Overcoming the obstacle course by university students as a way to increase motor activity

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Abstract

Objective of the study is development and integration of specialized obstacle course training for students of military age based on simulation methods into the educational process.

Methods and structure of the study. This article analyzes the aspects of preparing students for service in the Armed Forces of the Russian Federation. To achieve these goals, the following methodological approaches were used: an analytical review of scientific literature, data collection and systematization, and mathematical processing of the research results.

Results and conclusions. The integration of specialized obstacle course training into the curriculum of the discipline "Elective Courses in Physical Education" for senior students is aimed at developing their comprehensive motor skills, as well as at forming applied competencies and improving their physical fitness.

Keywords: *obstacle course, educational activities, draft age, military training, physical activity, applied skills.*

Introduction. Overcoming obstacles is a key component of the physical training of military personnel serving in the Armed Forces of the Russian Federation, including senior students. Performing exercises on an obstacle course, such as running, jumping, crawling over various obstacles, jumping into and out of trenches, throwing grenades, and others, not only helps to develop basic physical qualities, including speed, strength, endurance, and coordination, but also helps to form and strengthen the willpower of the participants in the training process.

Objective of the study is development and integration of specialized obstacle course training for students of military age based on simulation methods into the educational process.

The purposes of the study are:

-optimization of methods for overcoming obstacles;

-selection of methods and tools for developing running, jumping, and speed-strength training;

-implementation of the developed method for overcoming obstacles;

-evaluation of the effectiveness of integrating obstacle course exercises into the physical training program for students.

Methods and structure of the study. At the initial stage of the study, a methodology for modeling an obstacle course for a 50x30-meter gymnasium was developed through a thorough analysis of specialized literature on the subject (Fig. 1). This obstacle course was created to provide comprehensive training for key motor skills such as speed, strength, coordination, and endurance in a realistic environment. The designed obstacle course design allows for effective simulation of specific tactical tasks, including rapid movement, firing from a kneeling position, overcoming

destroyed structures, overcoming natural and artificial obstacles, as well as performing a prone movement in simulated gas attack conditions. [1]. At the end of the course, students perform a set of self-defense exercises using a simulated enemy [4].

The main elements of the obstacle course are the following structural components: a high-speed running area, a tactical field for moving in a kneeling position at a distance of 30 meters, a moat 2 meters wide (equivalent to three gym mats), a maze 8 meters long and 2 meters wide, a trench 1 meter wide (gym mat), another a trench of similar width, a destroyed bridge consisting of four sections of gymnastic benches with a gap of 1 meter and a bend at an angle of 135 degrees, a soft-surfaced section with a length of 6-8 meters and a platform for performing a complex of hand-to-hand combat within the framework of eight accounts.

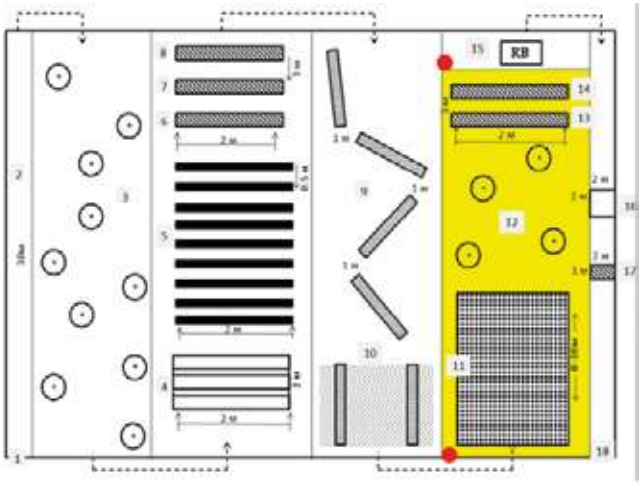

Figure 1. Complex obstacle course in a sports hall

Legend:

1. Line of the beginning of the lane
2. Speed running section
3. Tactical field, movement on the tactical field with the preparation of an imitation for shooting from the knee (30 m)
4. A ditch 2 m wide (3 gymnastic mats)
5. Labyrinth 8 m long, 2 m wide
6. Trench 1 m wide (gym mat)
7. Trench 1 m wide (gym mat)
8. Trench 1 m wide (gym mat)
9. A destroyed bridge consisting of 4 segments (gymnastic benches with a gap between them - 1 m) with a bend of 135 .
10. A destroyed staircase (2 gymnastic benches, the distance between the benches is 3 m) with an imitation of an infected section of the obstacle course, where all elements are performed in a medical mask (gas mask).
11. Area with a soft surface of 6 – 8 m.
12. Area for movement in the ready for shooting from the knee.
13 -14. Trench.
15. A platform for performing a complex of hand-to-hand combat for 8 counts.
16. A ditch (3 gymnastic mats) 2 m wide.
17. Trench (gymnastic mat) 1 m wide.
18. End of the obstacle course.

