

# Programming of skilled football players training process in the second cycle of specially created training during the year

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## Abstract

**Purpose:** of the research is to prove experimentally the skilled football players training process in the annual macrocycle on the basis of programming.

**Material:** the skilled football players participated in a research (n=20, age 18-23 years). Control provided use of the following tests: 30 m run; shuttle run 7x50 m; long jump from the spot; Cooper's test.

**Results:** programs of training microcycles were developed. In each program such components of the training were considered: value and orientation of loads; means (non-specific and specific); modes of coordination complexity of exercises performance; training time; time for renewal of competition form, theoretical and psychological preparation; load coefficient value; intensity of training load coefficient.

**Conclusions:** Programming of training process has to be carried out on the basis of systemically structural approach: the development of programs of less structural formations has to be subordinated to the main structural formations. The structure of microcycles includes programs of trainings. Programs of stages consist of a series of training microcycles programs. The program of a training cycle unites all structural formations.

**Keywords:** training process, football players, planning, programming, macrocycle.

## Introduction

The present state of football development demands search of the most optimum ways of the organization of athletes training process at different stages of the annual training cycle.

Creation of training process has to be carried out on the basis of conceptual approach which provides:

- system approach to creation of structural formations of training process (set of exercises and complexes, trainings, micro and mesocycles, stages, periods, macrocycles);

- phasicity of development of athletes' competition form; the highest level of it has to be on the period of the main competitions: planning of athletes' training process has to be carried out on the basis of competitions' calendar;

- accounting of sport development tendencies and created system of athletes training at the stages of long-term training;

- character and features of competitive activity in sport: intensity of sport fight, loss of power during the competition.

Training process of athletes is carried out on the basis of planning: long-term, perspective, annual, set of stages. The planning is previously planned operations procedure necessary for achievement of desired goal. Planning provides quantitative parameters of athletes' training during the certain period of their preparation. There is a question: as far as planning is an effective component in the general structure of administrative decisions?

Planning allows to distribute parameters of athletes' training during a certain cycle. Planning also allows to determine the content of structural formations of training process (training occupations, micro and mesocycles). But it is difficult to consider process of athletes' training in dynamics on the basis of planning, in interrelation with

the different parties of preparation. The main thing is that planning doesn't allow to define purposeful influence on training effects' formation: urgent, delay, cumulative. Programming of training process can be used for this purpose in structure of administrative influences.

Programming is an improvement of training process content according to the target tasks of athletes' training and the specific principles which define rational forms of training loads organization within a certain training stage [2]. Programming began to be used in the course of study in the 20th years of the last century by the American scientists: B.F. Skinner has developed the linear program of study; N. Krauder has developed the branched program of study.

S.V. Malynovskyi was one of the first scientists who introduced programmable study in physical training. The author has developed universal programs of training material study [14]. The basic methodical principles of programming and organization of skilled athletes training process have been created by Yu.V. Verkhoshanskyi [2].

In the system of athletes' training the fundamental problem is provement of programming theoretical and methodical bases at the present stage of sport' development. This problem is studied at the works of native [16, 19] and foreign [22, 23] scientists. Certain aspects of implementation of basic provisions of programming in team game sports were considered by many experts: development of effective programs of athletes' training in field hockey [12], football [13], volleyball [20].

Results of numerous researches of athletes' training problems in team game sports demonstrate prospects of individual programs application. In particular, use of the factorial analysis allows to find the most developed skills of players. It is necessary to develop the backward skills at creation of individual training process [9]. Experts note the necessity of individual approach to planning of volumes and intensity of achievement training loads. Its adaptation is significantly limited by individual capability of athletes [31].

Development and implementation of training programs of selective orientation are characteristics features of sport games. Efficiency of speed and strength skills improvement is proved as main for the achievement of good results in basketball [3]. It is recommended to use loads of strength [25, 34], anaerobic [32] and aerobic [36] orientations for rational training of football players. Training programs for the different categories of readiness is applied in practice of athletes' training of team game sports [12, 21]: technical and tactical [7, 29], physical [33, 34]. In the system of a sports training deserve attention: the flowchart of programming of skilled athletes' training [10]; programs of pedagogical [15, 28] and medico-biological [24, 35] control.

