

# Structural features and characteristic of process of training of the sportsman as the system object

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**Purpose:** to specify methodological bases of the system approach in practice of training of sportsmen.

**Material & Methods:** the system of training of the sportsman was considered. The following methods of the research are used: theoretical analysis and synthesis of scientific-methodical information, system analysis, and structurally-functional analysis.

**Result:** structural bases of the system of training of the sportsman, its characteristic properties, types and features of functioning of this system, types of communications between structural elements, between them and complete system of training of the sportsman are defined.

**Conclusions:** the main methodological basis of the system approach to the process of training of the sportsman is the way of its consideration as the system object, definition of properties, characteristic of it, features of its functioning and types of communications between structural elements and in the system in general.

**Keywords:** system, structural elements, communications, training of the sportsman.

## Introduction

The modern system of training of the sportsman was created as a result of the long development of the theory and practice of sport. The complete system of training of the sportsman is made by systems of competitions and competitive activity, the system of sports training and the system of extra training and out of competition factors increasing efficiency of training and competitive activity [16; 19; 24; 25]. It is known that the main attention was paid directly to the system of sports training as the fundamental part of training of the sportsman at the first stages of its development, since Ancient Greek times [20].

The system of training of the sportsman represents considerable capacities both on depth, and according to contents concept in modern look. Success of functioning of this system is provided with complex and set of knowledge, principles, laws and regularities of interaction of organizational and administrative forms, conditions and rules of competitive activity, means and methods of training, different types of preparation and external factors.

Effectiveness of competitive activity first of all depends on maturity and coherence of interaction of all structural formations of the system of training of the sportsman. Initial prerequisite to increase in efficiency of training of the sportsman (development of his fitness, formation of sportswear) is vision of the whole process of preparation as the system object.

Besides, the contradictions often arising between big loads and functionality of the sportsman, between model characteristics and his specific features, are removed in the process and in the process of sports growth by the means and receptions which are in the system unity with structural formations of the system of training of the sportsman at the accounting of laws of general communication of development and system representation of the happening changes in the sportsman's

organism.

Effective transformation of the saved-up organism reserves in the course of long-term transformation in high sports result is possible at the accounting of properties of system of training of the sportsman, knowledge of communications, characteristic of it, features of its classification and functioning.

The analysis of numerous scientific publications demonstrates that they have accurate focus on permission of the urgent problems, which are connected with practical problems of training of the sportsman. But, as V. N. Platonov (2015) notes, they are far from the real problems of training of the sportsman on the methodological approach.

Proceeding from the above, it is possible to conclude that now there is need of specification of methodological bases of the theory and practice of sports preparation and definition of the corresponding methodological approaches to the modern level of development of sports science and practice of sport.

## Communication of the research with scientific programs, plans, subjects

The research is executed according to the Consolidating plan of the research works in the sphere of physical culture and sport for 2011–2015 on the subject 2.6 “Theoretic-methodical bases of improvement of the training process and the competitive activity in the structure of long-term training of sportsmen (No. of the state registration is 0111U001168)”.

## The purpose of the research

To specify methodological bases of the system approach in practice of training of sportsmen.

*Research problems:*

1. To give characteristic to the process of training of the sportsman as to the system object.
2. To establish characteristic properties, types and features of functioning of the system of training of sportsmen.
3. To define communications, characteristic to the system of training of the sportsman.

## Material and Methods of the research

*Research methods:* theoretical analysis and synthesis of scientific and methodical information, system analysis, structurally-functional analysis.

## Results of the research and their discussion

The system of training of the sportsman, which has developed in Ukraine, includes the state and public organizations of the central, regional and local level as which at the legislative level obligations for assistance of development of sport in various organizations are fixed. However, the direct process of training of the sportsman (object of management) is carried out by the coach. His administrative decisions provide the growth of skill of the sportsman and his sports result. Thus, the coach in system of preparation is the subject of management (operating subsystem).

In general the whole system of training of the sportsman should be considered as the isolated set of three subsystems: the operating subsystem (coach), the subsystem of sports preparation (influence subsystem) and the operated subsystem (sportsman) (fig. 1). Each of them has the qualities, characteristic of it, properties. Their close, long-term interaction and interference allow creating the system with new properties, qualities and opportunities, i.e. to train the sportsman

ready to win at competitions.

