Original Article

Increase of results during swimming training of exercising and non-exercising students

DANIELA LEKINA¹, ANNA BOZHKOVA²

¹ Faculty of Public Health and Sports, Sports Department, SWU “Neofit Rilski”, BULGARIA

² University of Medicine – Sofia, Center of Language Training, Physical Education and Sports, Sofia, BULGARIA

Published online: March 31, 2017

(Accepted for publication January 25, 2017)

DOI:10.7752/jpes.2017.01025

Abstract:

The developed specialized methodic uses simultaneous training in swimming style techniques and is coordinated with the individual possibilities of every student as well as his susceptibility towards certain swimming technique. After applying it, one of the most important indicators for the training result is the reached level of acquired swimming skills during held testing in the end of the research. The purpose of the development is researching the growth of the level of swimming training for exercising and non-exercising students after training in swimming.

Key Words: swimming, swim styles, accelerated training, author's methodic, growth, exercising, non-exercising

Introduction

Swimming has a favorable and multi-action impact on the human organism. This fact defines it as one of the most preferred sports among the students of the South-Western University “Neofit Rilski”.

The established level of swimming skills is comparatively low – despite the required training when forming the groups of students of various majors at South-Western University having selected swimming as mandatory sports training. This on its own part imposes additional requirements regarding the methodic of primary swimming training.

Dilova-Neykova (2003) develops training methodic through applying psycho-physical methods for students who cannot swim from Veliko Tarnovo University “St. St. Cyril and Methodius”. The author uses ideomotor method of impact when learning swimming styles, where students imagine the precise execution of certain swimming movements.

Bebetsos Evaggelos (2014) made a study about the effect of instructional self-talk on performance and learning the backstroke of young swimmers and on the perceived functions of it. The results of this particular study come to the conclusion that the athletes that participated in the group that used instructional self-talk, improved their technique. It is suggested that the trainers, during practice, teach their athletes to use the instructional self-talk if the goal is to improve the teaching skill.

Messinis S. & Platanou T. (2010) made a study about pacing device for swimming and mechanical construction of constant speed. The aim of training is the periodic functional body charge of creating long-term operational adjustments so the swimmer to achieve the highest performance. One of the major factors for achieving high performance is the increasing power of the athlete.

Another methodic is the developed by Daniel A. Marinho^{1,2}, Nuno Garrido^{2,3}, Tiago M. Barbosa^{2,4}, Rui Canelas^{1,2}, António J. Silva^{2,3}, Aldo M. Costa^{1,2}, Victor Machado Reis^{2,3}, Mário C. Marques¹ (2009) concluding that verifying that in age-group swimmers seven weeks of a systematic training program seemed to be sufficient to improve sprint performance.

In this research we use the developed by us specialized methodic for accelerated swimming training for certain period of time, adapted towards the curriculums of students of various majors with set hours. Specialized methodic uses simultaneous methodic for training in swimming in compliance with the individual typological peculiarities of students as swimming techniques are mastered in parallel.

It consists of two parts with total hours of 60 school hours distributed in 30 school weeks (two semesters), 2 school hours per week with duration – 90 minutes. In the first part of the 30 school hours mastered is the technique of swimming styles. In the second part of the methodic (30 school hours) mastered are school swimming techniques and constructed are skills for using swimming for life (Lekina 2016). For inspection of the efficiency of applied methodic, of substantial significance is the growth of acquired swimming skills for exercising and non-exercising students. In her research Bulgakova (1996) establishes that the physical development and motor training of swimmers (11-16 years of age) are at very high level of students of the same age who do not practice swimming.

Material & methods**Research's design**

Object of the research are the acquired swimming skills for exercising and non-exercising students at SWU "Neofit Rilski".

Subject of the empirical research is the connection of reached level of swimming training with the growth of achieved results for exercising and non-exercising students.

Contingent of the research are 102 students (50 exercising and 52 non-exercising) of various majors in SWU who have selected swimming as mandatory sports training.

Objective of the empirical training is research of the growth of reached level of swimming training for exercising and non-exercising students after applying the developed methodic of swimming training.

Methods**Control tests**

For the realization of the scientific and research objective we developed a test battery for establishing the level of acquired swimming skills after held training with students.

Stage one:

Height; Weight; Years; Flexibility; Flexibility of the shoulder girdle; Vital capacity; Crawl - 50 meters; Back crawl - 50 meters; Breaststroke - 50 meters.

Stage two:

Crawl - 50 meters; Back crawl - 50 meters; Breaststroke - 50 meters.

Swimming tests we measure in 50-meter pool after a sound signal. Students swim in series. We measure with manual stopwatch with accuracy to 0,01 sec.

Anthropometric methods

Growth in upward position (cm) – we measure with stadiometer to the nearest 5 mm, each student is barefoot, in bathing suit, standing peacefully with his feet closed and facing back the stadiometer.