The research of programming problem is relevant in practice of football players' training of different qualification. S. Yu. Tyilenkov [17] has developed programs of football players training of high qualification at the different stages of annual training cycle. M.A. Bukuyev [1] studied technique of landmark programming of training loads. V.M. Shamardinim [18] investigated the management technology of long-term training system of the football teams of the top qualification. The author proved two versions of training programs for football team which participates in Eurocups.

Researches of foreign scientists were devoted to the problem of programming of skilled football players training process. The famous Dutch trainer R. Michels [30] developed the basic tactics principles of total football on the basis of programming. Programs of the differentiated approach in the training process of football players were investigated by H. Kormelink, T. Seeverens [26, 27]. Famous Canadian expert T. O. Bompa revealed the system of a complex training on the basis of programming [22].

The carried out analysis of references allows to claim that the problem of training process' creation of athletes on the basis of programming is relevant and perspective. At the same time it should be noted that development and provention of methodical approaches concerning creation of training process of the skilled football players on the basis of programming within an annual macrocycle are almost unresolved.

*Hypothesis.* It is provided that creation of skilled football players training process on the basis of programming will increase its efficiency.

*The purpose of the research* is to prove experimentally the skilled football players training process in annual macrocycle on the basis of programming.

#### Material and methods.

The qualified football players of Kamyanets-Podilsky Ivan Ohienko National University participated in a research (n=20, age 18-23 years). All participants gave a written approval of participation in this experiment.

*Organization of a research.* The research was conducted within two years. In the course of pedagogical observation over training activities of football players realized timing of trainings (fixing of character and time of exercises). The heart rate (HR) was simultaneous

registered. The monitor of heart rate Polar Rs800cx was used.

The analysis of output data allowed to define:

- 1) pedagogical directivity of means:
  - nonspecific exercises (without balls) or specific (with balls), general training, special training, preliminary or competitive exercises, speed, speed and strength preparedness [12, 16];
  - mode of coordination complexity. The technical and tactical actions (TTA) belonged to the first mode of coordination complexity (MCC) which executed on the spot or on convenient traverse speed. TTA executed in movement with restriction in space and time belonged to the second MCC. TTA executed in the conditions of the active counteraction from the rival [12, 28] belonged to the third MCC;
- 2) physiologic directivity of loads: loads of an aerobic, mixed aerobic and anaerobic, anaerobic alactic or anaerobic glycolytic orientation [4, 16, 35];
- 3) load value coefficient was defined according to the formula [6, 12]:

$$LMC = \sum_{i=1}^n t_i \cdot I_i, \quad (1)$$

where:  $LMC$  – load value coefficient;  $n$  – number of exercises;  $t_i$  – duration of separate exercise;  $I_i$  – intensity of exercise depending on HBR [6, 12]: intensity of exercise with HBR 114 bpm<sup>-1</sup> is evaluated in 1 point; 120 bpm<sup>-1</sup> – 2 points; 126 bpm<sup>-1</sup> – 3 points; 132 bpm<sup>-1</sup> – 4 points; 138 bpm<sup>-1</sup> – 5 points; 144 bpm<sup>-1</sup> – 6 points; 150 bpm<sup>-1</sup> – 7 points; 156 bpm<sup>-1</sup> – 8 points; 162 bpm<sup>-1</sup> – 10 points; 168 bpm<sup>-1</sup> – 12 points; 174 bpm<sup>-1</sup> – 14 points; 180 bpm<sup>-1</sup> – 17 points; 186 bpm<sup>-1</sup> – 21 points; 192 bpm<sup>-1</sup> – 25 points; 198 bpm<sup>-1</sup> – 33 points;

- 4) training load intensity coefficient was defined according to the formula [12, 28]:

$$IC = \frac{LMC}{T}, \quad (2)$$

where:  $IC$  – training load intensity coefficient;  $T$  – time of training.

