UDC 797.212

DOROFEEVA T., PILIPKO O.
Kharkiv G. Skovoroda National Pedagogical University
Kharkiv State academy of physical culture

Efficiency of the use of different rest intervals in the training students-swimmers with the aim of development of special endurance

Abstract. ***Purpose:*** *to determine the effectiveness of the use of different rest intervals in the re-training of students-swimmers with the aim of development of special endurance.* ***Material and Methods****: In research took part students of KhNPU named after G. S. Skovoroda in the age of 16–17 years, who were engaged in the swimming section. In article were used following methods of research: theoretical analysis and generalization of scientific-methodical literature, studying of best practices, pedagogical observation, pedagogical experiment, statistical processing of the obtained results****. Results:*** *we investigated the influence of repeated loads, performed with the use of different rest intervals on the dynamics of the level of development of special endurance swimmers.* ***Conclusions:*** *it is proved that high-speed re-load with rest breaks due to the recovery of heart rate to 120 beats per minute, contributes to a more significant increase of the special endurance than re-load with regular predetermined intervals of rest.*
Keywords: *swimmers, special endurance, re-training, the intervals of rest.*

Introduction. Swimming – is one of sports in which record achievements are quite often got at a youthful age [7; 8; 12].

The essential value for the growth of sports results in swimming has a level of the development of special endurance which, according to many experts, is got not only at the expense of volume and intensity of a training load, but also thanks to an optimum ratio of its indicators: speeds of performance of exercises, duration of intervals of rest, and so forth [1; 6; 9; 10; 11].

Many experts consider that the more successful increase of a level of the development of special endurance is reached at a watch of training loads which are carried out with a different speed of swimming [4; 5; 9 but other]. However concrete sizes of volumes of a training work of different intensity aren't rather often specified in the provided recommendations, the divergence of views about a duration of intervals of rest between the repeated exercises takes place. In one case experts recommend to set constant intervals of rest, in other – consider it expedient to determine a duration of pauses of rest by a renewal of heart rate till 120 beats per minute [2–4; 11; 12].

The analysis of references, the syntheses of experience of the advanced sports practice showed that a question concerning the research of influence of the repeated loads which are executed with a different speed and with an application of different intervals of rest of dynamics of a level of the development of a special endurance of swimmers and hitherto remain insufficiently studied.

The objective of the research: to define the efficiency of use of different intervals of rest in a repeated training of students who are engaged in swimming in groups of the increase of sports skill (ISS), for the purpose of the development of a special endurance.

Material and methods of the research. Students of G. S. Skovoroda KNPU at the age of 16–17 years old, who were engaged in section of sports swimming, took part in the research; methods were used: the theoretical analysis and generalization of scientifically methodical literature, studying of experience of the advanced practice, pedagogical supervision, pedagogical experiment, statistical processing of the received results.

Results of the research and their discussion. The program of training of students who are engaged in swimming in groups of ISS, included a reusable overcoming of such series of exercises, as: 8x50 m, 4x100 m, 8x100 m, 4x200 m, 8x200 m by a free style. Sportsmen of the control and experimental groups applied different intervals of rest between certain distances. So, the experimental group had a rest between series before a renewal of heart rate to the level 120 bpm^{-1}, the control group, in independence of a fatigue, had a rest between series of only 60 s.

After two weeks of training in the set mode, we made a control test of indicators during overcoming of the series of 8x100 m by a free style (tab. 1, 2).

From the obtained data we see that in general sportsmen, both of the experimental, and the control groups, had approximately the identical time difference between the first and eighth repeats (from 3,5 to 6,4 s), but the time difference of passing between the first and eighth pieces by each of sportsmen had a little less, the majority, in the experimental group, than in the control one. This fact says that sportsmen of the experimental group overcame each new piece of a distance a little more steadily, than sportsmen of the control group to what the obtained data of coefficients of a variation testify.

