TRAINING PROCESS PROGRAMMING OF QUALIFIED FOOTBALL PLAYERS IN HIGHER EDUCATION ESTABLISHMENTS

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Abstract

Relevance. Modern trends in the athletes’ training need to find new ways to improve the structure and content of different structural units of the training process. One of the most effective theoretical and methodological approaches in the athletes’ training is programming. The purpose is to launch structural units program of the training process and, on this basis, to increase the efficiency of qualified football players training in the annual macrocycle in terms of higher educational establishments. Results. Research was conducted in student football team. Age of players is 18–23 years old. Sports qualification – candidate masters, athletes of the first category. The study had been conducting during two years. In the first year, a confirmatory experiment was conducted, in the second – forming. Structural units programs of qualified football players training process were launched and experimentally grounded. On the basis of the main competitions calendar, the replayed training cycle of qualified football players was planned. The program of each cycle of the annual macro cycle consists of four blocks: the duration of the preparation, competitive periods and the transition phase; quantitative indicators of trainings; the ratio of training work means and training loads of different orientations; criteria of athletes’ preparation. Conclusions: it is established that the construction of the training process on the basis of structural units programming of the training process allows optimizing managerial influences at different stages of the annual macro cycles, depending on the three phases of the sports form of skillful football players.

Key words: footballers, training process, programming, macrocycle.

Віктор Костюкевич, Вадим Стаюк. Програмування тренувального процесу кваліфікованих футболістів в умовах вищих навчальних закладів. Актуальность. Сучасні тенденції підготовки спортсменів потребують пошуку нових способів удосконалення структури й змісту різних структурних утворень тренувального процесу. Одним із найбільш ефективних теоретико-методичних підходів у системі підготовки спортсменів є програмування. Мета статті – розробити програми структурних утворень тренувального процесу та на їх основі підвищити ефективність підготовки кваліфікованих футболістів у річному макроциклі в умовах вищих навчальних закладів. Результати. Дослідження проводили в студентській футбольній команді. Вік футболістів – 18–23 роки. Спортивна кваліфікація – кандидати в майстри спорту, спортсмени першого розряду. Дослідження проводили протягом двох років. На першому році проведено констатуючий експеримент, на другому – формувальний. Розроблено та експериментально обґрунтовано програми структурних утворень тренувального процесу кваліфікованих футболістів. На основі календаря основних змагань сплановано потрібний цикл підготовки кваліфікованих футболістів. Програма кожного циклу річного макроциклу складається з чотирьох блоків: тривалості підготовчого, змагального періодів і переходного етапів, кількісних показників тренуваної роботи, співвідношення засобів тренувальної роботи й тренувальних навантажень різної спрямованості, критеріїв підготовленості спортсменів. Висновки. Установлено, що побудова тренувального процесу на основі програмування структурних утворень тренувального процесу дає змогу оптимізувати управлінські впливи на різних етапах річного макроциклу залежно від трьох фаз спортивної форми кваліфікованих футболістів.

Ключові слова: футболісти, тренувальний процес, програмування, макроцикл.

Віктор Костюкевич, Вадим Стаюк. Програмування тренувального процесу кваліфікованих футболістів в умовах вищих навчальних закладів. Актуальность. Сучасні тенденції підготовки спортсменів потребують пошуку нових путей по совершенствованию структуры и содержания различных структурных образований тренировочный процесса. Одним из самых эффективных теоретико-методических подходов в системе подготовки спортсменов является программирование. Цель статьи – разработать программы структурных образований тренировочного процесса и на их основе повысить эффективность подготовки квалифицированных футболистов в годовом макроцикле в условиях высших учебных заведений. Результаты. Исследование проводилось в студенческой футбольной команде. Возраст футболистов – 18–23 года. Спортивная квалификация – кандидаты в мастера спорта, спортсмены первого разряда. Исследование проводили в течение двух лет. На первом году проведен констатирующий эксперимент, на втором – формирующий. Разработаны и экспериментально обоснованы программы структурных образований тренировочного процесса квалифицированных футболистов. На основе календаря основных соревнований спланирован потренированный цикл подготовки квалифицированных футболистов. Программа каждого цикла годичного макроцикла состоит из четырех блоков: продолжительности подготовительного, соревновательного периодов и переходного этапа, количественных показателей тренировочной работы, соотношение средств тренировочной работы и тренировочных нагрузок различной направленности, критериев
Introduction. In recent times, organization of the training process of athletes is mainly carried out on the basis of the theory of periodization [1; 5, 9; 11; 12–14; 21; 27].