Considering that each subsystem of the complete system of training of the sportsman in the analysis is considered as the independent system, with all to it characteristic properties, in this work the above-stated subsystems will be called systems.

The operating and operated systems (the coach and the sportsman) are natural, organic and self-organized systems.

The system of sports preparation is developed by the coach and is the system of influence. It represents the set of the organized ideas in plans, training programs, actions and is the result of cogitative activity of the coach. Due to stated, it is called the conceptual system. Its components became: the system of competitions and competitive activity; the system of sports training, the system of extra training and out of competition factors. The conceptual system is inorganic, artificial system.

Full functioning of the whole system of training of the sportsman, close and effective interaction of the managing, conceptual and operated subsystems is provided with two types of communications. These are the direct connections, which are going from the managing to the operated system and the feedback, which is directed from the subject (sportsman) to the object (coach) of management.

Direct connections are the team communications defining the purpose, tasks, look, contents and the mode of necessary activity.

The contour of feedback allows to create the closed, complete system and to obtain full information on the level and quality of result of action, "price" of the reached result and

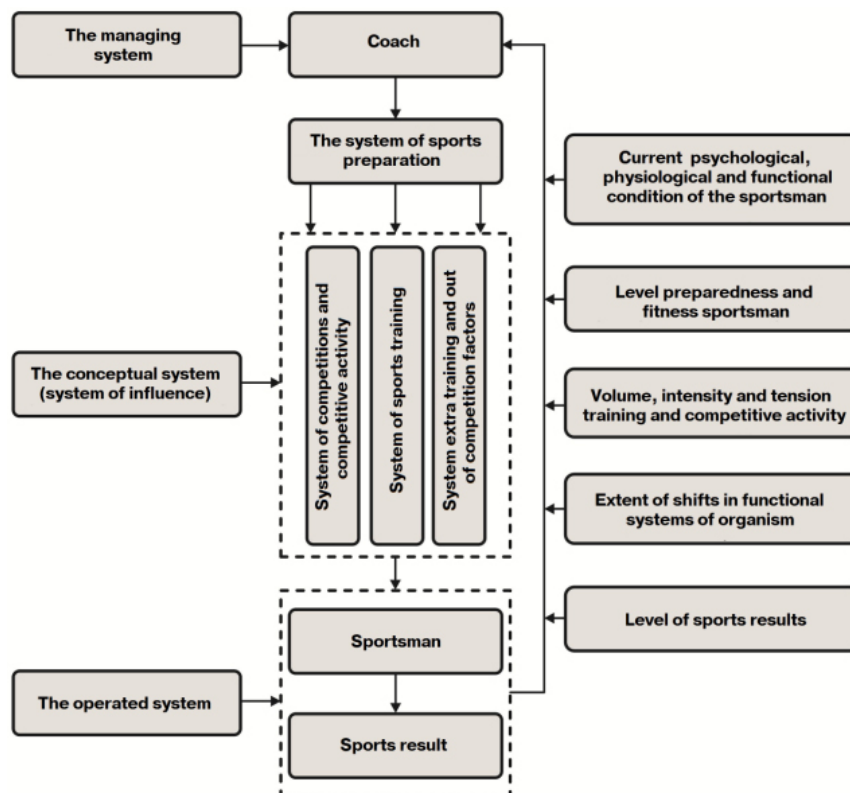


Fig. 1. The system of training of the sportsman

current state of the operated system (the sportsman's organism).

Thus, the "ring of management" (N. V. Zhmarev, 1989) providing the device and effective interaction between components of the complete system is formed (see fig. 1).

The system of sports preparation represents the isolated set of specific structural formations of three subsystems. At the same time each component of the specified structural education has the specific functional purpose which is focused on the achievement of ultimate goal – high sports result (fig. 2). Today each of structural formations of the conceptual system comprehensively is also rather fully studied. So, proceeding from publications of V. N. Platonov (1986; 2004; 2015), V. S. Keller (1987; 1995), F. P. Suslov (1995; 1997), the system of competitions and competitive activity is considered as the basis of creation of system of training of the sportsman.