Swimmers of the control group had the highest speed of a swimming by of pieces of a distance, but stability of passing of the repeated pieces was a little worse at them, than in the experimental group that allows us to make the assumption that sportsmen of the control group began a new piece of a distance against an incomplete renewal of an organism.

The repeated test in the series of 8x100 m by a free style was made after the eighth week of the pedagogical experiment.

Apparently from the data which are provided in tab. 3 and 4, sportsmen of the experimental group considerably improved a passing time between each of distance pieces. So, if sportsmen of the experimental and control groups had an approximately identical difference between the first and eighth pieces ranging from 3,5 to 6,4 s at the beginning of our research, at the end this time made: from 2,2 to 3,9 s in the experimental group, at sportsmen of the control group – from 3,7 to 5,8 s.

Table 1

Results of a performance of the series "8x100 mby a free style with a rest interval before a renewal of HR to 120 bpm^{-1}" by sportsmen of the experimental group (on the second week)

№	Sportsman	%	Control pieces (in the repeated training) and time of rest between them														Statistical data			
			1	t, s	2	t, s	3	t, s	4	t, s	5	t, s	6	t, s	7	t, s	8	Difference between 1–8 pieces	$\bar{X}$	±m	V
1	B-k S.	90	1.20,2	53	1.20,8	61	1.21,6	68	1.22,0	75	1.22,4	84	1.23,7	94	1.24,5	105	1.24,7	5,1	82,6	0,6	2,2
2	S-a M.	90	1.20,7	57	1.21,3	64	1.21,8	73	1.22,2	81	1.22,6	87	1.23,8	96	1.24,6	103	1.24,8	5,1	82,9	0,6	2,1
3	N-v Yu.	90	1.21,6	54	1.22,3	62	1.22,8	71	1.22,8	79	1.23,2	86	1.24,2	93	1.24,4	99	1.24,6	4,8	83,6	0,5	2,0
4	L-v V.	90	1.21,7	61	1.21,9	67	1.22,5	74	1.22,8	80	1.23,1	87	1.24,1	95	1.24,5	102	1.24,8	5,1	83,7	0,6	2,3
5	V-v V.	90	1.21,9	58	1.22,3	64	1.22,7	72	1.23,1	82	1.23,2	87	1.24,6	94	1.24,7	104	1.24,8	4,9	83,8	0,5	2,1
6	K-v S.	90	1.21,0	55	1.21,5	63	1.22,3	70	1.22,4	80	1.22,8	88	1.23,6	95	1.24,4	105	1.24,7	4,4	83,0	0,5	1,9
7	D-o I.	90	1.21,3	60	1.21,8	68	1.22,3	74	1.22,5	81	1.23,2	87	1.23,7	96	1.24,6	103	1.24,8	3,5	83,0	0,4	1,5
8	B-o K.	90	1.20,8	59	1.21,3	66	1.21,6	72	1.22,0	82	1.22,6	86	1.23,8	94	1.24,7	100	1.24,9	4,3	82,7	0,5	2,0
9	H-n V.	90	1.19,8	57	1.20,4	67	1.21,2	74	1.21,8	81	1.22,8	88	1.23,8	93	1.24,3	104	1.24,6	6,2	82,6	0,7	2,7
10	S-n O.	90	1.21,4	55	1.21,3	63	1.22,4	71	1.22,9	81	1.23,5	87	1.24,3	95	1.24,5	104	1.24,9	3,7	83,2	0,5	1,8

Note. *t – a rest-hour before a renewal of HR to 120 bpm^{-1} (s); % – swimming speed in % from maximum.*

Table 2

Result of a performance of the series "8x100 m by a free style with a constant interval of rest" by sportsmen of the control group (on the second week)

