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Revealing the correlative interconnection between the respiratory system and general physical readiness, functional and reserve capacities of the 3rd course cadets-cynologists' organism, taking into account their bioenergy type

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Abstract: Reserve capacities of an organism are important factors of a person's physical development. It is especially urgent for young people, who study at higher educational establishments, including military higher educational establishments. The results of the research works of recent years, carried out in civil and military higher educational establishments, prove the urgency of the present research work. ***Materials***. Correlative interconnection revelation between respiratory system, general physical readiness, functional and reserve capacities of the organism of the 3rd course cadets at cynological faculty, taking into account their bioenergy type. ***Research methods.*** Information sources analysis and summarizing, correlative interconnection analysis between respiratory system, general physical readiness, functional and reserve capacities of an organism using "SpirolabIII" apparatus and "D&K-Test" methodology; methods of mathematical statistics. ***Results.*** The research results analysis helped to reveal correlative interconnection between respiratory system, general physical readiness, functional and reserve capacities of the organism among the 3rd course cadets- cynologists, taking into account their bioenergy type. The results of the carried out research work help to make the conclusion that the 3rd course cadets of cynological faculty with anaerobic type in most cases have high and negative correlative interconnection with general physical readiness, functional and reserve capacities of an organism. Cadets with the mixed type have the average correlative interconnection. Cadets with aerobic type have weak and moderate connection. ***Conclusion.*** The received results help to choose the most effective means of training at physical training lessons among the cadets according to bioenergy type at military higher educational establishments of the National Guard Army.

Keywords: cadets, correlative interconnection, respiratory system, general physical readiness, functional state and reserve capacities of an organism, bioenergy type.

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Introduction

Reserve capacities of an organism are important factors of a person's physical development, which is especially urgent for young peopleю They study at higher educational establishments, including military higher educational establishments.

The results of the research works of recent years, carried out in civil [1-8] and military [9-13] higher educational establishments, prove the urgency of the present research work.

In order to estimate physical qualities of cadets from a military Institute, define reserve capacities of an organism, reveal the characteristics of its systems adaptation to physical loads, it is necessary to get complete information concerning its functional state. For this purpose it is necessary to reveal correlative interconnection between these indices.

Correlative interconnection revelation is defining interconnection between different phenomena or processes. One of the effective ways, which helps to reveal correlative interconnection between numerical values of each factor and sports result, is

Pearson correlation coefficient calculation.

Pearson correlation coefficient is an important and widely used statistical index. With the help of it we reveal potentially significant cause-effect relations between different variables.

When we estimate the strength of connection between correlation coefficients we use Chaddock scale (table).

Table

Chaddock scale

Correlation coefficient	0,1 - 0,3	0,3 - 0,5	0,5 - 0,7	0,7 - 0,9	0,9 - 0,99
Connection between the values	weak	moderate	noticeable	high	Extremely high

The aim of the research work: to reveal correlative interconnection of respiratory system, general physical readiness, functional and reserve capacities of an organism among the 3rd course cadets- cynologists, taking into account their bioenergy type.

Materials and methods

During the research work in order to reveal correlative interconnection of respiratory system, general physical readiness, functional and reserve capacities index among the 3rd course cadets-cynologists, we used "SpirolabIII" apparatus and "D&K-Test" methodology. The research was fulfilled by means of Brave-Pearson correlation coefficient calculation.

SpirolabIII (MIR), Italy) is a diagnostic spirometer. It helps to measure SpO2 and HR(heart rate). Color high-definition display can simultaneously show 8 curves. Software program WinspiroPRO and friendly interface on the basis of icons makes SpirolabIII a universal clinical spiroanalyzer. It functions online. Internal storage of SpirolabIII spiroanalyzer helps to keep till 6000 spirometric tests and till 1000 hours of plethysmograms. Integrated thermal printer helps to print the reports very quickly. The peculiarity of SpirolabIII spirograph is the ability to use both non-disposable and disposable turbines.

