Journal of History Culture and Art Research (ISSN: 2147-0626)

Tarih Kültür ve Sanat Araştırmaları Dergisi
Revue des Recherches en Histoire Culture et Art
مجلة البحوث التاريخية والثقافية والفنية

Vol. 6, No. 4, September 2017

http://kutaksam.karabuk.edu.tr

DOI: 10.7596/taksad.v6i4.1161

Citation: Kalina, I., & Aidarov, R. (2017). Differentiation of Students' Physical Load in Group Health-Improving Classes. Journal of History Culture and Art Research, 6(4), 673-679. doi:http://dx.doi.org/10.7596/taksad.v6i4.1161

Differentiation of Students' Physical Load in Group Health-Improving Classes

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Abstract

The paper reveals the relevance of the implementation of group including educational-training classes with students, technologies of differentiation in planning the parameters of physical loads corresponding to the current state of the respondents. The paper presents the results of the directed use of individually-oriented health-improving programs designed for those engaged in them taking into account the results of detailed analysis of the level of their physical fitness, health and functional status: the conducted pedagogical experiment has shown that it was possible to achieve a significant health-improving effect (i.e. to increase the level of health by at least 1 point) in 32.6% of cases, which is 15.2% higher than in the control group, and to improve the level of the morphofunctional state of the organism in several features for all students of the experimental group. The level of general physical fitness of 91% of respondents increased on average by 18%, which is more than 50% higher than the control group. The organizational and methodological conditions necessary to apply these technologies in group training classes at the university with the purpose of optimizing the physical education of students are specified.

Keywords: Physical culture and health-improving classes, Differentiation of physical load

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parameters, Optimization of motor activity.

Introduction

Significant differences in the level of physical development, fitness and health of young people require changing approaches to the organization of training sessions in educational institutions, which are usually conducted with large groups of people engaged without individual differentiation of physical load. This leads to the fact that for some of them the loads used are inadequate (that is, they do not activate the development of physical qualities and functional capabilities of the organism), and for others they are critically exessive (which can lead to disruption of the adaptation mechanisms of the circulatory system) (Grigoriev, 1998; McLachlan & Hagger, 2011; Masironi & Denolin, 1985; Riddoch et al., 2007). Therefore, today, the development and implementation of individually planned load parameters corresponding to the current state of respondents continue to be relevant in the practice of physical education during group including training classs with students (Andrzejewski et al., 2010; Kalina, 2008).

Currently, the personal planning of training classes is stipulated by the methodology of sports training, and is also used in medical physical culture. In the practice of mass physical culture and health education, as repeatedly noted in many research data (Dvoenosov & Shadrin, 2004; Peshkova & Alkova, 2000; Shilko, 2003), there is a lack of scientifically based support for these technologies - there are no specific organizational and methodological elements for planning, controlling and implementing an individually-oriented sport and recreational activity.

Along with this, the fact is noted that the differentiation of physical load parameters, balanced with individual abilities and health of students, at training sessions in various types of physical activity - swimming, basketball, power and rhythmic gymnastics, etc., may not only improve the recreational progress of classes, but also have a positive impact on the motivation of students for the training process (Ntoumanis, 2001), since they will be able to engage in a selected sport, which is significantly difficult in the traditional system of physical training (especially in sports with highly intensive motor actions).

Materials and methods

The study was conducted with the use of the following scientific methods: analysis of scientific and methodological literature, methods of quantitative assessment of the level of somatic health and physical readiness, pedagogical experiment, pedagogical observation, statistical methods for processing experimental data. The analysis of scientific and

methodological literature on the subject of research identified the most rational ways of solving the tasks set.

The method of rapid assessment of the level of somatic health according to the bioenergetic reserves, proposed by Professor G.L. Apanasenko (2000), was used during the initial screening of the health level of students who were involved in the experimental study, as well as in the subsequent monitoring of the medical and biological indices of their body. The method proposed by the author involves calculation of several indices based on the main morphofunctional parameter of the body of the surveyed persons – the relative characteristics taken as the basis for the development of comparative estimates, including several levels: from low to high (total five). The diagnostic scale of somatic health allows ranking the surveyed, identifying groups of healthy, sick and those in a prenosological state, i.e., on the verge of norm and pathology.

And the number of points on individual indices helps to determine the weak links in the individual health system of each respondent, which we took into account when determining the parameters of physical load for future sport training.