№	Sportsman	%	Control pieces (in the repeated training) and time of rest between them														Statistical data			
			1	t, s	2	t, s	3	t, s	4	t, s	5	t, s	6	t, s	7	t, s	8	Difference between 1–8 pieces	$\bar{X}$	±m	V
1	L-v I.	90	1.18,1	60	1.18,8	60	1.19,5	60	1.20,7	60	1.21,4	60	1.22,8	60	1.23,5	60	1.24,3	6,2	81,1	0,7	2,8
2	R-o D.	90	1.18,3	60	1.18,5	60	1.19,4	60	1.19,9	60	1.21,3	60	1.22,4	60	1.23,5	60	1.24,7	6,4	81,0	0,7	2,9
3	D-o I.	90	1.18,7	60	1.18,8	60	1.19,6	60	1.20,3	60	1.21,5	60	1.21,4	60	1.22,6	60	1.23,8	5,1	80,8	0,6	2,3
4	B-ch O.	90	1.19,2	60	1.19,5	60	1.19,8	60	1.21,1	60	1.21,3	60	1.22,4	60	1.23,5	60	1.24,6	5,4	81,4	0,6	2,4
5	Ya-o S.	90	1.19,4	60	1.20,3	60	1.21,5	60	1.21,9	60	1.22,5	60	1.22,9	60	1.23,7	60	1.24,2	4,8	82,1	0,5	2,0
6	K-r S.	90	1.18,8	60	1.19,3	60	1.19,5	60	1.20,7	60	1.21,4	60	1.22,8	60	1.23,6	60	1.24,3	5,5	81,3	0,7	2,6
7	B-n M.	90	1.19,5	60	1.19,4	60	1.19,9	60	1.20,5	60	1.21,8	60	1.22,6	60	1.23,9	60	1.23,8	4,3	81,4	0,6	2,3
8	K-o O.	90	1.18,8	60	1.19,5	60	1.20,3	60	1.20,8	60	1.21,7	60	1.22,5	60	1.24,6	60	1.24,7	5,9	81,6	0,7	2,7
9	K-v M.	90	1.19,3	60	1.20,5	60	1.20,8	60	1.21,4	60	1.22,6	60	1.22,9	60	1.23,7	60	1.24,5	5,2	82,0	0,6	2,1
10	P-v V.	90	1.18,4	60	1.18,9	60	1.19,5	60	1.20,8	60	1.21,4	60	1.22,6	60	1.23,8	60	1.24,4	6	81,2	0,7	2,8

Note. *t – a rest-hour 60 s; % – swimming speed in % from maximum.*

Table 3

Result of a performance of the series "8x100 m by a free style with a rest interval to a renewal of HR to 120 bpm^{-1}" by sportsmen of the experimental group (on the eighth week)

№	Sportsman	%	Control pieces (in the repeated training) and time of rest between them															Statistical data			
			1	t, s	2	t, s	3	t, s	4	t, s	5	t, s	6	t, s	7	t, s	8	Difference between 1–8 pieces	$\bar{X}$	±m	V
1	B-k S.	90	1.18,7	51	1.18,9	57	1.19,3	62	1.20,6	68	1.20,3	75	1.21,0	81	1.21,5	90	1.22,6	3,9	80,4	0,4	1,7
2	S-a M.	90	1.19,2	54	1.19,7	56	1.20,1	65	1.20,4	70	1.21,2	77	1.21,4	84	1.21,8	93	1.22,5	3,3	80,8	0,4	1,4
3	N-v Yu.	90	1.18,4	52	1.19,1	55	1.20,0	64	1.20,3	69	1.21,5	74	1.21,7	85	1.21,9	95	1.22,3	4	80,7	0,4	1,8
4	L-v V.	90	1.19,4	56	1.19,9	60	1.20,2	65	1.20,4	69	1.20,9	78	1.20,9	87	1.21,5	97	1.21,6	2,2	80,6	0,2	1,0
5	V-v V.	90	1.18,8	55	1.19,8	59	1.20,5	64	1.20,7	68	1.21,5	77	1.21,7	87	1.21,9	94	1.22,2	3,4	79,6	0,4	1,5
6	K-v S.	90	1.19,7	53	1.20,3	57	1.20,6	64	1.20,5	70	1.21,2	75	1.21,5	86	1.21,7	95	1.21,9	2,2	79,7	0,3	1,0
7	D-o I.	90	1.18,8	56	1.19,3	61	1.19,9	67	1.20,3	72	1.20,8	76	1.20,8	87	1.21,2	98	1.21,7	2,9	80,3	0,3	1,2
8	B-o K.	90	1.18,3	54	1.19,9	60	1.20,3	66	1.20,5	73	1.21,5	78	1.21,8	85	1.22,4	97	1.22,7	3,4	81,1	0,4	1,5
9	H-n V.	90	1.19,7	53	1.20,0	58	1.20,3	64	1.20,6	69	1.20,8	74	1.21,5	82	1.21,9	92	1.22,4	2,7	80,8	0,3	1,2
10	S-n O.	90	1.19,2	52	1.20,5	57	1.20,6	65	1.20,7	72	1.21,6	78	1.21,7	85	1.21,9	96	1.22,5	3,3	81,0	0,3	1,3