Data on the each training have been written in the scheme of a microcycle [12]. As a result of synthesis of the obtained data it has been defined: volume, value and intensity of training loads; ratios of means and loads of different orientation in separate structural formations of training process.

Use of modeling methods at the forming stage of experiment has allowed to develop models of structural formations programs of training process.

Development of structural formations programs of training process of the skilled football players was based on the system conceptual approach and was carried out according to the scheme: the choice of model of an annual macrocycle (special planning has been chosen) □ development of the program of each of preparation cycles □ development of the training program of (competitive) microcycles □ development of programs of separate

trainings. Such approach to creation of training process has allowed to plan optimum training influences by application of loads of different orientation, different means of training and different types of training of the skilled football players.

The program of a separate macrocycle of the skilled football players consisted of four blocks. In these blocks presented: terms of carrying out periods or stages of preparation; general parameters of trainings (training days, training occupations, games); ratio of training means and loads of different orientation; criteria of players preparedness [13].

Control of players' physical preparedness indicators was executed at the all stages of a pedagogical experiment. Control provided tests which meet the requirements of reliability and informational content and are applied in practice of skilled football players training [6, 12, 18]: 30 m run, shuttle run 7x50 m, long jump from the spot, Cooper's test. Testing was carried out according to the standard technique in the main part of training after obliging warm-up. Athletes were previously provided instructions concerning correctness of test performance.

For 30 m run was considered the best result of the player from two attempts (rest between attempts was 3-5 minutes). Shuttle run 7x50 m provided passing by football player 50 m distances with obliging condition that the supporting leg put over the line of start and finish. Three attempts were provided for the athlete to perform a long jump from the spot and the best result was fixed. Cooper's test for evaluation of the general endurance of football players provided continuous run during 12 minutes with definition of distance which was passed by the player (firstly 15 minute warm-up was carried out, then was 5 minutes rest and after that the test was carried out).

**Statistical analysis.** The descriptive statistics was used during processing results of research. It were defined indicators which characterize selection of objects (an arithmetic average, an average square deviation), Shapiro-Wilkie criterion of coherence, Student's t-test parametrical criterion. The difference between indicators was considered reliable on significance value  $p < 0,050$ . Processing of results of research was carried out with the help of software Excel, Statistica 10.0.

### Results.

The program of the second cycle within annual training of the skilled football players at the forming stage of experiment (123 days) is presented in fig. 1.

The programs of training microcycles were developed on the basis of the second cycle program of skilled football players training (tabl.1) In each program of training microcycles were considered the following components of trainings: value and orientation of loads; means (nonspecific and specific); modes of coordination complexity of exercises' performance; training time; time for renewal of competition form, theoretical and psychological preparation; load coefficient value; intensity of training load coefficient.

Each program of training microcycle consisted in loads of different orientation and volume and intensity of trainings (fig. 2).

In general for the 2nd cycle of annual training of the skilled football players training influences were stipulated by application of glycolytic loads: 55,7% of aerobic, 37,9% of mixed, 3,5% of anaerobic alactic and 4,5% of anaerobic.

The biggest volume of the general physical training means (GPT) was observed at the preparatory period (56,3%) and at the intermediate stage (100,0%). Means of the special physical training (SPT) were mostly used at the preparatory period (17,8%). At the competitive period the biggest part was means of technical and tactical (TTP) (28,6%) and game (GP) (19,7%) preparation. Content of training influences on the preparatory of players during the 2nd cycle of annual preparation has been stipulated by means: GPT – for 49,2%; SPT – for 8,5%; TTP – for 25,1%; GP – for 17,3%.

