

# Sport Training Technology Based on Psycho-Emotional Approach in the Paralympic Sport of Goalball

**Palibaeva Zulfiya Khalmakhanovna**

State Conservatory of Uzbekistan

Uzbekistan, Tashkent

E-mail: p.zulffiya@mail.ru

**Annotation.** In the light of its prospects and significance, it is important to apply an approach based on purposeful, conscious regulation of the psycho-emotional state of athletes in the process of training. The improvement of psychophysical training based on this approach, the development on this basis of a complex of physical culture and sports exercises in the field of adaptive physical culture and Paralympic sports, and its approbation in the training process of goalball players are considered.

**Keywords:** Paralympic sport, goalball, adaptive physical culture and sport, training process, psychophysical training.

**Introduction.** The health of every citizen becomes the daily concern for our state and the basis of its state policy. The importance of physical culture and sports is growing, their introduction into everyday life, ensuring the strengthening of the health of the population, the comprehensive and harmonious development of each individual, an integral part of society. The main task is “education of physically healthy, spiritually and intellectually developed, independently thinking, devoted to the Motherland youth with strong life views” [1].

An integral part of this process is the development of adaptive physical culture and sports. For individuals with disabilities, with its help, the urgent tasks of the maximum possible development of the motor activity of such persons are solved, by optimizing the functioning of their physiological, motor features and forces. In our country, support for the development of adaptive physical culture and sports is provided at the state level, and relevant legislative acts have been adopted [2, 3].

In the sphere of development of Paralympic sports around the world, a lot of research is being done to expand the coverage of a wide range of sports, improve physical training methods, selection and attraction of people with disabilities in Paralympic sports. In research in the field of improving physical fitness methods, complex methods based on a combination of exercises from various non-traditional systems of recreational gymnastics are widely used. Also, the methods of psycho-physiological training focused on the psycho-physiology of those involved are becoming more and more widely used.

**Goal and tasks.** An important issue of raising the effectiveness of the training process in adaptive physical culture and sports (APC and S) is the adaptation of well-established approaches of general physical culture and sports in accordance with the specific features of motor activity in people with disabilities [4].

In modern approaches to the construction of the training process, a prominent role is played by the development of the methodology of complex physical culture and sports technology, directed regulation of the psycho-emotional state of athletes - psychophysical training (PPT). Particularly promising are the development and implementation of such methods in AFC and S, in view of their ability to provide interesting and attractive classes and training, which increases their effectiveness and consolidates the need for them.

Accordingly, relevant:

improving the methodology of psychophysical training for people with disabilities through the development of exercise specifications and a summary classification matrix for a comprehensive assessment and regulation of their impact on the development of physical qualities, taking into account the maintenance of a positive psycho-emotional balance;

developing a set of exercises for visually impaired and blind people involved in goalball based on an improved method of psychophysical training and conducting a pedagogical experiment to evaluate its effectiveness.

**Methods and organization of research.** Complex trainings according to the PPT health-improving program are used as an effective means of improving the level of health, working capacity and physical activity during sports training and competitions [8]. Currently, only general methodological recommendations for conducting such classes have been developed. Since these methods are incomplete and not always acceptable in working with disabled athletes, it is necessary to develop a program that would be the most accessible, effective and emotionally oriented.

The most suitable exercises should be selected and combined from modern health and adaptive techniques, such as aerobics, shaping, Pilates, stretching. An important feature of PPT is the use of a large set of sequentially performed exercises in order to provide the body with a load, adapting to which it changes. The selection and alternation of exercises, the intensity of their implementation should ensure the comprehensive development of both the body and consciousness.

Exercises should allow, with a minimum load on the spine, to strengthen the muscular corset, without greatly increasing the volume of muscles, develop flexibility and a sense of balance, improve posture, self-control, and also help to master the grace and plasticity of movements. An important condition for performing exercises is the control and regulation of the breathing process. Proper breathing improves movement control during exercise, develops reactions of the nervous system, increases muscle strength, activates the muscle corset, and relieves excessive tension [7].