Note. *t – a rest-hour before a renewal of HR to 120 bpm^{-1} (s); % – swimming speed in % from maximum.*

Table 4

Result of a performance of the series "8x100 m by a free style with a constant interval of rest" by sportsmen of the control group (on the eighth week)

№	Sportsman	%	Control pieces (in the repeated training) and time of rest between them															Statistical data			
			1	t, s	2	t, s	3	t, s	4	t, s	5	t, s	6	t, s	7	t, s	8	Difference between 1–8 pieces	$\bar{X}$	±m	V
1	L-v I.	90	1.18,0	60	1.18,3	60	1.18,9	60	1.19,6	60	1.20,2	60	1.21,5	60	1.22,7	60	1.23,8	5,8	80,4	0,7	2,6
2	R-o D.	90	1.18,1	60	1.18,7	60	1.19,4	60	1.19,9	60	1.20,5	60	1.21,8	60	1.22,5	60	1.23,4	5,3	80,5	0,6	2,3
3	D-o I.	90	1.18,5	60	1.18,6	60	1.19,2	60	1.19,7	60	1.21,0	60	1.21,7	60	1.22,5	60	1.23,1	4,6	80,5	0,6	2,2
4	B-ch O.	90	1.19,1	60	1.19,3	60	1.19,5	60	1.20,5	60	1.21,2	60	1.21,7	60	1.23,1	60	1.22,8	3,7	80,9	0,5	1,9
5	Ya-o S.	90	1.18,8	60	1.18,8	60	1.19,3	60	1.19,8	60	1.21,4	60	1.22,6	60	1.23,1	60	1.23,7	4,9	80,9	0,6	2,5
6	K-r S.	90	1.18,4	60	1.18,5	60	1.18,9	60	1.19,4	60	1.20,7	60	1.21,4	60	1.22,8	60	1.23,6	5,2	80,5	0,6	2,5
7	B-n M.	90	1.19,2	60	1.19,7	60	1.19,9	60	1.20,5	60	1.22,3	60	1.22,7	60	1.23,3	60	1.23,9	4,7	81,4	0,6	2,2
8	K-o O.	90	1.18,4	60	1.18,5	60	1.19,4	60	1.20,7	60	1.21,8	60	1.22,3	60	1.23,4	60	1.23,7	5,3	81,0	0,7	2,6
9	K-v M.	90	1.18,7	60	1.18,6	60	1.19,4	60	1.20,5	60	1.20,8	60	1.22,5	60	1.23,2	60	1.23,8	5,1	80,9	0,6	2,5
10	P-v V.	90	1.18,1	60	1.18,4	60	1.18,9	60	1.20,5	60	1.21,5	60	1.22,4	60	1.22,9	60	1.23,6	5,5	80,8	0,7	2,6

Note. *t – a rest-hour 60 s; % – swimming speed in % from maximum.*

Sportsmen of the experimental group considerably improved indicators of a time of passing of test pieces of a distance, showing thus a big stability.