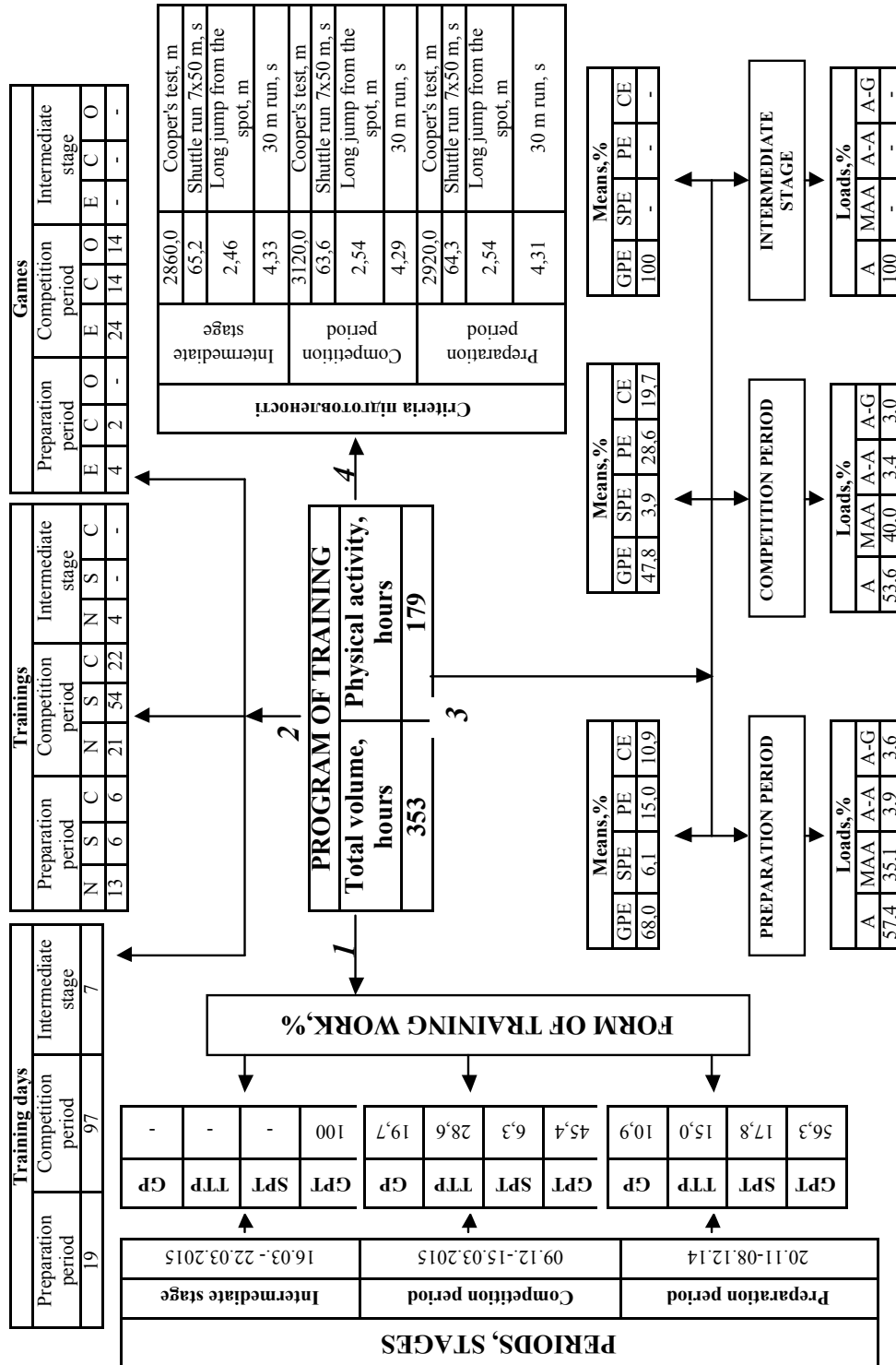
The analysis of control tests' results at forming stage of experiment has confirmed efficiency of programming of skilled football players training process.

