal post-effort algorithms in the content of our training system. For some exercises, we used average intensities (stretching exercises), and for others minimum intensities (alternating exercises with running and breathing variants).

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