It gives the chance to draw a conclusion on the fidelity of the elected by us training for the development of a special endurance in swimmers who are engaged in ISS groups.

Conclusions. Applications of high-speed loadings in which a watch of exercises and rest happens depending on a renewal of heart rate to level 120 bpm^{-1}, gives the chance to swimmers who are engaged in groups of ISS, to perform a large volume of a hard work with the planned speed.

A renewal of pulse rate to a certain level promotes a permanent preservation of the efficiency of swimmers.

Prospects of the subsequent investigations consist in carrying out researches for the purpose of the improvement of the training process in groups of ISS depending on the level of sports qualification of who are engaged.

References:

1. *Verkhoshanskiy Yu. V. Osnovy spetsialnoy fizicheskoy podgotovki sportsmenov [Fundamentals of special physical preparation of athletes], Moscow, 1988, 331 p. (rus)*
2. *Ganchar I. L. Plavaniye: teoriya i metodika prepodavaniya [Swimming: Theory and Methods of Teaching], Minsk, 1998, 352 p. (rus)*
3. *Glazirin I. D. Plavannya [Swimming], Kyiv, 2006, 502 p. (ukr)*
4. *Kaunsilmen Dzh. Sportivnoye plavaniye [Sport swimming], Moscow, 1982, 208 p. (rus)*
5. *Kozlov A. V., Orekhov Ye. F. Sportivnaya trenirovka yunykh plovtsov [Sports training young swimmers], Saint Petersburg, 2011, 208 p. (rus)*
6. *Matveyev L. P. Osnovy obshchey teorii sporta v sisteme podgotovki sportsmenov [The general theory of sport in the training of athletes], Kyiv, 1999, 316 p. (rus)*
7. *Petrovich G. I. Plavaniye – III. Issledovaniya, trenirovka, gidroreabilitatsiya [Swimming - III. Research, training, gidroreabilitatsiya], Saint Petersburg, 2005, pp. 129–131. (rus)*
8. *Plavaniye: primernaya programma sportivnoy podgotovki dlya detsko-yunosheskikh sportivnykh shkol, spetsializirovannykh detsko-yunosheskikh shkol olimpiyskogo rezerva [Swimming: an exemplary program of sports training for youth sports schools, specialized youth school of Olympic reserve], Moscow, 2004, 216 p. (rus)*
9. *Platonov V. N., Vaytsekhovskiy S. M. Trenirovka plovtsov vysokogo klassa [Train high-class swimmers], Moscow, 1985, 256 p. (rus)*
10. *Platonov V. M., Bulatova M. M. Fizichna pidgotovka sportsmena [The physical preparation of athletes], Kyiv, 1995, 320 p. (ukr)*
11. *Platonov V. N. Plavaniye [Swimming], Kyiv, 2000, 297 p. (rus)*
12. *Platonov V. N. Sportivnoye plavaniye: put k uspekhu: v 2 kn. [Sport swimming: the path to success: in 2 books.], Kyiv, 2012, Book 1, 480 s., Book 2, 544 p. (rus)*

Received: 10.11.2015.
Published: 30.12.2015.

Tatyana Dorofeeva: *PhD (Physical Education and Sport), Assosiate Professor; Kharkiv G. Skovoroda National Pedagogical University: Artema Str. 29, Kharkov, 61000, Ukraine.*
ORCID.ORG/0000-0001-9025-5645
E-mail: dti_81@mail.ru

Olga Pilipko: *PhD (Pedagogical), Professor; Kharkiv State Academy of Physical Culture: Klochkivska 99, Kharkiv, 61058, Ukraine.*
ORCID.ORG/0000-0001-8603-3206
E-mail: pilipkoolga@meta.ua