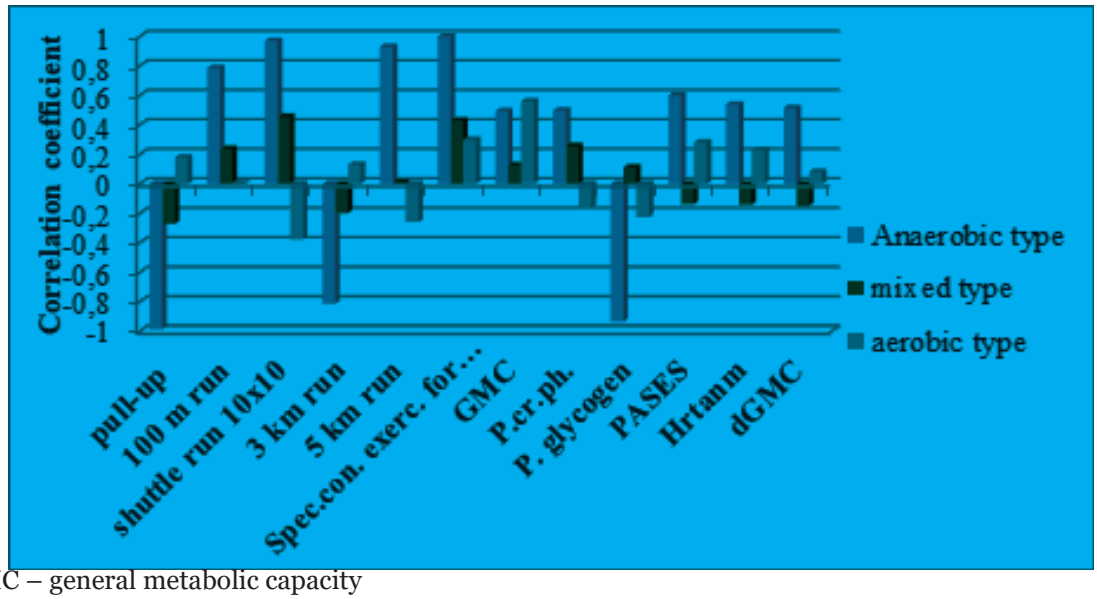
Computer technology of estimating functional and reserve capacities of an organism "D&K-TEST", which is based on the methodology by professor S.A. Dushanin, was developed by professor V.P. Karlenko and helps to estimate metabolism of a person's organism. With the help of this technology we get objective results concerning the level of power and volume development of muscle activity energy supply sources.

21 cadets of the 3rd course of cynological faculty at Perm Military Institute of the National Guard Army took part in the research. 11 people of them had aerobic type of energy supply, 7 people had the mixed type of energy supply and 3 people had anaerobic type of energy supply.

Results and discussion

Research results analysis helped to reveal correlative interconnection between respiratory system, general physical readiness, functional and reserve capacities of an organism among cadets-cynologists of the 3rd course, taking into account their bioenergy type. We used 5 spirometric parameters of respiratory system: VC (vital capacity, l), FVC (forced expiratory vital capacity, l), EVC (expiration vital capacity, l), FIV 1 (forced inhalation volume within the 1st second, l), MVV (maximal voluntary ventilation, l/min.)

The results of correlation analysis (picture 1) showed significant dependence of vital capacity on general physical readiness, functional and reserve capacities of an organism taking into account bioenergy type.



GMC – general metabolic capacity
P.cr. ph.– power of creatine phosphate
HR tanm – heart rate of threshold of anaerobic metabolism
PASES – power of aerobic source of energy supply

Fig. 1. Correlation coefficient between VC of the 3rd course cadets and the indices of general physical readiness, functional and reserve capacities of an organism, taking into account their bioenergy type

The revealed results of correlative interconnection show that the 3rd course cadets with the respiratory system of anaerobic type have high correlative interconnection of VC and “100 m run”, “Shuttle run 10x10 m”, “Special control exercise for cynological units” index and negative correlation with “pull-up”, “3 km run”, reserve capacities of an organism, “Power of glycogen” index.