Depending on the calendar system of competitions, the preparation of athletes in team sports takes place in one-cycle, in two and in three cycles models [4, 6, 9, 10, 18; 20]. It is worth noting that two and three-cycle models of the training process in the framework of the annual training cycle are specific for high-skilful football players. As a rule, in the leading football countries: England, Spain, Germany, Italy, France and others during the last 20 years at the competitions in high divisions, a two-cycle model is used [4; 16; 1; 19; 21]. The two-cycle model of the training process involves competitions under the autumn-spring scheme. In competitions during the spring-autumn stage of the annual training cycle, the preparation of football players is carried out within the limits of one-cycle model [4; 6; 11; 14; 18; 24]. Mostly under this model a training process is organized. This training process is for skillful football players who take part in competitions at the level of youth teams, city championships, and region championships. The subject of this study is an analysis of the training process programming of student football teams. That is, on the one hand, based on the calendar of competitions, it is necessary to determine, from the point of view of the periodization theory, the appropriate model of the training process organization of student football teams within the annual macro cycles, and, on the other, to substantiate the effectiveness of constructing structural units of the training process (lessons, microcycles, mesocycles, stages, periods) on the basis of programming.

Literary resources analysis [9; 10; 16; 18] allowed confirming the prediction that the problem of training process organized for qualified football players in higher education establishments is not sufficiently studied. One of the ways of its solution is the use of programming of structural units of the training process taking into account the main provisions of the theory of periodization [2; 3; 8; 15; 19; 21; 26].

Connection of Research with Scientific Plans, Themes. The research was carried out on the topic «Theoretical and methodological foundations of individualization in physical education and sports» (state registration number 0112U002001) according to the integrated plan of research work of the Ministry of Science, Youth and Sports of Ukraine for 2011–2015.

The Purpose of the Research is to develop programs of structural education of the training process and, on the basis of them, to increase the efficiency of training of qualified football players in the annual macro cycles in higher education institutions.

Organization of Research. The research was conducted at the student football team, which participated in the regional championship among the teams of the 1st group on football and mini-football, as well as in the competitions of the student football league of Ukraine. Age of players is 18–23 years old. Sports qualification – candidates master, athletes of the first category. The study was conducted during two years. During the first year, the stated experiment was conducted, during the second year – forming.

Research Methods. In the process of research, the following methods were used: the analysis of scientific and methodological literature – the relevance of the research was determined, the directions of scientific research on this problem were analyzed by national and foreign scientists; Pedagogical observation – defined parameters of training work of qualified football players; Control tests – defined indicators of players’ preparedness at different stages of the training cycle; Video shooting – an analysis of the competitive activities of teams and players; Modeling – developed models of programs of structural units of the training process; Methods of mathematical statistics. Descriptive statistics, sampling method, Shapiro-Wilk consistency criterion, Student's parametric criterion, and Mann-Whitney's nonparametric criterion were used. Mathematical processing of the results of the study was carried out using software packages MSExsel, Statistica 10.0.

Results of the Research and Discussion. The hypothesis of this study involved the experimental programming of the training process of qualified football players in conditions of higher educational establishments.

At the stage of the forming research experiment, programs of individual training tasks were developed, the structure of which consisted of general-preparatory, special-preparatory, subordinate (auxiliary) and competitive exercises. On the basis of programs of training tasks, programs of training sessions, which were included into the structure of training microcycles (fig. 1), were developed. The developed microcycle programs formed the basis for planning training work and competitive activities of skillful players at the stage of the forming experiment.
The main objectives for each microcycle were: the formation of urgent and retired training effects, adapting players to training and competitive loads, improving technical and tactical skills.

Microcycle programs have become the basis for developing programs for individual stages of training skillful football players in the annual training cycle.

On the basis of the calendar of competitions of the soccer team «Thunderbird (Burevisnyk)» of the
Kamyanets-Podilsky Ivan Ohienko National University in the 2014–2015 campaign, the team’s cycle of training was developed (fig. 2).

| Cycle | I | II | III |
|-------|---|----|-----|
| Months | 03.08 – 31.08.14 | 13.11 – 21.11.14 | 16.03 – 22.03.15 |
| | 01.09 – 12.11.14 | 22.11 – 08.12.14 | 23.03 – 07.04.15 |
| | 16.03 – 22.03.15 | 09.12 – 15.03.15 | 08.04 – 19.07.15 |
| | 09.12 – 15.03.15 | 16.03 – 22.03.15 | 20.07 – 02.08.2015 |
| Periods | 1–st preparatory stage | 2–nd preparatory stage | 3–rd preparatory stage |
| | 3–rd competitive stage | 3–rd competitive stage | 3–rd transitional stage |
| | 3–rd competitive stage | 3–rd transitional stage | |

The main goal of the first cycle was the preparation and participation of the team in the first round of the championship of the Khmelnytsky region and the student league of Ukraine in the first round of the championship (the duration of the first cycle was 108 days). In the process of the second cycle (123 days), the preparation and holding of games of the championship and the Cup of Khmelnytsky region on football was carried out.