The widest range of exercises from various fitness systems was considered. At the same time, each fitness system had its specific features identified.

When selecting exercises, the main criteria were determined by the factors of their use for training persons with disabilities and the use of a psycho-emotional factor. The main criteria for the selection of exercises, determined by the PPT methodology itself and the peculiarities of its use for persons with disabilities, were safety and maintaining a positive emotional background. Therefore, exercises with increased injury risk and intensity of performance, as well as exercises of a monotonous nature, were immediately eliminated.

Their features were also taken into account in terms of such factors as the phases of the lesson, the comprehensive development of all muscle groups and the physical qualities of those involved. Widely used signs of systematization and classification of exercises were used.

Based on these methods of classifying exercises, for all exercises, a “specification of the physical exercise” was compiled according to a special template that fully describes this physical exercise, including its classification according to various criteria.

The specification of physical exercise’s specification template is presented in Table 1. Based on this template, specifications were compiled for all selected exercises.

Table 1.

Physical exercise’s specification template.

Code designation of the exercise	Name of the exercise
EC for qualities (Q)	Q1. Force. Q2. Quickness (speed). Q3. Endurance. Q4. Agility. Q5. Flexibility.
EC by muscles group (G)	G1. Muscles of the neck and occiput. G2. Muscles of the shoulder girdle, chest, back.

	G3. Muscles of the abdomen and pelvis. G4. Muscles of the thighs and buttocks. G5. Muscles of the forearms and hands. G6. Muscles of the legs and feet.																																																												
EC by intensity (I)	I1. Maximum intensity. I2. Submaximal intensity. I3. Great intensity. I4. Average intensity. I5. Low intensity. I6. Lowest intensity.																																																												
EC by tempo (T)	T1. Slow. T2. Moderate. T3. Middle. T4. Fast. T5. Very fast.																																																												
EC by mode (M)	M1. Dynamic. M2. Static (isometric). M3. Combined.																																																												
EC by structure (S)	S1. Cyclic. S2. Acyclic. S3. Mixed.																																																												
EC for energy supply (E)	E1. Aerobic. E2. Anaerobic. E3. Mixed.																																																												
Description of execution	Spread your legs wide, bend your arms at the elbows near the body, your back is tilted forward. Begin doing side-to-side jumps, shifting your body weight from one leg to the other. Raise your thigh high to parallel with the floor. The body does not remain static, but turns towards the knee. In these exercises, it is very important to catch your pace.																																																												
Reps	30 reps on each side (60 total).																																																												
System	Classic																																																												
Note	Benefits of Exercise: This is a super effective cardio exercise for weight loss.																																																												
Classification diagram	<table border="1"> <tr> <th colspan="5">Q</th> <th colspan="6">G</th> <th colspan="4">I</th> <th colspan="5">T</th> </tr> <tr> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td> <td>3</td><td>4</td><td>5</td><td>6</td> <td>1</td><td>2</td><td>3</td><td>4</td><td>5</td> </tr> <tr> <td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td> <td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td> <td>☐</td><td>☐</td><td>☐</td><td>☐</td> <td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td> </tr> </table>	Q					G						I				T					1	2	3	4	5	1	2	3	4	5	6	3	4	5	6	1	2	3	4	5	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
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Note: Abbreviations in the columns (fields) in table: EC - exercise classification; EC by qualities (Q) - EC by developing qualities; EC for muscles group (G) - EC for developing muscles group; EC by intensity (I) - EC by intensity of execution; EC by tempo (T) - EC by tempo of execution; EC by mode (M) - EC by mode of muscle work; EC by structure (S) - EC by the structure of movements; EC for energy supply (E) - EC for energy supply of muscle activity. In the classification matrix, the ☐ sign marks the fields corresponding to the values of the classification indicators of this exercise.