Structural components of the analyzed system: types and competition calendar, rules of carrying out and refereeing of competitions, structure of technique, tactics and estimates of competitive activities for the functional orientation allow to define the winner of competitions, to create the model of preparation and preparedness of the sportsman, is means and method of sports training, control and management of training and competitive activity of the sportsman. Thus, the system of competitions and competitive activity is the main system-formative and integrating factor of the whole process of training of the sportsman.

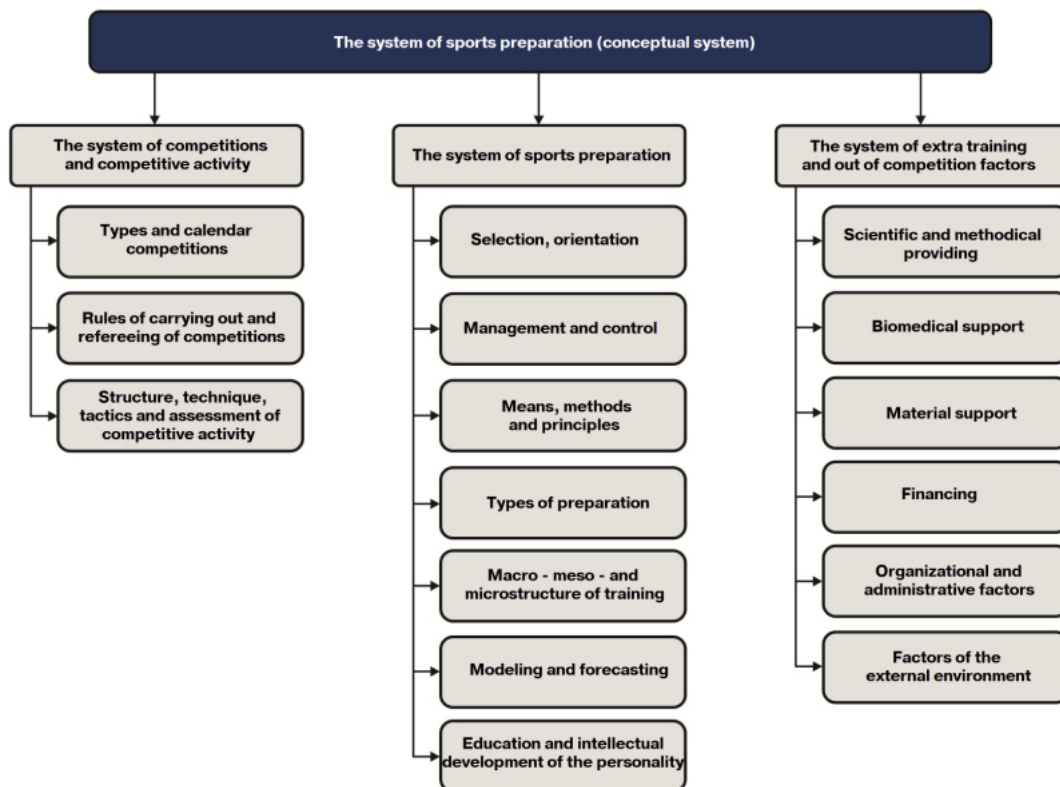
The system of sports training is the basis of sports preparation. Structural formations of this system allow determining the content, character, orientation of training process, to distribute training load in various structural educations, begin-

ning from training task to the program of long-term training of the sportsman. All parties of preparedness of the training sportsman are improved in the course of training activity. At the same time successful prerequisite for the achievement of high level of sports preparedness is genetic predisposition to this or that type of physical activity, good breeding and level of mental ability of the person (fig. 2).

On the present many aspects of sports training have gained the development in scientific works of N. A. Bernstein (1940–1991), N. G. Ozolin (1949–1984), L. P. Matveyev (1964–2010), D. Kharre (1971), Yu. V. Verkhoshansky (1973–2005), V. N. Platonov (1980–2015), A. P. Bondarchuk (1986–2005).

Recently, it becomes harder and harder to coaches to provide the growth of results of the sportsman due to creation of the effective program and structure of the training process every year. Along with it, the accurate tendency of essential increase in role and the importance of system of the extra training and out of competition factors, promoting increase in system effectiveness of sports training, are observed (fig. 2).