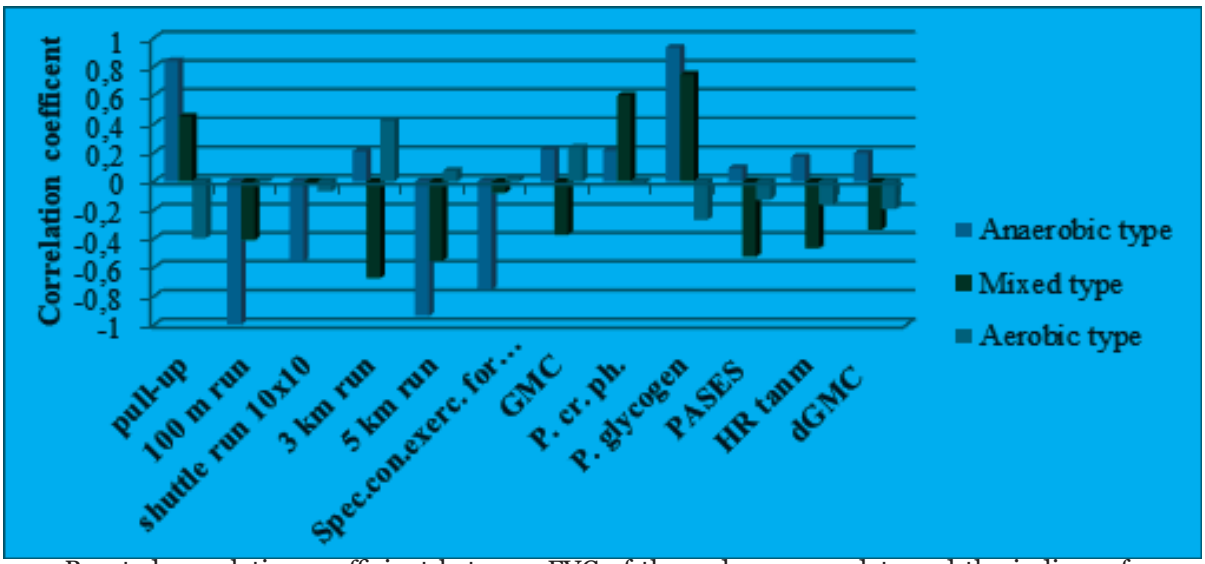


Fig. 2. Boosted correlation coefficient between FVC of the 3rd course cadets and the indices of general physical readiness, functional and reserve capacities of an organism, taking into account their bioenergy type

The results of analysis (Fig. 2) show that among the 3rd course cadets with the respiratory system of an anaerobic type FVC index has the greatest interconnection with “Pull-up”, “Power of glycogen” indices and negative correlation with “100 m run”, “5 km run” and “Special control exercises for cynological units”.

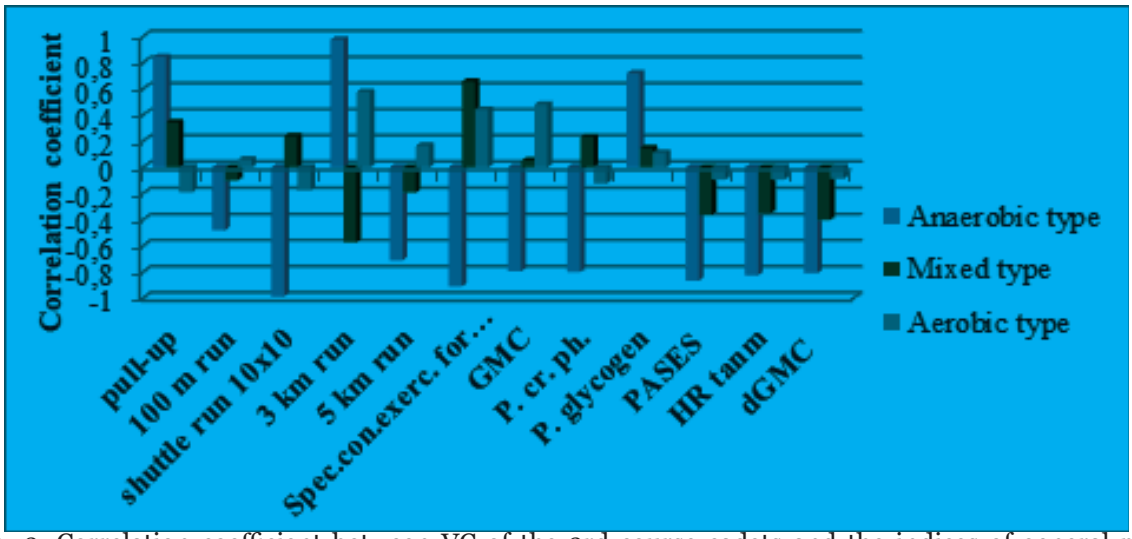


Fig. 3. Correlation coefficient between VC of the 3rd course cadets and the indices of general physical readiness, functional and reserve capacities of an organism, taking into account their bioenergy type

The research showed that cadets with the respiratory system of anaerobic type have significantly high and negative correlative interconnection with the indices of general physical readiness, functional and reserve capacities of an organism.

