

# Methodological conditions for the construction

## of the educational process in the heterogeneous group of a special medical department in the discipline "physical culture and sports"

*Condiciones metodológicas para la construcción del proceso educativo en el grupo heterogéneo de un departamento médico especial en la disciplina "cultura física y deportes"*

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Received/Recibido: 06/28/2020 Accepted/Aceptado: 07/15/2020 Published/Publicado: 09/07/2020 DOI: 10.5281/zenodo.4264952

### Abstract

The purpose of the article is to consider the organization of the educational process in the discipline "Physical Culture and Sports" of students assigned for health reasons to a special medical group in the system of higher professional education. An analysis of the scientific and methodological literature showed that there is no single approach to the organization of educational work with representatives of a special medical group. The identified trend, indicating a growing number of students with poor health, requires the search for new forms and technologies for organizing training sessions with this category. The complexity of organizing training sessions with students of a special medical department is that the study group, as a rule, consists of students with various diseases and various levels of functional and physical development. A possible approach to the organization of the educational process in physical education in a heterogeneous group is considered in this article.

**Keywords:** physical education, educational process, training sessions, special medical group, heterogeneous group, cardiovascular system, respiratory system, musculoskeletal system.

### Resumen

El propósito del artículo es considerar la organización del proceso educativo en la disciplina "Cultura física y deportes" de los estudiantes asignados por razones de salud a un grupo médico especial en el sistema de educación profesional superior. Un análisis de la literatura científica y metodológica mostró que no existe un enfoque único para la organización del trabajo educativo con representantes de un grupo médico especial. La tendencia identificada, que indica un número creciente de estudiantes con problemas de salud, requiere la búsqueda de nuevas formas y tecnologías para organizar sesiones de capacitación con esta categoría. La complejidad de organizar sesiones de capacitación con estudiantes de un departamento médico especial es que, por regla general, el grupo de estudio está formado por estudiantes con diversas enfermedades y diversos niveles de desarrollo físico y funcional. En este artículo se considera un posible enfoque para la organización del proceso educativo en educación física en un grupo heterogéneo.

**Palabras clave:** educación física, proceso educativo, sesiones de entrenamiento, grupo médico especial, grupo heterogéneo, sistema cardiovascular, sistema respiratorio, sistema musculoesquelético.

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### Introduction

According to the Ministry of Health of Russia, among students, 30% have various deviations in health status, diseases of a temporary or permanent nature. It is no secret that the number of these students is steadily increasing from year to year. In this regard, it is very important to increase the effectiveness of the educational process in special medical groups (SMG). Classes in these groups contribute to improving

health, promoting healthy lifestyles, and introducing students who are physically weakened to active physical education (Denisova, 2016).

Pedagogical and socio-philosophical problems of physical culture activities are the basic norms for strengthening and maintaining health (Romanova and Dugnist, 2015). About

half (56.8%) of students lead a sedentary lifestyle, spend free time at home at a computer, TV, and social networks. In this regard, students of natural sciences have a more active motor regime (26.8%), while humanities are more passive (17.2%) (Dugnist and Romanova, 2015).

A physical education teacher working with these groups should know the features of the influence of physical exercises and hardening agents on a sick body, be able to choose the means and methods of physical culture necessary for the treatment of certain diseases, and evaluate the effectiveness of their influence on the body (Bulich, 1986).

Physical education classes with students of a special medical group should be aimed at improving health, increasing physical performance, and functional capabilities of the body, developing physical qualities.

Physical culture as a historically established social phenomenon, in which the tasks of education, upbringing, and improvement are uniformly and interconnected, has an impact on all spheres of life. However, like in any other area of public life, needs constant updating. Recently, there has been a tendency to reorient the values of physical culture, which is due to the need of society for a harmoniously developed personality. In contrast to the prevailing opinion of physical culture as motor activity, mainly oriented towards the development of a person's physical parameters, there is a need to form a new system of ideas in society that characterizes it primarily from general cultural positions (Coleda, 2016).

A distinctive feature of the modern world is the dynamism of the development of society. It is largely determined by the rapid introduction of information technology, a large amount of information, political and economic transformations, etc. All this makes increased demands on a person as an integral socio-biological phenomenon, especially when performing objective life functions. Physical culture, together with other types of culture, is an integrative and multifunctional phenomenon in the life of an individual and society.