One of the reasons of such shift of accents in the system of training of the sportsman is politicization of sports progress and commercialization of sports activities. It leads to essential expansion and activation of circle of the organizations participating in the process of training of sportsmen namely: private companies, commercial organizations, scientific institutions, industrial enterprises, public authorities. At the same time these organizations not so much are interested in problems of training of the sportsman, how many their efforts are directed to the improvement of manufacturing techniques of stock, equipment, conditions of competitive activity, sports food, pharmacological providing. In turn the advanced developments of the technological plan demand revision and recon-



**Fig. 2. Structure of the system of sports preparation**

sideration of role and the importance of separate elements of system and system of training of athletes in general.

Other reason of increase in the importance of the above-stated system is connected with use in the system of sports training of nonspecific means of training (multipurpose trainer, devices, pressures chamber, cryobaths, training in the complicated or facilitated conditions – in water, at various heights, at various humidity, etc.).

Questions of use of the extra training and out of competition factors influencing efficiency of sports training are to some extent displayed in the scientific-methodical works of F. P. Suslov (1983, 1997, 1999), F. Z. Meyerson (1981, 1986, 1988), V. N. Platonov (1988, 2010), I. P. Ratov (1995), A. A. Grushin (1998), O. O. Borisova (2007), O. S. Kulinenkov (2009).

Analyzing the complete system of training of the sportsman (fig. 1, 2) and scientific publications [4; 6; 20; 23], it should be noted that the system of training of the sportsman is the difficult and dynamic system, and, owing to impact of set on it of the forcing-down factors, in many cases achievement of goals (victories at competitions) has probabilistic character. To increase probability of achievement of good result by one of the most effective directions is the choice of the correct methodological approach to the organization of training of sportsmen. Such methodological basis is the system approach allowing considering process of training of the sportsman as system object. Proceeding from the above, it is possible to define that the system of training of the sportsman has to be under construction on the integrative beginnings, based on unity of direct and return communications, interrelations and interactions of structural bases of sports preparation with expressiveness and orientation of urgent and long-term adaptation and adaptive reactions of organism of the sportsman – organic subsystem in the system of training of the sportsman.

Transformation of the saved-up organism reserves owing to long-term adaptation in high sports result is possible at the accounting of the characteristic and properties of complete system of training of the sportsman, types and characteristics of its functioning, communications characteristic to this system (fig. 3).

Characterizing the system of training of the sportsman, except above the specified characteristics (complexity and dynamism), it should be noted that it is the open, artificial, purposeful, cybernetic (operated) system representing set organic (the coach, the sportsman) and conceptual (systems of sports preparation) systems (see fig. 2; 3).

The openness of this system is defined by the fact that its functioning is closely connected with the environment, since training and competitive activity are carried out mainly in open, natural conditions taking into account extent of influence of external factors.

The system of training of the sportsman, in spite of the fact, that it is created by the organic system trainer for improvement of the biological system of the sportsman, who is capable to achieve good results, is the purposeful and artificial system.

Because the studied system is difficult, dynamic system, contains the operating and operated subsystems, functions on the basis of exchange of information through straight line and feedback, the principles of self-organization and self-government, such system, according to V. M. Zatsiorsky (1969), V. V. Petrovsky (1973), N. V. Zhmarev (1986) are peculiar to it, can be called cybernetic system.

The following characteristic properties are peculiar to the system of training of sportsmen: degree of structure, hierarchy, integrity, information and communication with the environment (fig. 3).

The degree of structure of system is defined by the fact that characteristics, the description of system are carried out through the establishment of its basic structural units. The concept of structural unit of the system is meant as structural educations – elements which are definitely ordered and integrated on signs, concrete, characteristic of them.

Hierarchy is presented in the form of the inter-structural relations in the system which is characterized by the sequence, orderliness and organization of interactions between elements on the vertical line.