The training process of the team during the third cycle (134 days) was aimed at preparing and participating in the second round of the championship of the Khmelnytsky region on football.

For each cycle of the team’s annual training, a training program was developed (fig. 3). The program consists of four blocks. The first one presents the duration of the preparatory, competitive periods and the transition phase, the types and the correlation of the training of qualified football players. The second block contains quantitative indicators: training days, training sessions (nonspecific, specific and complex), games (educational, control and official). In the third block the correlation of means (general preparation, special-preparatory, competitive) and training loads (aerobic, mixed, anaerobic, lactatious, anaerobic glycolytic) in preparatory, competitive stages and transitional stage are presented. The fourth block is characterized by criteria of high–speed, speed–force training, as well as special and general endurance.

The content part of the program consisted of retractable, shock, submersible, competitive, intermixed and rebuilding microcycles. The structure of each microcycle consists of the types and components of the training work – the magnitude of the load, orientation, specific and non-specific exercises, the time allocated for restoration, theoretical and psychological training. In each microcycle, the coefficient of load size (CLS) and the intensity of the training load CI T.n. were determined. To determine the CLS of each training session or game and a certain type of microcycle, the methodical approach offered by V. N. Sorvano (1978) was used. Exercise, performed with heart rate (heart rate) 114 beats for a minute was estimated at 1 point; 120 – 2 points; 126 – 3 points; 132 – 4 points; 138 – 5 points; 144 – 6 points; 150 – 7 points; 156 – 8 points; 162 – 10 points; 168 – 12 points; 174 – 14 points; 180 – 17 points; 186 – 21 points; 192 – 25 points; 198 – 33 points. Based on the estimation of the intensity of the exercise, the coefficient of load size was determined.

\[
KBH = \sum_{i=1}^{n} t_i \cdot I_i, 
\]

where: \( t_i \) – duration of exercise (min); \( I_i \) – intensity of exercise (ball).

For the magnitude of the training effect in a training session (game) or microcycle, CIT.n. was determined.

\[
KI_{m,n} = \frac{\sum_{i=1}^{n} t_i \cdot I_i}{\sum_{i=1}^{n} t_i}, 
\]

where: CIT.n. – Coefficient of intensity of training load; \( \sum_{i=1}^{n} t_i \cdot I_i \) – Value of load in balls; \( \sum_{i=1}^{n} t_i \) – the duration of the training session.

*Identical programs have been developed for the second and third cycle. The limited amount of an article does not allow them to be presented in the text.
Fig. 3. The Program of Training of Qualified Football Players in the Second Cycle During the Training Year at the Stage of the Forming Experiment
Such an approach to the programming of structural units of the training process allowed planning not only the ratio of training loads of different orientations, but also the magnitude of training effects (fig. 4).

![Fig. 4. The Volume, Intensity and Direction of Training of a 5-day Shock microcycle of the 1-st Cycle of Annual Training of Skillful Players at the Stage of the Forming Experiment](image)

- aerobic loading;
- mixed loads;
- anaerobic-alactate stresses;
- anaerobic-glycolytic stresses.

Programming of annual training, carried out on the basis of rational use of training equipment, loads of different orientation and types of training players allowed to optimize the training process and improve the effectiveness of managerial influences in the university football system.

As for the indicators of training work during the year, in general, the motor activity of the players of the student football team was 32,074 minutes (535 hours), of which 10,184 minutes (170 hours) were assigned to the 1-st cycle, 10,753 (179 hours) to the 2-nd Cycle and 11,137 mines (186 hours) – for the 3-rd cycle of annual training.

The amount of training facilities for skillful players in the annual training cycle at the stage of the forming experiment is presented in the tabl. 1.