With an in-depth examination of the nature and content of physical culture, its role and place in the system of social phenomena, one of the main tasks are to consciously represent and accept it as an integral component of a harmoniously developed personality. In addition, an adequate understanding of physical culture in the context of its various functions, forms, tasks in public life is necessary, taking into account their systemic correlation and patterns. The current state of physical culture is based on its systemic support, which is based on the following interdependent aspects:

- the direct activity of the individual and society to streamline the totality of the interconnected elements of physical culture for its use both on the state and social lines - as the basis of the system of physical culture;
- identification of integrative nodal mechanisms for constructing the system (properties, relationships, objects, processes) to combine them into a single whole, which determines the systemic nature of physical culture;

- Search and detection of a system-forming factor - a specific result of activity - based on a consideration of the structure and patterns of system functioning;
- Theoretical modeling of the system, involving the construction of a "model" in physical culture studies to obtain in a simplified form idea about the properties and relationships of the modeling object. At the same time, objects of modeling in physical culture studies can be both indicators of a person's physical and functional state during physical exercises, as well as parameters characterizing the process of development of physical culture in society;
- Physical culture as a social phenomenon is in the natural dependence of a person's quality of life on the basic mass sport (especially youth sports) and the actual acquisition and use by adults of its value potential for the formation of mental, physical, and moral health.

The usefulness of physical culture does not require evidence since there is sufficient empirical material that convincingly shows the role and significance of its factors, forms, and means in life and work. At the same time, the fundamental problem of physical culture in the modern world is the consistent study of its basic laws, due to the concept of individual human life. In each age period, it is necessary to reflect the adequate nature of the motor activity. In this regard, the student environment acts as a kind of catalyst. The systematic assimilation by students of special knowledge in this field allows them to expand the boundaries of their capabilities using optimal and effective methods of physical education.

The essence of physical culture presupposes, first of all, the integrative of its influence on the physical and spiritual development of man. The integrative influence of forms, means, and methods of physical education is associated with their feasibility and integrity. So, unreasonably used physical exercises or elements of physical culture, taken in isolation from each other, cannot have a positive effect on the health of students and do not form an organic complex of factors for the comprehensive and harmonious development of students.

A distinctive feature of modern education is the increasing heterogeneity of modern schools and other educational institutions. The development of the education system in our country actualizes the problem of ensuring equality in the availability of quality education and training of students. This makes it necessary to create conditions for the positive socialization of students in heterogeneous groups in the school environment based on the integration of general and additional education. This process causes great difficulties in the conditions of a modern school due to the incomplete readiness of leaders and teachers to work with diverse groups of children (Stakhovsky, 2017).

Scientists conducted a study of the professional competence of teachers based on their self-esteem of teachers on three issues: willingness to work with different contingents of students; the difficulty of achieving various learning outcomes provided for by the educational standard; the complexity of the implementation of educational tasks formulated in the new

educational standards (Sazhina and Grekhovodova, 2016). The results of the study showed that “when assessing their competence, teachers as the most difficult tasks for themselves note the ability to work with children in the “risk zone”, the possession of ways to organize the educational process for the development of the student as a subject of educational activity, the ability to implement educational tasks related to worldview and the moral development of school children” (Sobkin and Adamchuk, 2016). These data are confirmed by our observations - the most problematic areas today are the willingness, ability, and willingness of teachers to work with different students (with heterogeneous groups) (gifted children, children from disadvantaged families, children with disabilities, children with special problems in behavior, children for which the Russian language is not native); willingness, ability, and desire of teachers to implement their pedagogical activities in accordance with the requirements of the modern educational standard (achievement of the results of training and education provided for by the educational standard).

The definition of modern researchers of the psychology of interaction of Werderber and Werderber, understand a heterogeneous group as a group consisting of people of different sex and age, with different levels of training, as well as different attitudes and interests (Werderber, 2003). Bezrukova (2000) defines a heterogeneous class (group) as “a class consisting of children of different levels of development, different ages, and different attitudes to educational and other activities. Alloys, conglomerates of rocks, and social groups are heterogeneous (Sazhina and Grekhovodova, 2016).

So, heterogeneity is a property of systems to consist of heterogeneous elements, while maintaining their common qualities. Heterogeneous classes include Sunday-school classes of different ages, participants in festivities, groups of groups, and sections. It is very difficult for a teacher to work with heterogeneous groups that require knowledge of a differentiated and individual approach to children” (Bezrukova, 2000).