In comparison with statement stage of experiment were positive changes in speed and strength qualities' indicators at the preparatory and competitive periods; special and general endurance. At the preparatory period indicators of 30 m run have increased by 2,1% ( $p < 0,050$ ), a long jump from the spot – by 2,8% ( $p < 0,050$ ), shuttle run 7x50 m – by 3,2% ( $p < 0,050$ ), Cooper's test – by 4,8% ( $p < 0,050$ ). Positive dynamics in results of football players preparedness was observed also during the competitive period. Decrease in indicators of preparedness at intermediate stage is connected with considerable reduction of loads volumes.

### Discussion.

The analysis and comparison of the obtained data allows to state exclusive practical value of use of the offered systemical and conceptual approach to the development of programs of training of football players. It is connected with the fact that researches concerning problems of realization in practice of reasonable theoretic and methodical provisions of programming of football players training are limited [17]. In comparison with model and target approach [11, 12] the programming allows to plan optimum training influences. Programming is carried out by a variation of load components and training means at the different stages of annual and long-term training of football players.

Current trends of team game sports' development stipulated the necessity of application of integrated scientifically-based approach [7, 9, 12]. The offered technique of programming of the skilled football players training is the perspective direction of training process' optimization: programs of trainings, micro and mesocycles, stages and periods of annual macrocycle weren't limited by selective influence on the separate sides of preparation. The received results were compared with other researches [25, 29, 32, 33]. The offered program



**Fig. 1.** The program of training of the qualified football players in the second cycle within training year at a stage of a forming experiment: trainings: N – nonspecific, S – specific, C – complex; games: E – educational, C – control, O – official; forms of training work: GPT – the general physical training, SPT – special physical training, TTP – technical and tactical preparation, GP – game preparation; means: GPE – general preparatory exercises, SPE – special preparatory exercises, PE – preliminary exercises, CE – competitive exercises; loads: A-A – anaerobic lactic, A – aerobic, MAA – mixed aerobic and anaerobic, A-G – anaerobic glycolytic.

**Table 1.** The fragment of 6-day preliminary microcycle program of the 2nd cycle of annual training of football players at the stage of forming experiment

Forms and components of trainings			Training days						
			First		Second		Third		
			MT	ET	MT	ET	MT	ET	
Value of loads			A	A	A	B		B	
Orientation			AA- MX	A- MX	AA- MX	A- MX		AG-MX	
Non-specific	General preparatory exercises	AR	8 <sup>4</sup>	6 <sup>4</sup>	6 <sup>4</sup>	6 <sup>4</sup>		6 <sup>4</sup>	
		Str.	8 <sup>2</sup>	6 <sup>2</sup>	6 <sup>2</sup>	6 <sup>2</sup>		6 <sup>2</sup>	
		RE	8 <sup>8</sup>	6 <sup>8</sup>	6 <sup>8</sup>	6 <sup>8</sup>		6 <sup>8</sup>	
		GDE							
		Atl.			12 <sup>3</sup>				
		SP			16 <sup>4</sup>				
	Special preparatory exercises	SPT	SSP						
			SE						
			3B						
		TTP	SSP	16 <sup>12</sup>					
			SSSP		18 <sup>14</sup>				
			SE			16 <sup>7</sup>			22 <sup>17</sup>
Preliminary exercises	TTP	standard provisions			16 <sup>5</sup>		12 <sup>5</sup>		
		1-st MCC	12 <sup>5</sup>	12 <sup>5</sup>	6 <sup>5</sup>	8 <sup>6</sup>	12 <sup>5</sup>		
		2-nd MCC	22 <sup>8</sup>	12 <sup>8</sup>		8 <sup>8</sup>	12 <sup>10</sup>		
		3-rd MCC		12 <sup>10</sup>		4 <sup>10</sup>	12 <sup>12</sup>		
Means Specific exercises	Competitive exercises	GP		20 <sup>8</sup>					
		CP				60 <sup>10</sup>			
Renewal, minutes			15	15	15	15		15	
Theoretical and psychological preparation, minutes			30	30	30	45	60	30	
Time of training, minutes			74	92	84	98		88	
LVC, points			540	772	670	836		842	
C <sub>iii</sub> point×min <sup>-1</sup>			7,3	8,3	7,9	8,5		9,6	