Moreover, to determine the degree of tension of regulatory mechanisms, we used the method of calculating the adaptive potential (AP) of the circulatory system, proposed by R.M. Baevskii (1987).

Calculation of cardiovascular AP is carried out according to the formula:

AP = 0.011•PR+0.014•SBP+0.008•DBP+0.014•A+0.009•BW-(0.009•H+0.27),

Where BW - body weight (kg); H - height (cm); A - age (years); SBP - systolic blood pressure (mm Hg); DBP - diastolic blood pressure (mm Hg); PR - pulse rate per 1 min.

Based on the calculated value of AP, the state of the body's regulatory mechanisms is assessed:

AP The state of regulatory mechanisms

2.1 and lower: Satisfactory adaptation

2.11 – 3.20: Stressed adaptation mechanisms

3.21 – 4.30: Non-satisfactory adaptation

4.31 and over: Adaptation mechanism breakdown

We used this indicator as an assessment criterion for the optimality of the recommended parameters of the motor activity of students.

The level of physical fitness of students was assessed based on their performance of the

control standards in endurance exercises - running at a distance of 2000-3000 m (min., sec.); speed - running at a distance of 100 m (min., sec.); suppling - sit-and-reach exercise (cm.); in power exercises for young men: high bar pull-ups or 16 kg kettlebell snatch (number of times); for girls: push-ups or low bar pull-ups (number of times).

The pedagogical experiment was carried out on the basis of Naberezhnye Chelny Institute of Kazan Federal University and consisted in the development of individual sports and fitness programs for each student of the experimental group with the differentiated physical loads, as well as in checking the effectiveness of their implementation in the training process within the framework of this scientific research.

Results

The experimental part of our study was devoted to the introduction of the technology of differentiated planning of the parameters of physical loads corresponding to the current state of each person into the practice of physical education of university students.

The method of pedagogical experiment led to the creation of two groups of students - experimental and control. The experimental group consisted of students from five study groups of the first year (118 people) who, during the training sessions at the university, adhered to individually-oriented programs in the chosen form of physical activity during the study period, and students from the other five study groups of the first year (118 people) entered control group and were training according to the traditional method of organizing group sessions that do not involve differentiation of physical activities.

For a comparative analysis of the results of the experiment, before its start, the groups were checked for homogeneity using the initial indices characterizing the functional state and level of physical fitness of students. For this purpose, an assessment of the medical and biological indices of the first-year students' organism (heart rate, blood pressure, vital capacity, hand dynamometry, weight, height, pulse recovery time after the standard exercise test) was carried out during the planned medical examination, then relative indices were calculated, characterizing the adaptive potential of the circulatory system (according to the method by R.M. Baevskii, 1987) and the level of somatic health of the respondents (according to the method by G.L. Apanasenko, 1988), and also the so-called initial control tests of first-year students in the form of various exercises, the results of which are compared with the norms for the level of general physical fitness for the corresponding age (18-25 years).

The tested students were subgrouped in such a way that there were no significant differences ($p>0.05$) in the characteristics given between the experimental and control groups before the

experiment, which was confirmed by statistical data processing with the use of the non-parametric Wilcoxon test for non-linked samples.

In our study, we used the following sequence of development of individual programs: according to the examination results of the students involved in the experiment, relatively homogeneous groups were identified among them based on the similarity of registered morphofunctional indicators (including health level). For each of these groups the unified programs of sport and recreational trainings with optimized parameters of physical loads were developed, which included: minimum, optimal and maximum permissible intensity; volume - the number of training classes per week and their duration in minutes at the main and preparatory stages.

This method allows simplifying the process and shorten the time for creating individually-oriented programs for a large number of students, because it finally comes downt to the selection of a standard (unified) program best matching the identified physical state for each of them. In the future, by clarifying the students' preferences for motor activity during classes (based on the capabilities of the university and its sports facilities), the unified programs are transformed into differentiated ones, which the students were adhering to during the entire experimental period (two academic years: 2015-2017), and, as we hope, which they will be able to correct and use in their subsequent sport and recreational practice.

It should be noted that Naberezhnye Chelny Institute of Kazan Federal University have all conditions for students of different sports orientation. This allowed the students to choose an attractive type of motor activity (basketball, volleyball, football, badminton, track and field athletics, skiing, rhythmic and power gymnastics, etc.), and us to implement the experiment plan in full.