In total, 226 exercises were selected for the list (nomenclature) of exercises of improved psychophysical training for adaptive physical culture and sports. In view of the large number of exercises, in order to designate them and optimize the subsequent process of compiling a complex based on them, it was decided to divide all exercises into three conditional subgroups:

- exercises performed in a standing position (ES);
- exercises performed in a sitting or lying position (EL);
- exercises performed with movement (EM).

Based on belonging to the above subgroups and the sequence number of the exercises in the list for each of them, for the purpose of unification, a conditional code designation of exercises was introduced (example, EM-1 - exercise performed with movement, sequence number 1). A total of 108 exercises performed in a standing position, 108 exercises performed in a sitting or lying position, and 10 exercises performed with movement. Based on the analysis of various complexes and systems of exercises, a scheme for the use of exercises of improved psychophysical training in the educational and training process of persons with disabilities was developed.

Since the process of teaching exercises is a certain system of interaction between a teacher (trainer) and students, and these actions have a meaningful connection and are sequentially distributed in time, the solution of specific learning tasks makes it possible to single out the following separate stages: “initial”, “intermediate” and “advanced”.

At each stage, a separate part (subset) of exercises of the complex is used, which have increasing characteristics in terms of complexity and physical activity. This allows you to smoothly increase the load and maintain a positive psycho-emotional balance.

In addition, when selecting exercises for the complex, the classes themselves were divided into three phases: “warm-up”, “main part” and “cool-down”, each of which allows you to achieve certain goals in the process of training.

As a result, a set of exercises was created, consisting of 9 (nine) sub-complexes ranked by three stages of the entire course of classes and three phases within classes. For each subcomplex, classification matrices were created based on the specification of physical exercises.

For each subcomplex, a sequence of physical exercises was selected. After that, with the help of the classification matrix, the compliance of the subcomplexes with the criteria for balanced development of all muscle groups and developed qualities and compliance with the tasks to be solved in terms of increasing loads and the pace of execution was controlled. If necessary, the selected exercises were replaced until an acceptable result was obtained. Examples of a subset of exercises and its classification matrix are presented in Tables 2 and 3.

Table 2.

Summary table of a subset of exercises for a group with an initial level of training, the preparatory part of the lesson (warm-up) - (IP).

№	Designation code	Name of exercise
1.	EM-10	Walking with knees up
2.	ES-53	Turns of the head
3.	ES -12	Shoulder rotation
4.	ES -10	Elbow rotations
5.	ES -14	Hand rotations
6.	ES -7	Wrist rotations
7.	ES -16	Pelvic rotation
8.	ES -11	Leg rotations
9.	ES -8	Rotation of the knees in a circle
10.	ES -15	Foot Spins
11.	ES -90	Breeding arms for shoulders, back and chest
12.	ES -54	Twists for abs and obliques
13.	ES -17	Arching for the back and spine
14.	ES -47	Tilts to the floor with a turn
15.	ES -24	Lateral lunges for warming up legs
16.	ES -23	Leg stretches
17.	ES -62	Leg raises to stretch the buttocks
18.	ES -2	Run in place with shin overlap
19.	EM-7	Jumps with arms and legs spread
20.	ES -4	Recovery breathing with tilt
21.	EL-85	A simple pose for posture and stretching the back
22.	ES -69	Salutation to the Sun (Complex 1)

Table 3

Summary classification matrix of a set of exercises for a group with an initial level of training, preparatory part (warm-up) (IP).