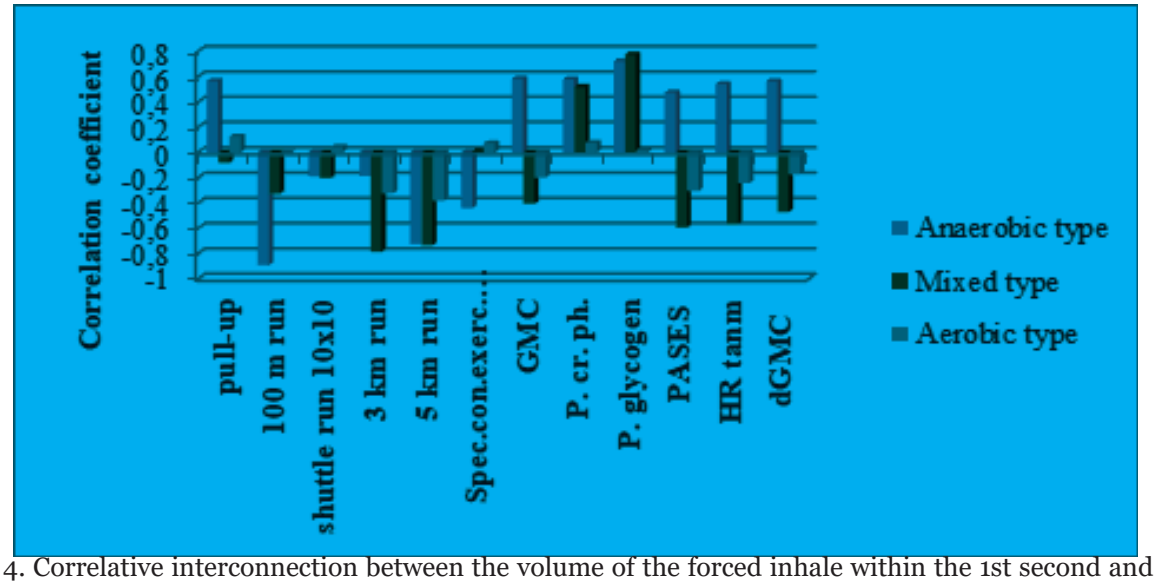


Fig. 4. Correlative interconnection between the volume of the forced inhale within the 1st second and the indices of general physical readiness, functional and reserve capacities of an organism among the 3rd course cadets, taking into account their bioenergy type

The results of the test show the average interconnection among the 3rd course cadets of an anaerobic and mixed type. At the same time cadets with aerobic type have weak correlation.

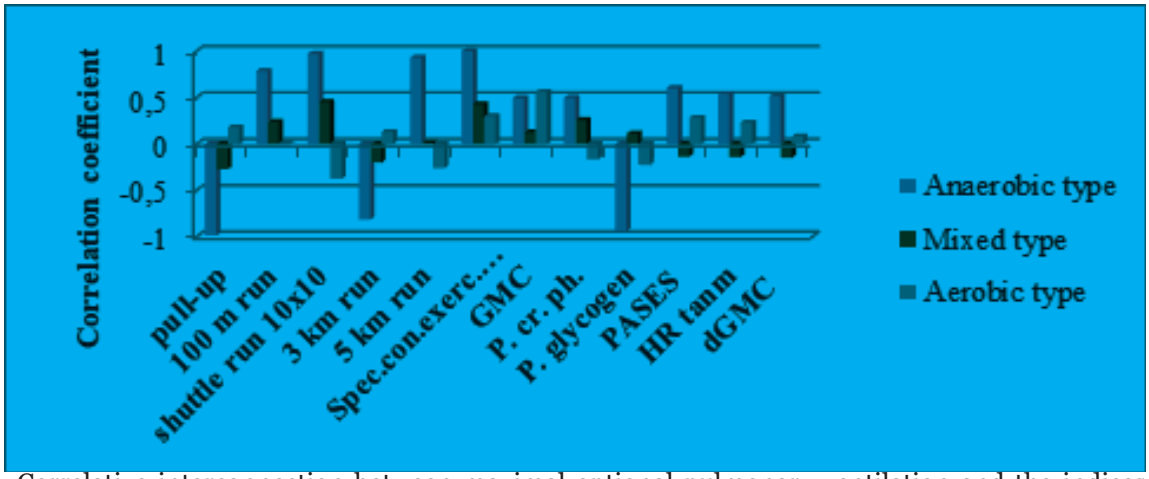


Fig. 5. Correlative interconnection between maximal optional pulmonary ventilation and the indices of general physical readiness, functional and reserve capacities of an organism among the 3rd course cadets, taking into account their bioenergy type

The results of the test among the 3rd course cadets show high correlative interconnection of the studied parameters mainly among the cadets with anaerobic type. We revealed high and negative correlative interconnection with general physical readiness indices, functional and reserve capacities of an organism.

Conclusion

Thus, the results of the carried out research underline that the 3rd course cadets from cynological faculty with anaerobic type have mainly high and negative correlative interconnection with general physical readiness, functional and reserve capacities of an organism; among the cadets with the mixed type we revealed the average correlative connection; among the cadets with aerobic type we revealed weak and moderate connection.

The received results help to select more effective means of training at physical training lessons of cadets according to bioenergy types at military higher educational establishments of the National Guard Army.

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