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Improvement of Methods for Developing Physical Training Exercise Complexes

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Abstract: The aim of the study was to develop a methodology for the process of developing sets of exercises aimed at solving specific tasks on the basis of unified classification and evaluating physical exercises. Based on this methodology, a set of exercises was developed and tested, based on the use of a psycho-emotional factor using physical exercises from a wide range of classical and non-traditional training systems.

Keywords: Adaptive physical culture, Paralympic sports, educational and training methods, psycho-emotional state, exercise complexes.

Introduction: In the field of physical education and sports, research is constantly conducted to improve and optimize the educational and training process, methods, and tools for enhancing physical development and physical fitness of a wide range of people.

One of the main tasks in this field is the development of exercise complexes aimed at solving specific tasks based on a comprehensive approach, ensuring a unified concept and integration, in most cases, of contradictory requirements into a single logic of human development and improvement.

In the field of adaptive physical culture and Paralympic sports, the range of tasks is expanded by adapting existing technologies and methods to the specifics of physical and sports activities for people with disabilities. During adaptation, it is necessary to strive to make activities interesting and attractive for participants, contributing to their comprehensive development and improvement, which will lead to increased efficiency of activities and the establishment of a need for them [3].

Adaptive physical culture integrates three areas of knowledge: physical education, medicine, and correctional pedagogy, including a large number of educational and scientific disciplines: the theory and methodology of physical culture and sports, physical education, motor recreation, physical rehabilitation, and so on [3]. Therefore, a comprehensive approach is especially important both in the training process and in the medical, biological, and psychological support of people with disabilities, as only such an approach ensures the required efficiency.

OBJECTIVE OF THE STUDY

To develop a unified model for the classification of physical exercises. To create a set of widely used traditional exercises combined with exercises from various non-traditional health gymnastics systems (such as aerobics, fitness, Pilates, breathing practices, stretching, yoga, etc.) with their full descriptions and classifications. To create a methodology for developing exercise complexes aimed at solving specific tasks based on the unified classification of exercises. To test the methodology.

METHODS

The task was to create a targeted set of exercises based on the principles of psychophysical training, expanded by means of mixed workouts and registered under the name "Extensive Physical Training (EPT)".

The concept of "Psychophysical training" is defined as a method of self-influence on the body through changes in muscle tone, regulated breathing, imaginative representation of normal organ functioning, verbal reinforcement to increase psychophysical potential, develop active attention,

willpower, memory, self-control [3].

Mixed training is a set of complex methods aimed at combining the best from various training systems by integrating exercises from them [4].

Extensive Physical Training (EPT).

The technology is based on:

- the application of the widest range of health-oriented exercises to ensure balanced development of all physical qualities and body muscles;
- the involvement of psychophysiology of physical activity to optimize physical loads by type and volume to achieve maximum effectiveness from their application;
- the use of psychophysiology of psycho-emotional states to achieve harmony in the emotional sphere during the educational and training process.

According to the methodology of pedagogical technology, which is the systematic and consistent implementation of pre-designed educational and training processes, the main principle of the methodology was the preliminary design of the educational process in the form of exercise complexes and its subsequent reproduction during sessions.

To select the criteria for choosing physical exercises and building exercise complexes based on them, classifications of physical exercises reflecting the main influencing factors were involved. Currently, more than 300 classifications of physical exercises are known. Based on the requirements and objectives, the following classifications for physical exercises were applied:

For selecting exercises:

1. Classification by the intensity of the load performed by the participant (maximum, submaximal, high, medium, low, and moderate intensity).
2. Classification by the pace of execution (including determining the pace of musical accompaniment). Exercises are divided into slow, moderate, average, fast, and very fast pace.
3. Classification by the nature of muscle work (dynamic, static, and combined).
4. Classification by movement structure (cyclic, acyclic, and mixed).
5. Classification by energy supply of muscle activity. Aerobic, anaerobic, and mixed types of energy supply are distinguished.