Accordingly, the purpose of the article is to consider the organization of the educational process in the discipline “Physical Culture and Sports” of students assigned for health reasons to a special medical group in the system of higher professional education.

## Materials and Methods

The relevance of the problem under consideration is determined, on the one hand, by the annual increase in the number of students assigned to a special medical group (SMG), which is confirmed by both our monitoring regularly conducted at Petrozavodsk State University (PetrSU) (Kremneva, 2018b) and numerous studies by other authors as Borodulina, 2015, Weiner, 2010; 2009, Volkova, 2007, Zhovan, 2015. On the other hand, there is a clear and bad tendency towards a decrease in the physical and functional development of both students of the main and preparatory health groups, and students assigned for health reasons to a special medical group, which is also reflected in the works of many authors

as Balashova, 2005, Bogurin, 2012, Ivanova, 2012; and is confirmed by our diagnostic procedures (Kirilina, 2019).

Also, the relevance of the problem considered in the article lies in the fact that, despite the huge number of theoretical and methodological developments on the organization of the educational process in groups of a special medical department, the issue remains not fully resolved.

All authors, without exception, involved in researching approaches to organizing physical education classes with SMG students note that the effectiveness of working with this category of students largely depends on the principles of the formation of study groups. And further, taking as a basis for the acquisition of a group one of the criteria, the study is based on this experimental basis. In the majority of the studies that we assessed, one of the most effective ways of organizing educational activities with students of a special medical department is the separation of students in similar nosological profiles (Bogurin, 2012; Rassolko, 1999; Skuratovich, 2006), because, in this case, the possibilities for the directed use of physical culture means to improve the health of students. The division into subgroups “A”, “B” and “C” is proposed, and for each of these subgroups in the pedagogical, medical scientific and methodological literature, approaches that lead to the organization of classes with students of one nosological group are thoroughly considered and described.

Another approach, which occurs just as often, to recruit groups for classes in a special medical department (Borodulina, 2015; Bogurin, 2012; Volkova, 2007; Ivanova, 2012), is that the basis for the distribution of students to medical groups for physical education should not only be a disease, but also the level of physical development, physical fitness, and general physical performance, as well as the functional state of individual body systems.

Thus, the analysis of the scientific and methodological literature and the proposed methods shows their effectiveness, subject to a certain principle of the formation of the study group, most often either by nosological grounds or by the level of functional and physical development. Without disputing the significance of the research, it should be noted that all of the above authoring developments can be effectively applied in the educational process, if the university has such an opportunity, namely, to organize the educational process with students assigned for health reasons to SMG dividing them into subgroups according to nosological featured, according to the level of physical and functional development. Unfortunately, the reality is that the research results expressed in the methods and technologies proposed by the authors may not always be applicable in the real pedagogical process since the study group on physical education has a special medical department (in many universities in Russia and PetrSU, in particular) students of various nosological profiles, different in the level of physical and functional development, are connected.

The highlighted contradiction between the increasing number of students with poor health, requiring admission to a special medical group on the one hand, and the lack of a unified ap-

proach to organizing classes with this category of students, on the other hand, determined the purpose of the study - to justify the methodological conditions for organizing classes in the discipline "Physical Culture" and sport" in the heterogeneous group of the special medical department. The study was conducted based on Petrozavodsk State University during 2017-2018, 2018-2019, 2019-2020 academic years. The study involved 657 students in 1-3 courses.

## Results and Discussion

An analysis of the scientific and methodological literature suggests dividing the educational process in physical education with students of a special medical group into two periods: preparatory and basic (Ivanova, 2012; Skuratovich, 2006) with the traditional three-part structure of the training session (Bogurin, 2012; Shepel et al., 2018). In our study, the first step that directly precedes practical activity is the diagnostic step to identify the most common diseases, the level of students' functional and physical development at the beginning of each academic semester. The more thoroughly the analysis of the students' health status is carried out, the more accurately and competently it is possible to set tasks that will have to be solved during training.

Characterizing the quantitative composition of students of the SMG of PetrSU, we can confirm the trend of an increase in the number of students assigned for health reasons to a special medical group. The monitoring of the quantitative composition of SMG students for 2015-2019 is shown in Table 1.

