

## PROGRAM OF CONDITIONNING FOR FOOTBALL REFEREES

Victor Romanuk<sup>1</sup>, Victoria Petrovich<sup>1</sup>, Vadim Smoluk<sup>1</sup>, Igor Bychuk<sup>1</sup>

<sup>1</sup>Lesya Ukrainka Eastern European National University, city Lutsk, Ukraine, romanukvictor96@gmail.com

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### Abstracts

**Novelty.** Level of football referee conditioning directly influence on quantity and quality of lapses in judgment. So, design and implementation of effective training programs in pipe-line of referee is actual. **Purpose of research:** to prove the effectiveness of experimental program of football referee conditioning. **Method of research:** the reaction of organism on training loading was studied by pulsometer Polar M 200. The average age of experimental subject was 30 years. The program was tested on 10 referees. The first stage was planning. During second stage the theoretical design of experimental program was done. The third stage was a practical testing of program. The effectiveness was studied at the forth state. **Result of Research.** Experimental program consists of one training mesocycle divided into retractor, basic and control-preparative microcycles. Microcycles consist of training which have seven directions depend on their influence on organism. They are: uniform training, uniform training+, uniform and basic training, uniform and fast training, basic longtime training, fast training, fast and maximum training. **Conclusions.** Testing of experimental program has proved its effectiveness. It was shown the increasing of 10 km distance rate of advance with the same average heart rate, it was accompanied by tendency to energy demands decreasing. Analysis of running index shown positive dynamics of conditioning changes in the context of experimental program in general and in any referee certain. At the start of program the mean group running index was estimated as «average» during realization of program it was improved to «very good».

**Key words:** referee, specialization, football, training, program.

**Програма спеціальної фізичної підготовки арбітрів у футболі. Віктор Романюк, Вікторія Петрович, Вадим Смолюк, Ігор Бичук. Актуальність.** Рівень спеціальної фізичної підготовленості арбітра напряму впливає на кількість і якість помилкових рішень. Тому, розроблення і впровадження у процес підготовки арбітрів ефективних тренувальних програм є актуальним. **Мета роботи** – обґрунтувати ефективність експериментальної програми спеціальної фізичної підготовки арбітрів у футболі. **Методи дослідження.** Реакція організму на тренувальне навантаження вивчалась за допомогою годинника-пульсометра Polar M200. Середній вік обстежуваних 30 років. Програму апробовано на 10 арбітрах. Перший етап досліджень передбачав планування. На другому етапі здійснено теоретичну розробку експериментальної програми. Завданням третього етапу було апробувати програму на практиці. На четвертому етапі вивчалась її ефективність. **Результати роботи.** Експериментальна програма складається з одного тренувального мезоциклу, який містить втягуючий, базовий та контроль-підготовчий мікроцикли. Мікроцикли складаються з тренувальних занять, які в залежності від дії на організм мають сім напрямів: рівномірне тренування; рівномірне тренування +; рівномірне і базове тренування; рівномірне і темпове тренування; базове тривале тренування; темпове тренування +; темпове і максимальне тренування. **Висновки.** Апробація експериментальної програми підтвердила її ефективність. Виявлено збільшення темпу долаття десяти кілометрової дистанції при однаковій середній частоті серцевих скорочень, яке супроводжувалось тенденцією до зменшення енергозатрат. Аналіз Індексу бігу засвідчив позитивну динаміку змін спеціальної фізичної підготовки в умовах експериментальної програми у групі досліджуваних загалом і в кожного арбітра зокрема. На початку реалізації програми середньо груповий Індекс бігу оцінювалася як «середній» та покращився за період реалізації програми до рівня «дуже хороший».

**Ключові слова:** арбітри, спеціальна фізична підготовка, футбол, програма тренувань.

**Віктор Романюк, Вікторія Петрович, Вадим Смолюк, Ігорь Бичук. Программа специальной физической подготовки арбитров в футболе. Актуальность.** Уровень специальной физической подготовленности арбитра напрямую влияет на количество и качество ошибочных решений. Поэтому, разработка и внедрение в процесс подготовки арбитров эффективных тренировочных программ есть актуальным. **Цель работы** – обосновать эффективность экспериментальной программы специальной физической подготовки арбитров в футболе. **Методы исследования.** Реакция организма на тренировочную нагрузку изучалась с помощью часов-пульсометра Polar M200. Средний возраст обследуемых 30 лет. Программа апробирована на 10 арбитрах. Первый этап исследований предусматривал планирование. На втором этапе осуществлено теоретическую разработку экспериментальной программы. Задачей третьего этапа было апробировать программу на практике. На четвертом этапе изучалась ее эффективность. **Результаты работы.** Эксперимен-