Weight (kg) – we measure with medical scales with accuracy to 50 grams. When measuring, each student is barefoot, in bathing suit, as the scale is checked and adjusted and the embarking and disembarking of the platform is with isolated in weighing system.

Physical qualities

Flexibility – performed by standing on a gymnastic bench with the body leaning down and stretched arms. We measure with accuracy of 1 cm. 24.

Flexibility of the shoulder girdle – reported is the grip at a measurement stick in cm, after transfer of the stick with arms stretched in the elbows facing front to back over the head. We measure in cm. the highest grate is obtained with lowest distance between the grip.

Spirometry

Vital capacity of the lungs (vital capacity) (cc) – we measure twice with air spirometer by recording highest accuracy up to 100 cc air.

Statistical methods**Descriptive statistics**

Descriptive analysis was conducted to calculate the sample size, mean, minimum, maximum, standard deviation, variance, range, sum, standard error of the mean for each variable measured.

One Way ANOVA

The One-Way ANOVA procedure produces a one-way analysis of variance for a quantitative dependent variable by a single factor (independent) variable. Analysis of variance is used to test the hypothesis that several means are equal. This technique is an extension of the two-sample *t* test. Levene's test for homogeneity of variance, analysis-of-variance table and robust tests of the equality of means for each dependent variable, user-specified a priori contrasts, and: Turkey's honestly post hoc range test was conducted.

Mann–Whitney U test

To compare the variables' means of two independent groups was used Mann–Whitney U test. It is a nonparametric test of the null hypothesis that it is equally likely that a randomly selected value from one sample will be less than or greater than a randomly selected value from a second sample. Unlike the *t*-test it does not require the assumption of normal distributions.

Growth measurement

The growth was calculated as a ratio between the obtained result of the second measurement in seconds and the obtained result of the first measurement in seconds and in three swimming techniques: $G=t_2/t_1$ If G is $>$ than 1, this means worsening of the results, if $G < 1$, this means improvement of the results. The less G , the higher the growth.

Results

The obtained results of the anthropometric measurements, of the physical quality – flexibility and spirometry for all researched individuals are indicated in Table No 1.

Table №1. Anthropometric data, flexibility and capacity of lungs of all researched individuals.

	N	Range	Minimum	Maximum	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
Age	102	7	18	25	19,91	,130	1,313
Height	102	42	153	195	174,73	,979	9,886
Weight	102	60	40	100	71,08	1,289	13,021
Shoulder flexibility	102	75	47	122	91,72	1,356	13,698
Flexibility BC	102	42	-23	19	1,42	,612	6,181
Capacity	102	3500	2100	5600	3501,96	77,251	780,198
Valid N (listwise)	102						

In the table presented are participants included in the pedagogical experiment and average values of obtained results of held tests after applying specialized methodic.

Table 2. Anthropological data, flexibility and capacity of lungs of researched individual, divided into criteria "exercising and not exercising sports"**Group Statistics**

Exercising sports		N	Mean	Std. Deviation	Std. Error Mean
Height	Not exercising	52	170,79	9,450	1,311
	Exercising sports	50	178,82	8,656	1,224
Weight	Not exercising	52	66,19	13,008	1,804
	Exercising sports	50	76,16	11,029	1,560
Shoulder flexibility	Not exercising	52	91,87	10,646	1,476
	Exercising sports	50	91,56	16,393	2,318
Flexibility BC	Not exercising	52	1,40	4,936	,684
	Exercising sports	50	1,44	7,307	1,033
Capacity	Not exercising	52	3153,85	631,047	87,510
	Exercising sports	50	3864,00	760,172	107,505
Capacity groups	Not exercising	52	,96	1,009	,140
	Exercising sports	50	1,96	1,009	,143

The comparative analysis of anthropometric data between the two main groups exercising and non-exercising indicates that as per height, weight and capacity they differ significantly $P=0,000$ for the three indicators. The two flexibility indicators do not differ in the two groups.

Results of held swimming tests

Swimming tests we hold at 30th hours (crawl I, back crawl and breaststroke I) and 60th hour (crawl II, back crawl II and breaststroke II) after applying the specialized methodic of training students. The obtained results are indicted in Table No 3.

Table №3. Success rate with regards to swimming skills inspected in various tests in both stages of applying the methodic in the groups of man and women

	N	Range	Minimum	Maximum	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
Crawl I	102	72	42	114	85,41	1,783	18,007
Back I	102	69	59	128	91,23	1,358	13,711
Breaststroke I	102	92	60	152	98,94	1,675	16,913
Crawl II	102	52	32	84	56,40	1,173	11,849
Back crawl II	102	90	16	106	69,10	1,293	13,059
Breaststroke II	102	86	42	128	76,29	1,583	15,987

In the table noticed are the average values of obtained results of held swimming tests at the two stages of the held training with students.

Table №4 Distribution of results as per criteria of swimming skills for exercising / non-exercising.