**Table 1. Data on students requiring admission to a special medical group (2015-2019)**

	2015	2016	2017	2018	2019	Total number of students
Number of students at PetrSU (1-3 course)	4584	4532	4498	4512	4576	22702
Number of students enrolled in the SMG	356	346	335	329	328	1693
Same in %	7.7	7.6	7.4	7.2	7.9	7.4

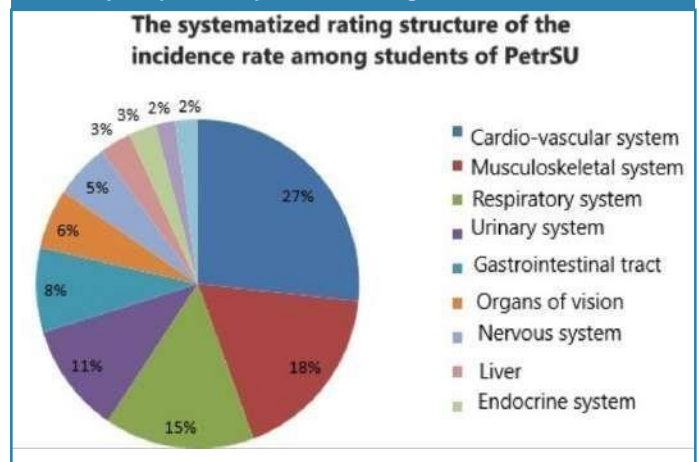
In the data presented in Table 1, attention should be paid to the increase in the percentage of students of SMG from the total number of students: from 7.7% in 2015 to 7.9% by 2019. Although quantitatively, the number of students in a special medical group has decreased (328 in 2019, and 356 in 2015). This is due solely to a decrease in the total number of students who entered university in recent years, and not to an improvement in the health status of students. That is, the relative increase in the number of sick students is reliable, which is confirmed by earlier studies (Kremneva, 2018b; 2018c).

An analysis of the morbidity structure of students of a special medical group over 5 years is presented in Table 2.

**Table 2. Analysis of the structure of the incidence of students in a special medical group (2015-2019).**

No	Type of disease	2015	2016	2017	2018	2019	%
1	Cardiovascular disease	22.4	26.8	24.89	31.95	27.72	26.66
2	Diseases of the musculoskeletal system	10.2	16.1	23.56	21.74	19.15	17.73
3	Visual diseases	17.7	14.17	12.5	13.23	16.8	14.99
4	Urinary system diseases	10.2	11.1	10.23	9.59	12.88	10.86
6	Diseases of the nervous system	7.9	5.44	3.56	4.57	5.45	5.48
7	Gastrointestinal diseases	12.1	11.28	7.12	5.48	4.69	8.3
8	Liver disease	3.38	3.36	2.22	2.73	3.51	3.14
9	Endocrine system diseases	2.24	2.55	4.89	2.72	1.57	2.26
10	Other diseases	3.75	1.46	2.65	1.83	1.55	2.26

The structure of the incidence rate among students at PetrSU for the analyzed period is presented in Figure 1.



As the analysis shows, the basic composition of a special medical group is made up of students who have diseases of the cardiovascular system, musculoskeletal system, and respiratory system. It should be noted that a similar trend occurred in the previous five-year period (Kremneva, 2018c).

These three prevailing nosological profiles, transformed into pedagogical tasks, formed the basis for planning work with the heterogeneous group of the special medical department at the second stage:

1. Improving the functional state of the cardiovascular system (aerobic work)
2. Physical development of the musculoskeletal system (corrective exercises, strength training (exercises with its own and low weight))
3. Improving the functional state of the respiratory system (breathing exercises)

The second stage is the planning stage, the direct formulation of tasks for constructing a training program taking into ac-

count the most common diseases, a clear definition of contraindicated, not recommended types of motor activity. The first two stages occupy a short period in the whole pedagogical process, but their significance and importance cannot be ignored since the effectiveness of the follow-up will be largely determined by the effectiveness and quality of the teacher's activity in the first two stages.

The third and fourth stages are directly preparatory and the main, the implementation in practice of the planned program (taking into account all the methodological requirements). It is important to emphasize that the above tasks should be comprehensively addressed precisely in the classroom (without leaving for independent and extracurricular activities). This approach is due to the data from the PetrSU surveyed students of SMG, proving that the majority of students in this category (more than 70%) are engaged in physical education exclusively and only in the process of training (Kremneva, 2018a). These data correlate with the results of other studies (Antonova et al., 2018; Weiner, 2010), which prove that, unfortunately, the main motor activity of students in a special medical department is carried out only through training sessions. Therefore, all of the above tasks should be solved precisely in educational activities, hoping that students will solve this independently is utopian.