As part of the first stage, methodological recommendations were developed for performing exercises on a single obstacle course:

1. The beginning of the obstacle course ("start") is performed by students from a high start [2].
2. The speed run section is performed at a medium pace.
3. The tactical field. Movement through the tactical field in a combat stance for kneeling shooting is performed at high speed. The knee should be lowered at the designated marker, the arms should be raised to simulate shooting from a kneeling position, and the back should remain straight.
4. To overcome the obstacle in the form of a moat, take a running start with one push-off leg. Ensure that the thigh is raised as high as possible during the running start. Land on a semi-crouched leg.
5. To overcome the maze, use side steps followed by a forward stride.

6,7,8. The trench is crossed using a running step.

9. When performing the exercise of crossing a destroyed bridge, it is necessary to bend the legs at the knee joints and tilt the body forward to ensure stable balance on the gymnastics bench.
10. To cross a destroyed staircase, it is recommended to use a side step with both feet in contact with the surface of the gymnastics bench. It is important to lift the thigh as high as possible to ensure stability and efficiency of the movement.

Overcoming the "infected" section of the obstacle course.

11. Moving through the infected section of the obstacle course using a medical mask (gas mask) on a soft surface 8-10 meters long.
12. The task of overcoming the tactical field is performed using personal respiratory protection equipment, namely a mask (gas mask), in a kneeling position.

13-14. Overcoming trench sections is carried out in personal respiratory protection equipment (gas mask).

15. Complex of technical actions in the system of hand-to-hand combat without the use of weapons, on eight counts.

The starting position is a military stance.

"One" - take a fighting stance with your left leg forward.

"Two" - perform a left-handed upward chop and a forward right-handed straight punch.

"Three" - perform a forward right-legged straight or low kick.

"Four" - take a step to the side with your right leg and perform a diagonal right-handed palm-wedge punch.

"Five" - take a step back with your right leg and perform a left-handed inward chop.

"Six" - with a step forward with the right foot, perform a straight punch with the right fist from above.

"Seven" - perform a straight kick with the left foot forward and return to the left-handed combat stance.

"Eight" - deliver a knee strike with the right leg, while simultaneously grabbing and pulling the opponent towards you, then return to the combat stance and return to the starting position of the military stance with a step back with the left foot [3].

16. Crossing the moat with a running stride, followed by landing on a semi-bent leg.

17. Crossing the trench with a running stride, accelerating towards the finish line.

18. Finishing the obstacle course.

As part of the second stage of the research, the effectiveness of using exercises with an artificially created obstacle course and a set of hand-to-hand combat techniques was evaluated.

Results of the study and discussion. During the first semester of the 2024-2025 academic year, physical education classes were held for third-year students of the "Journalism" and "Economic Security" programs, with a total of more than 150 students. The effectiveness of the program was evaluated based on the heart rate (HR) at the beginning (September 2024) and end (December 2024) of the experiment, as well as the subjective assessment of the self-defense complex, expressed in points. The test results are presented in Table 1.

Table 1. Heart rate and exercise performance scores at the beginning and end of the experiment.

No.	Indicators	Before the experiment, s	At the end of the experiment, s	Difference
1	Heart rate (bd, min)	153	140	21
2	Performance of the complex (in points)	3,2	4,1	0,9

As a result of the study, a significant improvement in heart rate (HR) was observed, with an increase of 13 beats per minute. Additionally, the assessment of the performance of unarmed hand-to-hand combat techniques increased by 0.9 points. These results demonstrate the effectiveness of incorporating simulated obstacle courses into the educational process for students as part of the "Elective Physical Education" course. The classes had a positive impact on the overall physical fitness of the students, as evidenced by improvements in the performance indicators included in the зачетную программу: 100-meter run, Cooper test, standing long jump, and flexibility exercises. Overall, there was an improvement in the development of physical qualities such as agility, speed, and endurance, which confirms the effectiveness of the developed physical training methodology for students.

Conclusions. The use of the simulated obstacle course we have developed as part of physical education classes at the North-Western Institute of Management of the Russian Presidential Academy of National Economy and Public Administration demonstrates its high effectiveness in solving both applied physical training and improving students' overall physical condition.

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