Notes: MT – morning training; ET – evening training; loads value: A – average, B – big; orientation of load: AA – anaerobic alactic, A – aerobic, MX – is mixed aerobic anaerobic, AG – anaerobic glycolytic; means: GPT – general physical training, SPT – special physical training, TTP – technical and tactical preparation; LVC – load value coefficient; C<sub>iii</sub> – coefficient of training load intensity; AR – aerobic run; Str. – stretching; RE – running exercises; GDE – general developing exercises; Atl. – athleticism; SP – speed preparation; SSP – speed and strength preparation; SE – speed of endurance; SSP – special speed preparation; SSSP – special speed and strength preparation; SE – special endurance; MCC – mode of coordination complexity; GP – game preparation; CP – competitive preparation; record like “8<sup>4</sup>” – where, 8 – time of exercise in min., 4 – intensity of exercise in points according to V.M. Sorvanov (1978).

consisted of generally prepared, specially prepared, preliminary, competitive means and loads of different orientation. They were used for improvement of the general and special physical, technical, tactical and game preparation of football players. Such means and loads which are rationally connected to the means of physical efficiency renewal of players: control system; means of theoretical and psychological preparation. Integrated scientifically-based approach at creation of microcycles programs at the forming stage experiment provided such basic provisions and regularities as [4, 6, 8, 16]:

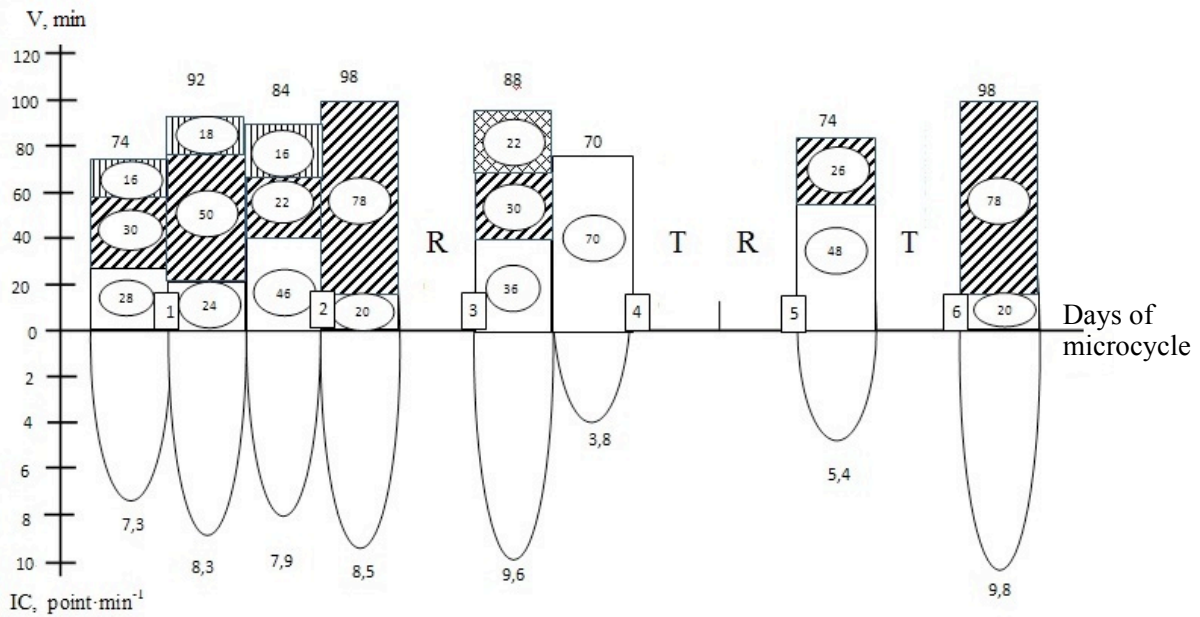
- each microcycle (except the renewal) has to consist of two phases – stimulation (connected with performance of determined volume and orientation of load) and renewal;

- within separate microcycles there is an interaction of the set aside training effects of each previous occupation with urgent training effect of the next occupations;

- changing of occupations in a training microcycle has to consider a renewal heterochronia of different functions. Changing of occupations in a training microcycle has to be carried out in the following way: loads are planned by time intervals sufficient for achievement of supercompensation phase of the leading function; load of other training influence shouldn't have negative impact on renewal of dominant function.