The main tasks of the preparatory phase: preparation of the functional systems of the body (cardiovascular, neuromuscular and respiratory, primarily based on the identified most common nosological profiles) for physical exercise, training in self-control. In the preparatory phase, special attention should be paid to teaching breathing techniques, combining movements with breathing.

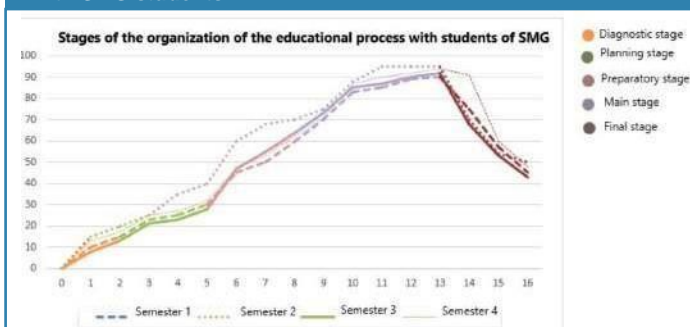
The main stage is characterized by the most intense training impact on the body. In the course of all training sessions, a comprehensive solution of the following tasks (highlighted above) is carried out: increasing the functional characteristics of the cardiovascular system (developing general endurance, training the heart muscle), strengthening the musculoskeletal system (correcting posture disorders, strengthening the muscular corset due to strength exercises), and the combination of aerobic and power load with proper breathing (studied in the preparatory period).

A special (in the sense that it cannot be delivered exactly after a certain stage, it acts as a cross-cutting one, penetrating the pedagogical process at any stage of implementation) is the regulatory stage. Its goal is constant monitoring of the effectiveness of the classes and the operational correction of the content, forms, methods, and techniques of training to achieve a more complete compliance of the planned tasks with real indicators.

The final stage is the final one, the content of which is the monitoring and evaluation of the achieved results, indicators of the functioning of the main physiological systems (cardiovascular, neuromuscular, respiratory), changes in the indicators of physical development (according to the basic control standards acceptable for use in a special medical department).

The selected stages are distributed in the cycle of the school year as follows - presented in Figure 2.

**Figure 2. Stages of the organization of the educational process with SMG students**



The first thing that needs to be noted and taken into account when organizing physical education training sessions (probably not only in a special medical department) is that the peculiarity of the educational process of a university is that after graduation there is a rather long period associated with the session and holidays. The average break time, during which most students, unfortunately, do not do physical exercises on their own (Kremneva, 2018a), do not support the achieved level of physical and functional development, is about one and a half months in the winter and about three months in the summer. This circumstance forces us to build the learning process in each next semester cyclically, starting from the first diagnostic stage (in even semesters a little more shortened due to a shorter break), and not continuing the main one. The planning stage in the second and fourth semester can also be minimized (depending on the identified diagnostic indicators).

As shown, the duration of the stages, the intensity, density, and volume of the load vary. So, the first semester is distinguished by the longest diagnostic stage (this is due to the process of primary diagnosis of students who have just arrived). Sufficiently long, with a relatively low occupancy density is the preparatory stage, which takes time to identify all kinds of risks, identify and take into account individual characteristics, and study the individual body reactions to the load. The highest density, the intensity of training sessions is noted at the main stages in the 2nd year (third, fourth semesters).

## Conclusion

The approach presented to the organization of the educational process in the discipline "Physical Culture and Sport" with students of a special medical heterogeneous group requires the following pedagogical conditions to be observed:

- Complex solution of the problems of functional (improvement of the functional state of the cardiovascular and respiratory systems) and physical (physical development of the musculoskeletal system) development at each training session;
- Observance and implementation in the educational process of physical education with students of a special medi-

cal group of the diagnostic stage, planning stage, preparatory, main, final, regulatory stages;

- Organization of the educational process in stages, in cycles in each academic semester.

Unfortunately, the epidemiological situation in the country did not allow the full implementation of the 3-year student curriculum (due to the transition to the distance learning format) and we considered it incorrect to insert a cycle that was not completed as usual. The diagram shows graphs of only fully completed training cycles (1 and 2 courses, from the first to fourth semesters). The work in full will be continued after quarantine measures are lifted, but already now the presented results can be useful and used in the practice of teaching physical education in higher education.

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