тальная программа состоит из одного тренировочного мезоцикла, содержащего втягивающий, базовый и контрольно-подготовительный микроциклы. Микроциклы состоят из тренировочных занятий, в зависимости от воздействия на организм имеют семь направлений: равномерная тренировка; равномерная тренировка +; равномерная и базовая тренировка; равномерная и темповая тренировка; базовая длительная тренировка; темповая тренировка +; темповая и максимальная тренировка. **Выводы.** Апробация экспериментальной программы подтвердила ее эффективность. Выявлено увеличение темпа преодоления десяти километровой дистанции при одинаковой средней частоте сердечных сокращений, которое сопровождалось тенденцией к уменьшению энергозатрат. Анализ Индекса бега показал положительную динамику изменений специальной физической подготовки в условиях экспериментальной программы в группе исследуемых в целом и каждого арбитра в частности. В начале реализации программы среднегрупповой Индекс бега оценивался как «средний» и улучшилось за период реализации программы до уровня «очень хороший».

**Ключевые слова:** арбитры, специальная физическая подготовка, футбол, программа тренировок.

**Problem statement and its significance.** The level of special physical preparedness of an arbitrator directly affects the quantity and quality of false decisions. The analysis of domestic football matches, testifies to the lack of stable quality arbitration in Ukraine. The insufficient preparedness of Ukrainian arbitrator also indicates that today there is practically no arbitrator serving international matches. This is evidence that the system of special physical training for football arbitrators is imperfect and needs new scientific researches. We believe that the development and implementation in the process of training arbitrators an effective training programs a special physical training is topical.

**An analysis of recent research and publications on this issue.** The problem of physical and professional training of football referees was studied by domestic and foreign scientists. In particular, the state and ways of improving the physical training of football referees of different qualifications have been studied today [1]. Received theoretical and experimental substantiation of individualization of special physical training of football referees of high qualification [2; 9]. Organizational and pedagogical aspects of constructing the process of professional training the football referees of the initial category are considered [3]. The actual aspects of position in the judging of the football competition and the vectors of movement of the referees during the game are determined [4]. Peculiarities of the physical training of football arbitrators in the preparatory period of the year cycle of training are revealed [5]. Resistance to the discouraging factors of football arbitrators with different activators of nervous processes is characterized [6]. Developed basic model preparedness football arbitrators different skills [7]. Overall physical performance of football arbitrators was studied [8]. At the same time, with comprehensive coverage of the problem of general preparation of arbitrators in football, the practical process of special physical training is justified not enough. Today there are no available and effective programs that take into account individual Physiological features of each arbitrator.

**The purpose of work** is to develop and experimentally substantiate the effectiveness of the special physical training program of arbitrators in football.

**Material and methods of research.** A group of 10 referees participated in the research. The average age of the examined is 30 years. The study of the reaction of the organism to the training load was carried out with the help of the sports clock, pulsometer Polar M200. The study consisted of four stages. The first stage of studies foresaw planning. At the second stage the theoretical development of the experimental program was carried out. The task of the third stage was to try the program in practice. At the fourth stage, its effectiveness was studied.

**Research results. Discussion.** The conducted researches included four stages. First stage (Feb-Jul 2017) foresaw the determination of the name of research, setting goals and tasks, studying and analyzing scientific-methodological, scientific literature on the specified problem.

The second stage (August-September 2017) provided for the theoretical development of an experimental program of special physical training for referees, consisting of one preparatory mesocycle, which in turn contained three microcycles: retractable, basic and control-preparatory (Table 1). Each microcycle had its own task and differed in volume and intensity.

The predominant focus of the first microcycle is the development of general endurance. Volume of loadings on the sum of running work is 38070 m, according to the amount of energy spent – 2914 kcal. The microcycle is characterized by no high intensity.

Table 1

## General structure of special physical training program of arbitrator

Mesocycle	Preparatory																	
Month	October																	
Week	1						2						3					
Microcycle	Retractable						Basic						Control-preparatory					
Period	2.10-7.10						9.10-14.10						16.10-21.10					
Day	Mon	Tue	Wed	Thu	Fri	Sat	Mon	Tue	Wed	Thu	Fri	Sat	Mon	Tue	Wed	Thu	Fri	Sat
Date	2	3	4	5	6	7	9	10	11	12	13	14	16	17	18	19	20	21
№ Training		1	2	3	4	5	6	7	8	9		10	11	12	13	14		15
Volume, kcal (dynamic)																		
Intensity, % (dynamic)																		
Volume, m (dynamic)																		

The task of the second microcycle is preparation for specialized loadings and development of special endurance. The volume of loads of microcycle is 41820 m, to overcome which is 3343 kcal. At the same time increase of loads volume is increased their intensity.