Exercises	Q					G						I				T				
	1	2	3	4	5	1	2	3	4	5	6	3	4	5	6	1	2	3	4	5
EM-10		●	●				●	●	●		●		●					●		
ES-65	●	●	●	●	●		●	●	●	●	●		●					●		

ES -53			○	○	○	○								○	○					
ES -12			○	○	○	○	○							○	○					
ES -7			○	○	○					○				○	○			○		
ES -15			○	○	○						○			○	○			○		
ES -90		○	○	○	○	○	○			○			○	○				○		
ES -17			○	○	○	○	○	○		○			○	○				○		
ES -39	○		○	○	○		○	○	○				○	○				○		
ES -47		○	○	○	○		○						○	○				○		
ES -81	○		○	○	○		○	○	○	○			○	○				○		
ES -24	○		○	○	○				○	○			○	○				○		
ES -23	○		○	○	○				○	○			○	○				○		
ES -45			○	○	○				○	○			○	○				○		
ES -62	○		○	○	○				○	○			○	○				○		
EL-50		○		○	○		○			○	○			○	○			○		
ES -29	○		○	○	○		○	○	○				○	○				○		
EL -85			○	○	○	○	○	○		○				○	○	○				
ES -69	○	○		○	○	○	○		○	○				○	○			○		
Total	8	6	17	11	17	7	12	10	11	8	8	0	16	4	8	4	9	14	0	0

Note: Classification accounting in the diagram was carried out according to the following parameters: developed qualities (Q), involved muscle groups (G), intensity of performance (I) and tempo of performance (T).

According to the classification matrix presented in Table 3, we can give the following assessment of the balance of this subcomplex:

- in terms of developing qualities - relatively few exercises for the development of strength and speed (it normal for a warm-up);
- by muscle groups - all muscle groups are loaded evenly and balanced;
- in terms of tempo and intensity - their gradual build-up.

### Results of the study and their discussion.

To study the effectiveness of the influence of the exercises of the developed complex of improved psychophysical training on the body of persons with disabilities, a pedagogical experiment was conducted.

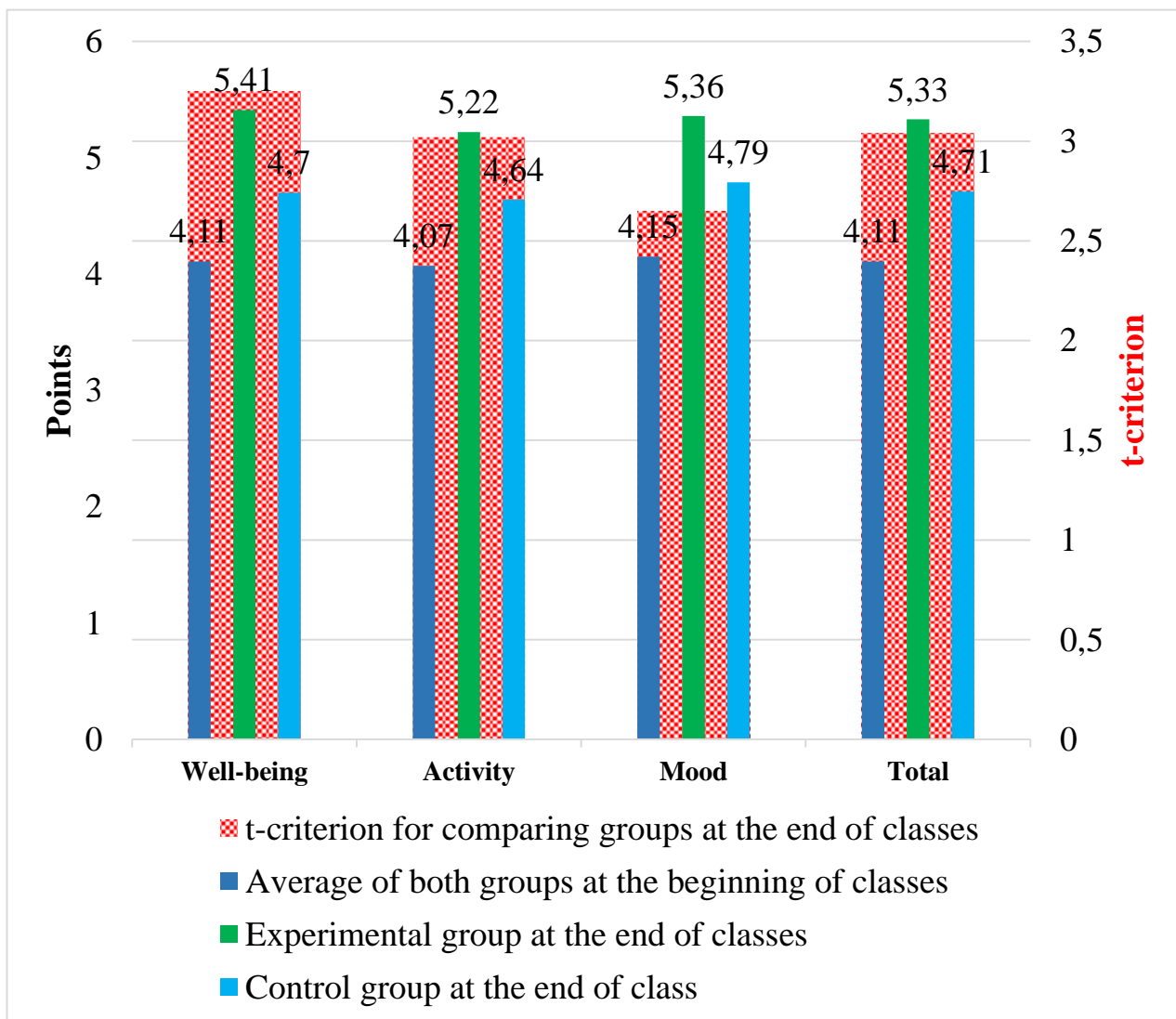
Involved in the study, 25 visually impaired and blind Paralympic goalball athletes were divided into experimental and control groups. The total number and total time of classes, the intensity of physical activity during the pedagogical experiment in the experimental and control groups were almost the same.