For building the exercise complex:

1. Classification by predominant impact on the development and improvement of the qualities and abilities of people with disabilities. According to this criterion, exercises for the development of speed, strength, agility, endurance, and flexibility are distinguished.
2. Classification by anatomical features, by the predominant impact on the development of individual muscle groups. The following muscle group division was used: muscles of the neck and occipital area, shoulder girdle, chest and back, abdomen and pelvis, thighs and buttocks, forearms and hands, calves and feet, and others.

To optimize the selection process of suitable exercises, a template for the specification of physical exercises was developed (an example is presented in Table 1).

Table 1.

Exercise Specification Example.

ME-1	Lateral Jumps with Diagonal Knee Raises
Qualities (Q)	Q2. Speed, Q3. Endurance, Q4. Agility
Muscles (M)	M3. Abdomen and Pelvis, M4. Thighs and Buttocks, M6. Calves and Feet
Intensity (I)	I3. High Intensity.
Tempo (T)	T4. Fast
Regime (R)	R1. Dynamic
Structure (S)	S1. Cyclical
Energy Supply (E)	E3. Mixed
Description	Stand with feet wide apart, bend your arms at the

	elbows near the body, and tilt your back forward. Start jumping side to side, shifting weight from one leg to the other. Raise your thigh parallel to the floor. The body is not static but rotates towards the knee.
Repetitions	10 repetitions on each side (20 in total)
System	Traditional (classical) system
Note	This exercise effectively accelerates metabolic processes in the body and helps to additionally load the lower abdominal muscles, oblique abdominal muscles, thighs, and buttocks, as well as leg extensors. It may seem easy at first glance but is characterized by high intensity.

Classification Matrix

Qualities					Muscles						Intensity				Tempo				
1	2	3	4	5	1	2	3	4	5	6	3	4	5	6	1	2	3	4	5
	◙	◙	◙				◙	◙		◙	◙							◙	

A set of 226 exercises was selected, including 108 standing exercises, 108 exercises in a sitting and lying position, and 10 exercises performed with movement.

The entire training cycle was divided into three stages: initial, intermediate, and advanced.

At each stage, a separate part (subcomplex) of exercises from the overall complex was used, with increasing characteristics in terms of complexity and physical load. This allowed for a gradual increase in load while maintaining a positive psycho-emotional balance.

Traditionally, when conducting sessions using various physical exercises, three main parts are distinguished: warm-up (preparatory), main, and cool-down (concluding). The typical session duration is 60-90 minutes.

1. The first part – the warm-up – lasts 5-15 minutes and is dedicated to general warm-up, muscle preparation, and getting ready for intensive physical activity.

2. The second part – the main session – lasts 30-60 minutes and includes the main series of exercises.

3. The third part – the cool-down – lasts 5-15 minutes and is aimed at recovery and preparation for further activity

Accordingly, each session was divided into three series (parts): warm-up, main session, and cool-down. Each series was designed to achieve specific goals during the session, with exercises selected from the appropriate part of the overall complex.

As a result, a set of exercises was created, consisting of complexes, separated by three stages of the entire course of classes, as well as three phases inside the classes themselves in stages (totally nine).

For each subcomplex, a summary matrix was created based on classification matrices from exercises specifications, allowing them to visually monitor them on the subject of balance and compliance with the tasks solved (the example is given in table 2).

According to the consolidated matrix presented in table 2, the following assessment of the balance of the subcomplex can be given: in terms of developed qualities - relatively few exercises for the development of strength and speed (normally for warm -up), in muscle groups - evenly and balanced, by the pace and intensity - their gradual increase.

Table 2.

The consolidated classification matrix of the subcomplex of the exercises for the group with the initial level of training, the preparatory part (warm -up) (IP).

