

Influence of an individual anthropometric profile on the physical fitness of students in the conditions of the far north

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Abstract

Objective of the study was to determine the characteristics of physical fitness of students, taking into account the individual anthropometric profile according to the principles of the Quetelet mass-height index as an indicator of adaptation to the natural and climatic factors of the Far North.

Methods and structure of the study. Scientific work was carried out from September 2022 to December 2022 at the Institute of Shipbuilding and Marine Arctic Technology (Sevmashvtuz), a branch of Northern (Arctic) Federal University in Severodvinsk. 3rd year students, men (n=88), aged 21±1 years, took part. All students were engaged in applied physical culture for two years.

Results and conclusions. The conducted experiment indicates that the indicators of the individual anthropometric profile of students according to the principles of the Quetelet mass-height index were distributed over all variations of this test, their assessment is due to adaptation to the conditions of the Far North. The group of students with a good index showed higher results in all physical fitness tests. The impact of environmental factors did not affect the performance of students in this group. The ratio of parameters in the flexibility test changed in favor of the group with exhaustion, poor index. Thus, the adaptation of the body to environmental conditions is not the same.

Keywords: students, testing, indices, anthropometry, profile, physique, physical qualities, endurance, flexibility, explosive strength, abdominals, back muscles, Far North.

Introduction. The training of specialists for industrial infrastructure enterprises located in the Arctic zone requires increased attention to human health and its adaptation to natural environmental factors. Living in the Far North region has a negative impact on changes in the cellular metabolism of the human body, immune deficiency, oxygen starvation, and psychological anxiety [2]. Experts point to a close relationship between the physical development of a person, his level of health and physical fitness. In this regard, attempts have been made to investigate the individual characteristics of the anthropometric profile of students, their physical fitness.

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Results of the study and their discussion. As follows from the results of the study of students (n=88) who took part in the assessment of an individual profile according to the principles of the Quetelet mass-height index, differences in the group were revealed: the group of students with a good index is more pronounced - 34%, with a bad and very bad index - 18.1%, excessive index - 17%, best index - 11.3%, average index - 9%, wasting - 4.5%, obesity - 3.4% (Figure 1).

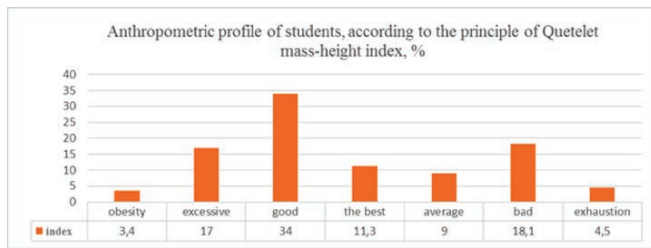


Figure 1. Anthropometric profile of students according to the principle of Quetelet mass-height index

Further research was carried out to determine the muscular functional endurance of the students' organism. Test exercises were selected taking into account the assessment of the muscle groups of the body that hold the resistance. In the exercise for static power endurance of the back muscles, it was found that the indicators are higher in the group of students with a good index - 112.2 s, average - 109.3, obesity - 104.6. Less indicators are for students with the best - 91.1, excessive - 89.4, poor - 85, exhaustion - 55.2 (Figure 2).

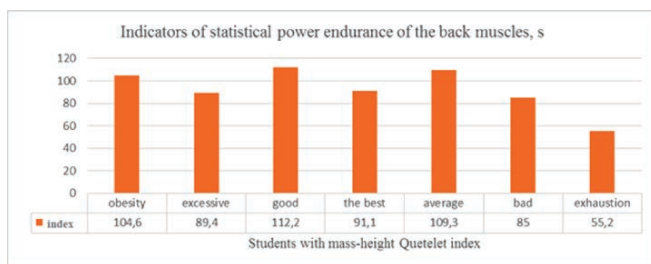


Figure 2. Indicators of statistical power endurance of the back muscles in students with different Quetelet mass-height index

The relationship of the test exercise to determine the static strength endurance of the right and left sides of the body with a violation of posture is expressed in terms of a deviation from the norm in the group with obesity ($30.6 < 35$), which indicates weakness of the muscles of the left side of the thoracic region with a difference of 4.4. In the group with excessive mass-

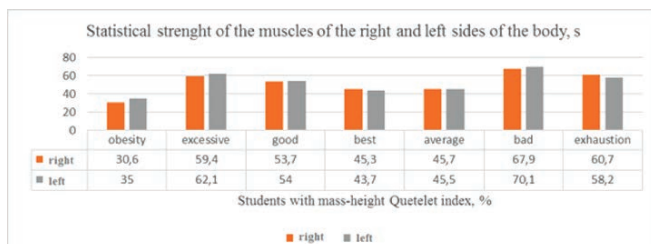


Figure 3. Statistical strength endurance of the muscles of the right and left sides of the body in students with different Quetelet mass-height indices

height index, the difference was 2.7, in the group with poor - 2.2, in the group with malnutrition - 2.5. Within the normal range, the indicators in groups with the best - 1.6, with good - 0.3, with an average Quetelet mass-height index - 0.2 (Figure 3).