For the experimental group, the developed complex based on the improved technology of psychophysical training was used. In addition, for the experimental group, the accompaniment of functional music was used to the maximum. In the control group, classes were conducted according to a widespread and generally accepted program of classes.

Positive changes were revealed in the body of those involved, with statistical significance according to Student's criterion  $P < 0.05$ , according to the following indicators: a decrease in heart rate (HR) and blood pressure (BP) at rest, a decrease in respiratory rate at rest and an increase in its depth. The vital capacity of the lungs (VC - the largest amount of air that a person is able to exhale after a maximum breath) has increased. In general, the ability of persons with disabilities involved in goalball in terms of physical qualities improved by 20%.

It should also be noted that the classes cause feelings of joy and satisfaction in Paralympic athletes, increasing the effectiveness of training and reinforcing the need for them. According to the results of the WAM survey (well-being, activity, mood), an increase in the indicators of the psycho-emotional state, as well as interest in physical culture and sports by 29%, was recorded.

The results of the survey are shown in the diagram.



Picture 1. Diagram based on the results of the survey

**Conclusions.** In the process of improving the technology of psychophysical training of persons with disabilities on the basis of psycho-emotional technologies, the main factors influencing the efficiency of physical activity and the criteria for selecting exercises corresponding to the goals and objectives of adaptive physical culture were used. An exercise specification has been developed including a basic description and exercise classification information to assist in the process of sequence of exercises and selecting the exercises that make up a set of exercises.

To determine the composition and order of performing a set of exercises, a summary classification matrix has been developed that provides a balanced development of physical qualities and anatomical muscle groups, aimed at a comprehensive assessment and adjustment of the overall distribution in terms of intensity, pace and order of performing exercises, optimizing and harmonizing physical activity.

Based on the improved methodology of psychophysical training, a set of exercises has been developed for the use in the process of physical training of athletes with disabilities in playing goalball.

The conducted pedagogical experiment showed significant positive changes in indicators of physical development and health status of athletes with disabilities in the experimental group compared to the control group.

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