Exercises	Qualities					Muscles						Intensity				Tempo				
	1	2	3	4	5	1	2	3	4	5	6	3	4	5	6	1	2	3	4	5
ME-10		◙	◙				◙	◙	◙		◙		◙					◙		

SE-53			◙	◙	◙	◙									◙	◙				
SE -12			◙	◙	◙	◙	◙							◙		◙				
SE -10			◙	◙	◙					◙				◙		◙				
SE -14			◙	◙	◙		◙			◙				◙			◙			
SE -7			◙		◙					◙				◙			◙			
SE -16			◙	◙	◙			◙	◙				◙					◙		
SE -11				◙	◙				◙		◙				◙		◙			
SE -8					◙				◙		◙		◙				◙			
SE -15			◙		◙						◙				◙		◙			
SE -90		◙	◙	◙	◙	◙	◙			◙			◙					◙		
SE -54			◙	◙	◙			◙					◙					◙		
SE -17			◙	◙	◙	◙	◙	◙		◙			◙					◙		
SE -47			◙	◙	◙		◙						◙					◙		
SE -24	◙		◙		◙			◙	◙		◙		◙					◙		
SE -23	◙		◙		◙			◙	◙		◙		◙					◙		
SE -62	◙		◙		◙			◙	◙		◙		◙					◙		
SE -2	◙	◙	◙						◙		◙	◙							◙	
RE -7	◙	◙			◙	◙		◙	◙	◙	◙	◙							◙	
SE -4				◙	◙		◙			◙					◙	◙				
LE-85			◙	◙	◙	◙	◙	◙		◙					◙	◙				
SE -69	◙			◙	◙	◙	◙		◙	◙					◙		◙			

Note: In the classification matrix should be marked ◙ only those fields that correspond to the values of these qualities of the exercise.

For the experimental justification of the effectiveness of the new exercise complex in the educational and training process for athletes with disabilities, a pedagogical experiment was conducted [6].

The experiment was conducted in training groups for goalball under the auspices of the Paralympic Association of the Republic of Uzbekistan. The Paralympians only had vision impairments, while all other physical qualities were normal. The division into the experimental and control groups was done randomly to ensure equality of the groups before the start of the training.

In the control group, training sessions were conducted according to a widely known and generally accepted training program. The total number and duration of sessions, as well as the intensity of physical loads during the pedagogical experiment, were practically the same in both the experimental and control groups. For the experimental group, the newly developed complex was used, while the control group continued with the traditional program [6].

RESULTS AND DISCUSSION

To optimize the selection process for physical exercises, a template for the specification of physical exercises was developed, unifying the description of their characteristics. A set of 226 widely used exercises was created, complete with their specifications and classification matrices. When designing exercise complexes, a summary classification matrix was created for each one, allowing for visual control and correction of the set of exercises in terms of balance and alignment with the tasks to be solved.

Based on the described methodology, a special targeted exercise complex was developed to optimize the educational and training process for people with disabilities.

A pedagogical experiment was conducted using the designed exercise complex in training groups for goalball under the auspices of the Paralympic Association of the Republic of Uzbekistan. For the experimental group, the designed complex based on the advanced psychophysical training technology was applied. In the control group, sessions were conducted according to the widely known and generally accepted training program.

The application of the developed complex based on the improved psychophysical training technology demonstrated its effectiveness, ensuring better growth in all indicators compared to standard training complexes. Most of the indicators were statistically significantly confirmed. The most notable improvements were observed in the development of the cardiovascular and respiratory systems, as well as improvements in overall flexibility and the development of muscles in the upper and middle body

regions.

CONCLUSION

A unified template for specifying physical exercises was developed. A set of a wide range of traditional exercises was created, combined with exercises from various non-traditional health gymnastics systems (such as aerobics, fitness, Pilates, breathing practices, stretching, yoga, etc.) with their full descriptions and specifications. A matrix methodology for developing exercise complexes was created, which allowed the development of an exercise complex aimed at solving specific tasks. These specifications and the methodology for developing exercise complexes allow for the formalization, simplification, and, in the future, automation of such processes. It is recommended to expand the number of parameters in the classification matrix and to work out and formalize the procedure for selecting exercises to balance and adapt the complexes to the tasks being solved.

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