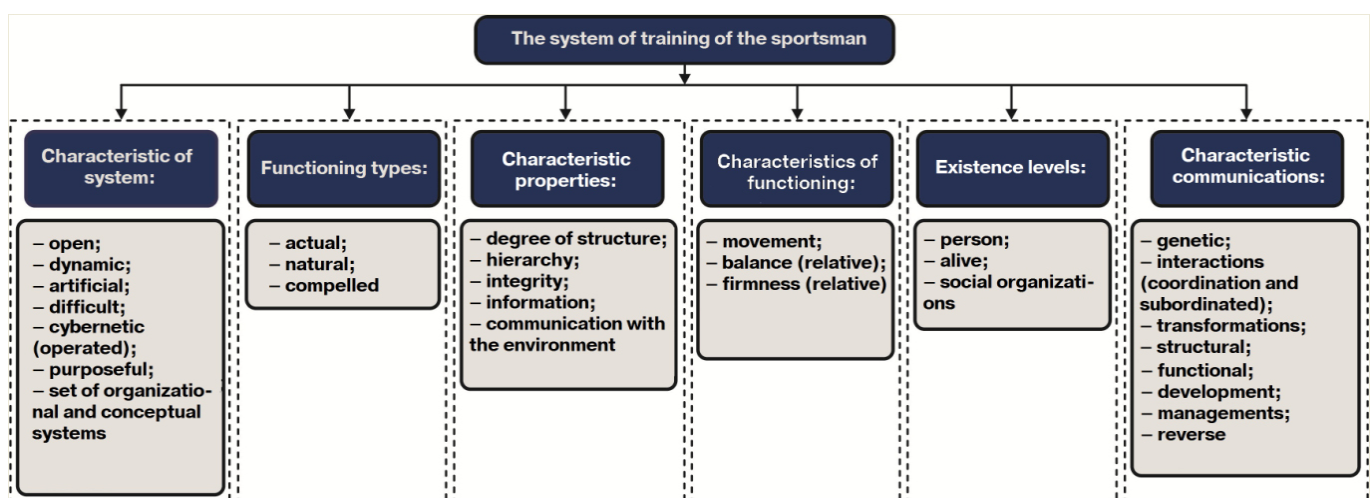


Fig. 3. General characteristic of the system of training of the sportsman

Integrity of the system is defined by the fact that properties of the whole do not consist of properties of its separate structural elements (elements), and their properties at close interrelation and interaction give new properties and qualities to the complete system. Thus, the system as integrity gains the new properties, new qualitative characteristics which are not contained in separate in the structural elements forming it. New integrative properties significantly expand possibilities of the system.

Important characteristic property of the system of training of the sportsman is the information. It is shown by the fact that each structural element of the system is the carrier of certain information on concrete structural education or process.

Information can be expressed in discrete (faltering) and continuous form [4]. The discrete form of information allows expressing quantitatively a number of indicators (pulse rates, rate of movements, quantity of steps, fungi, number of throws, hits, etc.). Continuous information can accept any values, for example, change of body temperature, arterial pressure and time of overcoming pieces of competitive distance. The obtained information allows the coach to correct process of management of sports preparation.

The process of training of the sportsman is inseparably linked with the environment. The accounting of extent of influence of factors of the external environment, at the corresponding approach, allows increasing efficiency of sports training.

The analysis of level of existence of the system of training of the sportsman has shown that on the level of hierarchy of subsystems, openness of system, self-keeping of its structure, its controllability, the system of training of the sportsman belongs to live systems (fig. 3).

As this system is formed by the operating and operated systems, in the person of the coach and the sportsman, to its manifestation of creativity, process of consciousness, thinking is characteristic, the system of training of the sportsman corresponds to the level of "person".

Because of the studied system allows to reach the socially important value (sports result) and difficult human emotions are characteristic to it, this system can be carried to the level of "social organizations".

As functioning the system of training of the sportsman is actual, natural and compelled (fig. 3).

Factuality of the system is defined upon its creation and real functioning for the purpose of achievement of socially-important result.

The natural type of functioning of this system can be determined by features of its formation and by its activity in the conditions which are in harmony with the environment.

The compelled type of functioning of the system of training of the sportsman is connected with professional duty and activity of the trainer, and also interest of the sportsman to increase the level of sporting achievements.

Characteristic of functioning of the system of training of the sportsman is shown in its movement, in relative balance and

firmness (fig. 3). The movement of the system is connected with process of its transition of one state in another that occurs in development of preparedness of the sportsman. The whole system of training of the sportsman is reconsidered with exit to other level of preparedness. The whole system is in the relative balance at the same time at each level of preparedness, at certain stage of time, as a rule, on macrocycle. The system shows firmness in relative balance on the specified period.

