



Assessment of tolerance to psychophysical load in students of a special medical group during nordic walking classes

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Abstract

Objective of the study was to assess tolerance to psychophysical stress in students of a special medical group based on indicators of the functional state of the cardiovascular system and subjective assessment on the pain scale.

Methods and structure of the study. A training program based on Nordic walking was developed, 12 sessions were conducted, during which tolerance to psychophysical stress was monitored by tracking objective and subjective indicators. The study involved 126 people, of which 76 girls and 50 boys, all belonging to the third health group (A), the average age at the time of the study was 18.2 years.

Results and conclusions. The results obtained indicate that adaptation to psychophysical stress among SMG students is positive if organizational, methodological and medical-biological factors are observed, including monitoring the functional state of the cardiovascular system in the form of pedagogical control and psycho-emotional background through assessment on a behavioral pain scale.

Keywords: *tolerance to psychophysical stress, students of a special medical group, physical education at the university.*

Introduction. The problem of a widespread decline in health levels is observed in all regions of Russia and is currently very relevant. By the time they enter university, 12-17% of students have deviations in their health, and the tendency for it to worsen by the end of their studies is also an alarming circumstance [2]. In the educational space of the university, various conditions are created for students with poor health. In particular, as part of the educational process, a special medical group is being formed, classes with which are designed to solve the problems of improving indicators of the functional and psycho-emotional state, increasing conditioning, expanding the capabilities of aerobic endurance and physical performance.

Nordic walking is a generally recognized means of improving health; its positive effect has been shown in numerous studies and is recommended as a recreational and rehabilitation tool for people of all ages, including students [1, 3].

At the same time, questions related to the methodological aspects of organizing Nordic walking classes with students of a special medical group, taking into

account the prevention of complications of the underlying disease or the manifestation of secondary disorders, are open for study. First of all, it is important to take into account the dosage of loads in the lesson, their methodologically competent differentiation and variation. In this context, it is appropriate to consider the term "psychophysical stress" as a set of psychological (emotional overtones of the activity, spirit of competition, expectation of encouragement in the form of praise, etc.) and physiological (direct impact on the cardiovascular, respiratory and other systems) effects on the body of those involved, caused in response to motor activity. The magnitude of psychophysical stress is determined by two sides, the first "external" is associated with the volume and intensity of motor activity, with the strength of its emotional coloring, while the second, "internal" is associated with the reaction of the body, mainly oxygen transport systems.

Considering the fact that students of a special medical group have persistent health problems, and in physical education classes it is important to ensure



a rehabilitation, health-improving and at the same time training effect, there is a need to study tolerance to psychophysical stress. Thus, physical activity stops when the first signs of an inadequate reaction of the respiratory and cardiovascular systems appear, as well as a subjective expression of the inability to continue.

The importance of studying tolerance to psychophysical stress is determined by the determinants of organizational, methodological, medical and biological support for physical education classes with students of a special medical group:

1. Implementation of the principles of individualization and differentiation in the context of psychophysical stress, ensuring the safety of pedagogical influences;
2. Providing urgent control based on monitoring the current state with specific quantitative indicators of the volume and duration of psychophysical stress;
3. Formation of sustainable motivation among students of a special medical group to improve their health, awareness of the patterns of psychophysiological processes.

Objective of the study was to assess tolerance to psychophysical stress in students of a special medical group based on indicators of the functional state of the cardiovascular system and subjective assessment on the pain scale.

Methods and structure of the study. In order to assess the tolerance to psychophysical stress of SMG students based on objective and subjective indicators, a training program based on Nordic walking was developed and tested. It was implemented over 6 weeks (12 lessons), 126 1-3 year students took part in the study, of which 76 girls and 50 boys, all belonging to health group III (A). The analysis of indicators was carried out based on the following methods:

- ✓ heart rate reaction values (normal – pulse 40-50% of the original);
- ✓ behavioral pain scale [Behavioral Pain Scale (BPS)] (norm 3-5 points, load reduction 6-7 points, load cessation 7-10 points).

Results of the study and discussion. Content analysis of publications of the last 5 years by domestic and foreign authors made it possible to find out that as rehabilitation and recreation for SMG students in

physical education classes, it is necessary to use aerobic types of motor activity of medium and low intensity of psychophysical load, such as: walking, including Nordic walking, light jogging followed by walking. And if the level of objective and subjective tolerance is exceeded, restore indicators through the use of breathing and relaxation exercises. Thus, as a result of the obtained content analysis data, our own pedagogical observations and experience, a training program using Nordic walking was created, which was implemented in three stages:

At the first stage, over 2 weeks (4 lessons), a gradual involvement in the training process was carried out, this included:

1. Teaching the Nordic walking technique for 1st year students or repeating it for 2nd-3rd year students.
2. Adaptation of oxygen transport systems: respiratory and cardiovascular to psychophysical stress.
3. Expanding the body's capabilities in terms of aerobic endurance and physical performance.

At the second stage, over the course of 3 weeks (6 lessons), the following problems were solved:

1. Optimization of Nordic walking technique, combination of pace and rhythm with individual capabilities and general health, including subjective well-being.
2. A gradual and maximum possible, taking into account tolerance to psychophysical stress, increase in the "price of adaptation" based on varying its volume and/or intensity during the lesson.
3. Creation of favorable conditions for the development of moral and volitional qualities of the individual on the foundation of humanely oriented pedagogical support for students.

At the third stage, during the 1st week (2 sessions), the goal was realized: to assess the capabilities of aerobic endurance and physical performance based on the "Nordic walking" test, 40 minutes, with an average speed of 4-4.6 km/h.

At all three stages, the current state of the body was monitored based on objective and subjective indicators of tolerance to psychophysical stress: 4-5 measurements of heart rate and blood pressure within 60 minutes and collection of feedback on the pain scale as necessary.

Average values of indicators assessing tolerance to psychophysical stress

Stages	1st stage "retracting"	2nd stage "training"	3rd stage "evaluation"
Increase in heart rate from the initial value (in%)	40,5±12,9	36,8±9,8	29±8,7
Maximum heart rate response values (bpm)	148±23,1	141±13,5	135±21,7
Behavioral Pain Scale (BPS) (point)	6,7±2,4	4,5±2,1	2,3±1,8
Heart rate recovery (min)	7,2±1,2	4,3±1,5	3,8±1,1



The results of the study of tolerance to psychophysical stress in students of a special medical group are presented in the table.

As can be seen from the table, active adaptation to psychophysical stress occurs within 6 weeks, so its subjective and objective indicators stabilize and reach normotonic values by the end of the study.

Our research is consistent with the scientific data of the authors, confirming the high importance of using aerobic types of motor activity in physical education classes with SMG students in relation to the increase in indicators of the cardiorespiratory system [1, 3, 4]. So, in our study, there was a quantitative and qualitative adaptation of the cardiovascular system to psychophysical stress, which is expressed in an improvement in the reaction of adaptability to external and internal stressors.

Conclusions. Evolutionarily, adaptation mechanisms determine the ability of the human body to adapt to environmental stimuli. The study showed that a training program based on Nordic walking, taking into account subjective and objective indicators of tolerance to psychophysical stress of SMG students, implemented for 12 weeks, leads to improved functioning of the cardiovascular system and, therefore, helps to increase aerobic endurance and performance.

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