Programming of structural formations of training process has allowed to define: volume, intensity and volume of load; ratios of means and loads of different





**Fig. 2.** The volume, intensity and orientation of trainings of 6-day preliminary microcycle of the 2nd cycle of annual training of the skilled football players at a stage of forming experiment:

V – volume (min);

CI – coefficient of intensity (point×min<sup>-1</sup>);

R – rest;

T – theoretical occupation;

□ – aerobic loads;

▨ – mixed aerobic and anaerobic loads;

▧ – anaerobic alactic loads;

▩ – anaerobic glycolytic loads.

orientation in separate trainings, microcycles, stages and periods.

Results of research confirmed phasicity of athletes' competitive form development [12, 16, 18]. The developed system of training process provided development of preparation programs with such condition that each of phases of competitive form correspond to certain stage of training cycle: at the preparatory period were solved tasks of competitive form formation; in competitive – its keeping and the subsequent increase; at a intermediate stage – temporary loss.. Therefore the concept of planning of skilled football players training process provided:

1) increase in volumes of specific means of trainings from microcycle to microcycle during the preparatory period; an optimum ratio of nonspecific and specific means in the competitive period;

2) gradual inclusion to the training process of anaerobic alactic and then anaerobic glycolytic loads (for maintenance of condition of players' competitive form such loads were planned also in the competitive period) against the background of the sufficient volume of aerobic loads.

The analysis of dynamics of physical preparedness indicators of the skilled football players at stages of

macrocycle displays phases of players' competitive form formation.

The program of the second cycle of annual preparation has been developed for the purpose of effective preparation and participation in competitions of futsal. These competitions were mainly carried out in winter months. The structure and content of training process provided features of players' competitive activity in a futsal. On the other hand it was provided that loads on the volume and intensity had to be easier from the first and third cycles of annual preparation. The second cycle of preparation had supporting character. First of all it has been caused by features of competitions calendar of the college football teams on the basis of which shorter intermediate stages of the first and second cycle of annual preparation have been planned. The received results were compared with researches of V.M. Shamardin [18]. At the preparation period of the second macrocycle it is found big loads of aerobic orientation and smaller loads of anaerobic. The received results confirm the previous researches [11, 12, 28] concerning ratio of training's means of the skilled football players in the periods of the second macrocycle.

The optimum ratio of training work means and

loads of different orientation allows to optimize process of training of the skilled football players. The received results of a research have confirmed a hypothesis: creation of training process of the college football teams on the basis of programming is effective.

### Conclusions.

1. The research of optimum ways of creation of training process of training of athletes is important at the present stage. Programming is one of structural formations of the training process.

2. Programming of athletes' training process has to be carried out on the basis of systemical and structural approach: development of programs of less structural formations has to be subordinated to main structural formations. Thus, programs of training occupations formations included into structure of microcycles. Programs of stages consist of series of training microcycles programs. The program of a training cycle unites all structural formations.

3. Programming allows to determine accurately the volume and orientation of training influences (both in the course of the separate training occupations, and within microcycles, stages of an annual macrocycle), purposefully to form training effects. The programs of structural formations of skilled football players training

process were developed and experimentally proved in the course of the research.

4. The subsequent researches of scientific problem will be directed to programming of training process of football players of different qualification.

*Special moments.* Programming of training process is one of perspective methodical approaches in the course of athletes' training. Programming has differences from planning of training process. Programming allows to form training effects purposefully: urgent, set aside, cumulative. First of all it is caused by programs of trainings and training microcycles. The main structural unit of training programs is model training tasks. Such tasks aren't considered in this article.

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### Conflict of interest.

The authors state that there is no conflict of interest.

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