Conclusion

The sequence of development of individually-oriented exercise programs used in the experiment consisted of: 1) the assessment of the functional state of the organism and the level of physical fitness of students using several diagnostic techniques; 2) the determination of the appropriate mode of physical activity with established parameters of loads; 3) the choice of each type of motor activity, corresponding to its capabilities and preferences (athletics, basketball, skiing, etc.); 4) specification of the loads in the selected type of activity (intensity, volume, frequency of training classes and their duration), which are reflected in individual programs.

The comparative analysis of the results of the study showed that all students of the

experimental group managed to improve the level of the morphofunctional state of their body for a number of indicators during two academic years, and in 32.6% of cases - to achieve a significant improvement in health ($p<0.05$). The level of general physical fitness increased by an average of 18% in 91% of the respondents (improvement by at least 1 point is considered progress).

While in the control group (at initial indicators equal with the experimental group), from September 2015 to May 2017, an increase in the general level of somatic health (estimated by G.L. Apanasenko's method, 1988) was noted in 17.4% of the students, and the level of physical fitness - by 9% in 73% of the respondents.

Optimization of the physical education of students on the basis of the differentiation of physical loads affected also their motivation for study - a gradual progress in personal results contributed to the formation of students' desire to train systematically, which also led to an improvement in the attendance of training classes in the experimental group.

The conducted practically oriented research allowed us to develop, experimentally test and confirm the effectiveness of the method of organizing physical education of students, which combines mass physical exercises with individually graduated and optimized physical activity for each person engaged in the selected type of motor activity.

The two-year experiment resulted in the detailed elaboration of all the elements of the technological chain, starting from the monitoring of the physical indicators of the sportsmen with their data recording into the computer database for their subseqent processing (appropriate assessment methods were selected); further - the development of individualized programs of sport and recreational classes, providing for the differentiation of motor loads; the next stage is the creation of conditions for training classes (with the preferred sport options for students); the implementation of these programs at the training classes at the university; and the assessment of the effectiveness of classes in the context of the students' health promotion.

Acknowledgements

The work is performed according to the Russian Government Program of Competitive Growth of Kazan Federal University.

References

Andrzejewski, M.; Chmura, J. & Strzelczyk, R. (2010). Individualization of physical loads and speed abilities of young soccer players in a six-month training macrocycle. Journal of Human Kinetics, 482-485.

Apanasenko, G. L. & Popova, L. A. (2000). Medical valeology. Rostov-on-Don: Feniks.

Dvoenosov, V. G. & Shadrin, V. M. (2004). Individually-oriented physical culture as a factor of a healthy lifestyle. Kazan: “Novoe Znanie” CJSC.

Grigoriev, V. I. (1998). Sport and pedagogical technology of physical education management of university students. Problems of improving the educational and training process in higher sports educational institutions: materials of the IV interuniversity scientific-practical conference, pp. 24-26. Chaikovskii.

Kalina, I. G. (2008). Individualization of sport and recreational activities of further education teachers: the author's abstract for the degree of Candidate of Pedagogical Sciences. Kama State Academy of Physical Culture of Sport and Tourism. Naberezhnye Chelny.

Masironi, R. & Denolin, H. (1985). Physical activity in disease prevention and treatment. Padua: Piccin; Boston etc: Butter worth.

McLachlan, S. & Hagger, M. (2011). Do people differentiate between intrinsic and extrinsic goals for physical activity. Journal of Sport & Exercise Psychology, (33), 273-288.

Ntoumanis, N. (2001). A self-determination approach to the understanding of motivation in physical education. The British Journal of Educational Psychology, (7), 225-242.

Peshkova, N. V. & Alkova, S. Iu. (2000). Organization of individually-oriented educational sport process at university. University physical culture and student sport: the state and prospects for improvement: materials of the regional scientific and practical conference, pp. 11-13. Tyumen: Publishing house of Tyumen State University.

Riddoch, C. J.; Mattocks, C.; Deere, K.; Saunders, J.; Kirkby, J. & Tilling, K. (2007). Objective meas-urement of levels and patterns of physical activity. Archives of Disease in Childhood, (92), 963-969.

Shilko, V. G. (2003). Methodology of building an individually-oriented content of physical culture and sports activities of students. TIPFK, (9), 45-49.