The functional association of structural elements of subsystems in the complete system is necessary for full and effective activity of the system. Such association of structural elements, their interference and interaction is carried out by varied in form, direction and types of communications.

Communications between the same and single-row elements are provided with horizontal communications, and between various levels of system – vertical.

High-quality management of activity of system is reached when using direct and return communications.

Objects of communication are classified on such types in difficult system: interaction communications, genetic, transformations, structural, functional, development and managements (see fig. 3).

Communications of interaction between structural elements in the system objects are implemented through coordination and subordinated communications. Coordination communications are carried out both between elements, and between elements and subsystems. As the system of training of the sportsman on the level of existence corresponds to the level of the person and the social organizations, coordination communications take special form. Specifics of these communications are that they are mediated by the aims which are pursued by each of the parties of interaction – the coach and the sportsman. In this regard there can be cooperative and conflict communications between them. Naturally, the big effect is rendered by cooperative communications for the achievement of main objective.

The subordination of communications in the system of training of sportsmen is shown in the natural sequence of formation of new structural associations with new, higher level, qualities on the basis of elements of the previous level.

Genetic linkages are characteristic to organic systems. The operated system (sportsman) is the carrier of genetic information in the system of training of the sportsman. It is known that prospects of the sportsman e in this or that sport are genetically determined [14]. In this regard, this type of communication in the system of sports training is extremely important.

Communications of transformation are type of communication, systems which are implemented at interaction of two or several structural elements in the course of which and thanks to communication between them the structural element gains new, higher level quality.

Structural communications arise in difficult system objects, between big structural elements (subsystems). These communications promote association of subsystems, including subsystems conceptual and organic systems, in the complete

system.

Functional communications are the communications providing activity of organic system, its functioning and its work. Variety of functions of structural formations of this system defines respectively and distinction of communications of functioning in this system.

Communication of development is characteristic of the developing object, in this case, organic, operated system – to the sportsman. There are essential structural and functional changes owing to long-term sports training in organism of the sportsman. The existing forms of functioning of bodies and systems of organism change in the course of its development. In turn, the exit of organism of the sportsman to the new level of functioning demands entering of amendments into the content of structural formations of the system of sports preparation. Thus, communications of development cause the process of change of the whole complete system.

Communications of management are communications which depending on their concrete look are created by kinds of functional communications or communications of development. These communications have the system-formative and integrating character and are implemented through straight line and feedback.

Feedback is the communications, which are going from the operated object to the operating subject or from the environment to the system. They show difference between expected and valid results of impact on the operated system. Feedback is subdivided on positive and negative. Positive feedback arises at compliance of degree and result of this influence, and they promote development of the system. Negative feedback arises in case actions of the system of influence are not effective and do not allow to achieve the goal. In that case stabilization of development of the system occurs.

Violation of feedback involves violation of management of the system, decrease in efficiency of action of the system of influence and activity of the system of training of the sportsman in general.

## Conclusions

The system of training of the sportsman, which is supporting the managing system, operated systems and the system of impact on the operated object is the open, dynamic, multi-component, difficult, and purposeful and artificially created, operated system.

Characteristic properties of this system are degree of structure, hierarchy, integrity, information and communication with the environment.

Effective functioning of this multilevel hierarchy of difficult system is provided by varied in form, contents, direction and types of communications.

The main methodological basis for creation of the system of training of the sportsman and the system approach to it is the way of consideration of process of training of the sportsman as the system venue of which establishment not only unilateral communications between structural formations of the system, but also the accounting of extent of interaction and interrelation between various elements at which not only integrated properties of the system determine content and properties of separate elements, subsystems is characteristic but also, in turn, the characteristic of structural educations influences formation of integrated properties of the complete system.

**Further researches** will be directed to the definition of algorithm and the characteristic of system approach to the process of training of the sportsman.

**Conflict of interests.** The author declares that there is no conflict of interests.

**Financing sources.** This article didn't get the financial support from the state, public or commercial organization.

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Received: 17.01.2017.

Published: 28.02.2017.

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