In a test exercise to determine the strength endurance of the muscles of the lower abdominal press, the lowest indicators were in the group with exhaustion - 16.7, with a poor index - 22.5. The highest result was shown by the group with a good index - 29.9 (Figure 4).

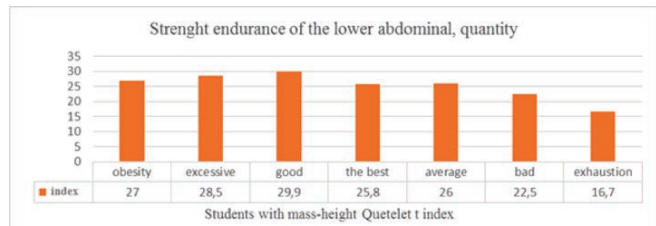


Figure 4. Strength endurance of the lower abdominal muscles in students with different Quetelet index

In the exercise to determine the strength endurance of the muscles of the upper shoulder girdle, the lowest result was shown by groups with exhaustion - 20.5, with a poor index - 25.5, with an excessive index - 26.4. The best indicator was in the group with an average index - 40.2, with obesity - 36.6, the best index - 36.3, good - 31.7 (Figure 5).

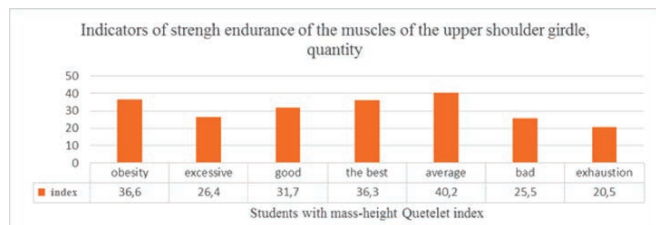


Figure 5. Indicators of strength endurance of the muscles of the upper shoulder girdle in groups with different Quetelet index

The determination of the mobility of the lumbar spine was carried out by a test exercise - forward bending from a sitting position on the floor. The best

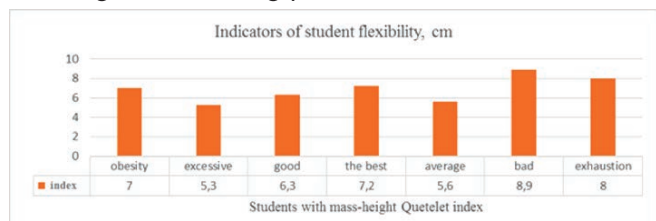


Figure 6. Indicators of flexibility among students with different Quetelet index

result was in the groups with a poor index - 8.9, with wasting - 8. The lowest score was in the group with an excessive index - 5.3 (Figure 6). Consequently, these groups have a higher level of intermuscular coordination, regulation of muscle tone against the background of low mass-height indices.

The analysis of students' speed-strength abilities indicators showed that the best result was in the group with an average index - 226, the best index - 216, with obesity - 214, a good index - 209.7, an excessive index - 184, a poor one - 180, with exhaustion - 164,5 (Figure 7).

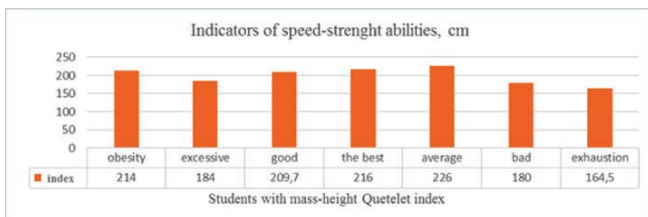


Figure 7. Indicators of speed-strength abilities of students with different Quetelet index

Conclusions. The conducted study shows that the indicators of the individual anthropometric profile of

students according to the principles of the Quetelet mass-height index were distributed over all variations of this test, their assessment is due to adaptation to the conditions of the Far North. The group of students with a good index showed higher results in all physical fitness tests. The impact of environmental factors did not affect the performance of students in this group. The ratio of parameters in the flexibility test changed in favor of the group with exhaustion, poor index. Thus, the adaptation of the organism to environmental conditions is not the same.

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