The third microcycle involves the further development of a special endurance of the «40 Ч 75 m» approaching the test conditions. The microcycle is characterized by a slight decrease in the volume and intensity of loads, which is associated with the preparation for testing and ensuring a more effective recovery. The microcycle overflows 39380 m and consumes 2719 kcal.

Microcycles are divided into separate training sessions, which, depending on the action on the body, have a number and a name that is formed on the basis of the analysis of the training by the program «Polar» (Table 2). There are 7 directions of training: uniform training (№ 1); uniform training + (№ 2.1-2.3); uniform and basic training (№ 3.1-3.2); uniform and tempo (№ 4); basic long training (№ 5); tempo training + (№ 6.1-6.2); Temporal and Maximum Workout (№ 7).

Table 2

## Model of training of special physical training of football arbitrators and their characteristics

№	Type of training	Direction	Energy			RHR		Pace (min/km)	Distance (km)	Ind. running	Duration (minute)
			source	%	fat	kcal	aver.				
1	Normal	aerobic	carb	25	346	144	164	7,38	5,00		39
2.1	Normal +	aerobic	carb	31	677	141	174		9,83		80
2.2		aerobic	carb	24	579	151	167	8,25	7,22	39	60
2.3		aerobic	carb	33	756	139	181		11,10	46	90
3.1	Normal and basic	aerobic	fat	32	400	134	170		5,24	42	50
3.2		aerobic	fat	35	293	130	158		5,20	51	40
4	Normal and tempo	aerobic	carb	28	598	143	186		8,45	46	67
5	Basic prolonged	aerobic	fat fat	44	589	124	159	8,30	8,94	50	87
6.1	Tempo +	anaerobic	carb	23	676	153	178	6,50	10,00	47	68
6.2		anaerobic	carb	26	818	149	187		10,68	46	86
7	Tempo and maximum	anaerobic	carb	22	643	152	184	6,36	10,18	47	66

All training sessions are illustrated by the charts of the heart rate monitor, which help during training to adhere to the pulse zones provided by the program. There are five zones of intensity of heart rate: the gray zone is very low intensity; blue low intensity zone; green zone of medium intensity; yellow intensive training area; red zone of maximum workout.

Consider for example workout 8 (table 1). This training is characterized as “Temp training +”, its model number is 6.2 (table 2). The main load of this training was acceleration of 35 times per 100 m. This workout improves anaerobic stamina, because of this(thanks to it) increases maximum oxygen consumption (VO2max) and efficiency. In addition, it increases the speed that can be stored without the formation of lactic acid. The length of the workout is sufficient to improve stamina at a given speed. Carbohydrates are the main energy source used by the body at such intensity of training. The total distance, which is overcome during training is 10.68 km, the length is 86 minutes. Average heart rate is 149 speeds/min, maximal – 187. For all training spends 818 kcal, 26% of which due to burning fat. The run index is 46 cond. units. 4% of total training time the pulse is in the red zone, 38% in the yellow zone, 40% in green, and 16% in blue. The average of 100 m acceleration time is 17.29 seconds. The fastest 100 m will overcome in 15.25 sec, the slowest - for 19.53 seconds.

At the third stage (october 2017), the task of the research was to introduce a developed program to improve the special physical fitness of football referees in practice. For this from 3.10. to 21.10.2017 were held training sessions with arbitrators. At each lesson, with the help of a pulsometer, were monitored the training load. The reaction on every training session was recorded and analyzed, supplementing the already developed experimental program with the data of physiological indicators: heart rate, kcal, run index. Thus, each training session, which is included in the program can act as a model, with the planning of the training process.

At the fourth stage (november-december 2017), the effectiveness of the experimental program was studied. In particular, was analyzed: the reaction of the organism to the load during the realization of the entire program; the reaction of the organism during repeated overcomes of 10 km at the beginning and in the middle of the experimental program; the dynamics of the run index throughout the entire training period of the program.

In general, approbation of the experimental program of the special physical training of football referees confirmed its effectiveness. An increase in the pace of overcoming of 10 km from 7 min, 20 s/km to 6 min 10 s/km  $p < 0,001$  at the same average heart rate of 153 speed/min, which was accompanied by a tendency to reduce energy costs from 676 to 643 kcal (table 3), was found. This is an indication that the cardiovascular system has adapted to the loads and is able to maintain a higher run speed without increasing its efforts in terms of heart rate and energy consumption.