During the year in the training process the ratio of nonspecific and specific exercises is approximately the same, 50,9 and 49,1 %. General training exercises were most used in the 2-nd cycle of annual training (53,3 %), specially – preparatory exercises – in the first cycle (5,6 %), subordinate (auxiliary) in the 2-nd cycle (25,1 % ), Competitive – in the 1st cycle of annual training of skillful players.

| Training Year Cycle | Amount of Funds, min. (%) | Total min, (%) |
|---------------------|---------------------------|---------------|
|                     | Nonspecific               | Specific      |               |
|                     | General Preparatory       | Special Preparatory | Auxiliaries | Competitive |
| 1-st cycle          | 4967 (46,7)               | 569 (5,6)     | 2494 (24,4) | 2154 (23,3) | 10184 (31,8) |
| 2-nd cycle          | 5737 (53,3)               | 462 (4,3)     | 2694 (25,1) | 1860 (17,3) | 10753 (33,5) |
| 3-rd cycle          | 5626 (50,5)               | 482 (4,3)     | 2705 (24,3) | 2324 (20,9) | 11137 (34,7) |
| In all              | 16330 (50,90)             | 1513 (4,8)    | 7893 (24,9) | 6338 (19,4) | 32074 |

**Table 1**

The Amount of Training Facilities for Skillful Football Players in the Annual Training Cycle at the Stage of the Forming Experiment
A significant difference in the redistribution of training loads of different orientations between the 1st, 2nd and 3rd cycles of annual training is practically not established (table 2). Aerobic loads ranged from 52.4 (1st cycle) to 55.7 % (2nd cycle), mixed – from 37.9 (2nd cycle) to 39.7 % (3rd cycle), anaerobic alactatic – from 3.5 (2nd cycle) to 5.0 % (1st cycle), anaerobic glycolytic – from 2.6 (2nd cycle) to 2.9 % (1st cycle).

**Table 2**

| Training Year Cycle | Amount of funds, min (%) | Total min, (%) |
|---------------------|--------------------------|---------------|
|                     | Aerobic | Mixed | Anaerobic Alactatious | Anaerobic Glycolytic |
| 1-st cycle          | 5335 (52.4) | 4039 (39.7) | 506 (5.0) | 304 (2.9) | 10184 (31.8) |
| 2-nd cycle          | 5992 (55.7) | 4079 (37.9) | 372 (3.5) | 310 (2.9) | 10753 (33.5) |
| 3-rd cycle          | 5877 (52.8) | 4419 (37.9) | 541 (4.9) | 300 (2.6) | 11137 (34.7) |
| In all              | 17204 (53.6) | 12537 (39.1) | 1419 (4.4) | 914 (2.9) | 32074 |

In general, for the annual training cycle, the proportion of aerobic loads was 53.6 %, mixed – 39.1 %, anaerobic alactatic – 4.4 % and anaerobic glycolytic – 2.9 %.

Regarding the distribution of different types of training of qualified football players within the training year (table 3), the total training was 60858 minutes (1014 hours), among which 17585 minutes (293 hours) were spent on theoretical and psychological training, 11 199 minutes (187 hours) was used to restore the sports performance of players.

**Table 3**

| Training Year Cycle | Types of Training, min (%) | Total min, (%) |
|---------------------|---------------------------|---------------|
|                     | General Physical Training | Special Physical Training | Technical and Tactical Training | Game Preparation | Theoretical and Psychological Preparation | Restoration | The Total Amount / Motor Activity |
| 1-st cycle          | 4406 (43.3) | 1128 (11,1) | 2496 (24.5) | 2154 (21.1) | 5805 | 3004 | 18893/10184 (31.8) |
| 2-nd cycle          | 5286 (49,2) | 913 (8,5) | 2694 (25,1) | 1860 (17,2) | 5930 | 4520 | 21203/10753 (33,5) |
| 3-rd cycle          | 4911 (44,1) | 1196 (10,7) | 2706 (24,3) | 2324 (20,9) | 5850 | 3675 | 20662/11137 (44,7) |
| In all              | 14603(45,5) | 3237 (10,1) | 7896 (24,6) | 6338 (19,8) | 17585 | 11199 | 60858/32074 |

Means of direct motor activity of qualified players were divided into GPT(45.5 %), SPT (10.1 %), TTT (24.6 %) and GP (19.8 %). It should be noted that approximately the same trend is observed during each of the three cycles of annual training.

Thus, microcycle program, the structure and content of which took into account the types and components of training work were developed and implemented in the training process of qualified footballers, they have allowed increasing the effectiveness of the training process of football teams in higher education institutions.

**Conclusions.** At the present stage the construction of the training process of qualified athletes within the year is carried out mainly on the basis of the theory of periodization of sports training. Athletes of team playing sports including football are characterized as one cycle, two-and three-cycle schemes for training process organization in the annual macro cycles.
It is established that programming is one of the best ways to increase the effectiveness of the training process of skillful football players. Programming of the training process of qualified football players should be done taking into account the main provisions of the theory of periodization.

Programming of the training process of athletes should be determined by: a hierarchical structure in which smaller structures are subordinate to larger, for example, microcycles to mesocycles or stages; target units according to each stage of the annual training cycle; algorithmicity – step by step planning and correction of managerial influences.

Further research will be aimed at programming the training process of players of different qualifications.

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