Table 3

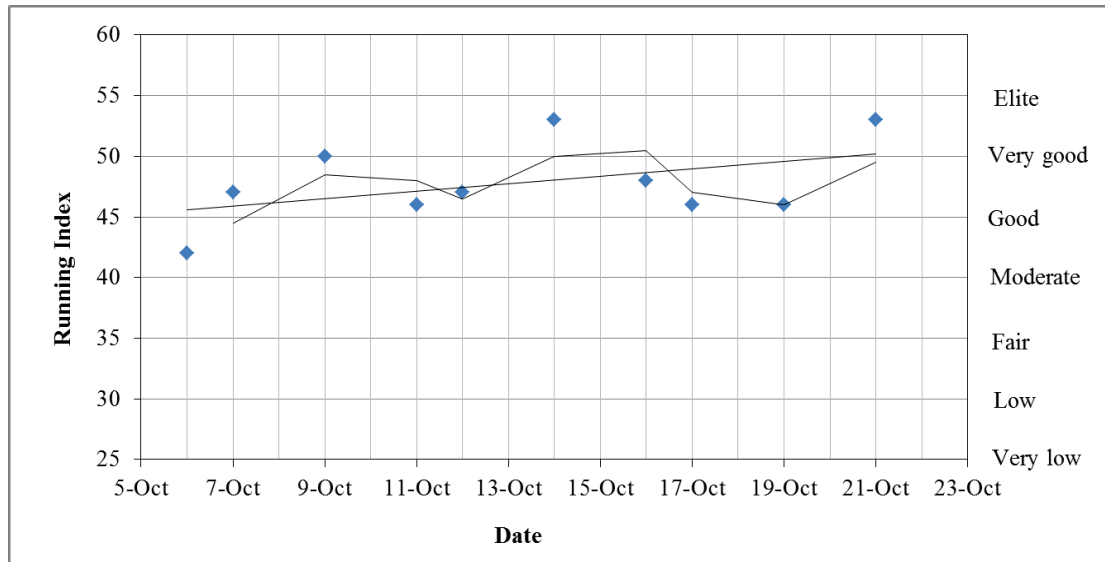
**The comparison of the functional capabilities of football referees in overcoming the 10 km distance in the beginning and in the middle of the implementation of the program of special physical training**

Indicator	HR (aver.)	HR (max)	Aver. tempo (s/km)	Max. tempo (s/km)	kcal	Run index (cond. units)	Time (min)
Average ( $X_1$ )	153	166	440	338	676	47	68
Standard mistake ( $Sx_1$ )	3,0	3,1	15,0	12,3	22,9	1,6	2,1
Average ( $X_2$ )	154	164	370	312	643	47	66
Standard mistake ( $Sx_2$ )	2,9	2,6	6,3	8,5	21,5	1,4	1,5
Student's t- test	-0,242	0,397	4,269	1,742	1,042	0,229	0,899
The level of significance	$p > 0,05$	$p > 0,05$	$p < 0,001$	$p > 0,05$	$p > 0,05$	$p > 0,05$	$p > 0,05$

The analysis of football referees run index has shown a positive dynamics of changes in the conditions of the experimental program of special physical training in the group of the studied in general and for each referees in particular (pic. 1). At the beginning of the program, the average group run index was 42 cond. units, at the end it has increased to 53 cond. units  $p < 0,001$ . By assessing the special physical fitness of

football referees with the help of the Run Index standards its improvement from the level «average» to the level «very good» is established.

Let's note, that the trend line on the graph (pic. 1), which is constructed using the linear regression equation, also shows a tendency of improvement the run index during the realization of the program from the «average» to the «good» level. The increase of the run index is from 45 cond. units up to 50 cond. units.



**Pic. 1.** The dynamics of football referees run index in the process of realization the experimental program of special physical training

**Conclusions and perspectives of further research.** The approbation of the experimental program of special physical training of football referees confirmed its effectiveness. An increase in the pace of overcoming of 10 km from 7 minutes, 20 s/ km to 6 minutes 10 s/km ( $p < 0,001$ ) with the same average heart rate of 153 speed/min was observed, which was accompanied by a tendency to reduce energy costs from 676 to 643 kcal. This is an indication that the cardiovascular system has adapted to the loads and is able to maintain a higher run speed without increasing its efforts in terms of heart rate and energy consumption.

The analysis of football referees' run index has witnessed the positive dynamics of change in the conditions of the experimental program of special physical training in the group of researchers in general and of each referee in particular. At the beginning in the realization the program, the average of group run index was 42 cond. units., at the end it has increased to 53 cond. units ( $p < 0.001$ ). By assessing the special physical fitness of football referees with the help of the Run Index standards, its improvement from the level «average» to the level «very good» was established.

The perspectives for research in this area are the testing of the effectiveness of the pilot program for the preparation of football referees for the testing by the FIFA program, the development of a program of special physical training for the entire cycle of training referees, approbation and further improvement.

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