Exercising		N	Mean	Std. Deviation	Std. Error Mean
Crawl I	Not exercising	52	88,13	15,944	2,211
	Exercising sports	50	82,58	19,691	2,785
Back crawl I	Not exercising	52	95,33	11,266	1,562
	Exercising sports	50	86,96	14,797	2,093
Breaststroke I	Not exercising	52	101,42	16,295	2,260
	Exercising sports	50	96,36	17,318	2,449
Crawl II	Not exercising	52	60,88	12,146	1,684
	Exercising sports	50	51,74	9,610	1,359
Back crawl II	Not exercising	52	73,67	10,272	1,425
	Exercising sports	50	64,34	14,014	1,982
Breaststroke II	Not exercising	52	80,17	16,019	2,221
	Exercising sports	50	72,26	15,071	2,131

Of the table evident is there is significant improvement of the swimming results of the second testing of students of both groups as well as better achievements of students of the sporting group.

During the held comparative analysis between the achievements of the two groups in the first measurement (30th hour) evident is that the obtained results differ significantly with breast crawl I swimming style. $F=5,863$; Mean Difference 8,367; Std. Error Difference 2,598; $P=0,002$. With the remaining two swimming styles not observed are any significant differences.

With the second measurement (60th hour) observed are significant differences for the three swimming styles.

With crawl II - $F=3,982$; Mean Difference 9,145; Std. Error Difference 2,174; $P=0,000$;

With breast crawl II - $F=2,713$; Mean Difference 9,333; Std. Error Difference 2,426; $P=0,000$;

With breaststroke II - $F=2,567$; Mean Difference 7,913; Std. Error Difference 3,082; $P=0,012$.

The growth of results of holding the offered specialized methodic for the two groups exercising and non-exercising sports is indicated in Table 5.

Table №5. Success rate (growth) with regards to swimming skills total for the testing

Exercising		N	Mean	Std. Deviation	Std. Error Mean
Growth of crawl	Not exercising	52	,4640	,19414	,02692
	Exercising sports	50	,6035	,34534	,04884
Growth of back crawl	Not exercising	52	,3021	,10878	,01508
	Exercising sports	50	,4373	,71965	,10177
Growth of breaststroke	Not exercising	52	,2820	,14090	,01954
	Exercising sports	50	,3534	,19525	,02761

From the table evident is that the biggest is the growth of the group not doing sports when mastering the breaststroke swimming style technique, the smallest growth is the group of those doing sports when mastering the technique of crawl swimming style. In both groups there is greater growth when mastering the technique of breaststroke and back swimming style, smaller in mastering the crawl swimming style.

The growth of results from holding the offered specialized methodic for all researched individuals was respectively at crawl ($N=102$, Mean=0,5324, STD=0,28601), at breast crawl ($N=102$, Mean=0,3683, STD=0,51171), at breaststroke crawl ($N=102$, Mean=0,3170, STD=0,17264).

When comparing the growth of achievements of the two groups there are significant differences only for crawl $F=10,639$; Mean Difference = 0,13945; Std. Error Difference = 0,05520 ; $P=0,002$ and breaststroke $F=5,174$; Mean Difference = 0,07139; Std. Error Difference = 0,03362 ; $P=0,025$.

Discussion

The significant differences $P=0,000$ as per criteria of anthropometric data and capacity between the two main groups (Table No 2), exercising and non-exercising are very consequential because, as systematic training activities cause adaptations to the work of the organs and systems, so does the musculoskeletal system.

Physical exercise causes lasting changes in muscle tissue and an overall increase in muscle mass, and hence weight, these changes depend mainly on sport being practiced. In systematic physical exercises activities and sports the major change occurring in the respiratory system is the increase in peak oxygen consumption.

The analysis of the results of held swimming tests in the first phase of training the students swimmers showed significant differences only in swimming style of back crawl I $P = 0,002$ (Table №4). The conclusion to be made is that swimming crawl style back differs from other swimming styles in body position, especially in breathing. With it breathing (inhaling and exhaling) is lighter because it is done over water. One of the main problems in teaching swimming in adults is associated with mastering new act of breathing in the water.

In the second test (60th hour) observed are significant differences in the three swimming styles (freestyle II $P = 0,00$; back crawl II $P = 0,000$; breaststroke II $P = 0,012$), (Table №4). Analysis of the data indicates that in the second part of the training an adaptation of students to the conditions to the aquatic environment occurs. Swimming movements are smoother and more rhythmic, without blunders and results improved significantly.

Analysis of the results total for the testing indicates (Table №5), that in exercising and non-exercising the highest growth in results is found in mastering the art of swimming breaststroke style, followed by back crawl swimming style and crawl swimming style.

Conclusions

The results in the end of the research indicate that students of the group of those sporting have better achievements after mastering the swimming styles technique by students in the non-exercising group.

With regards to the inspection of the possibilities of the students as per main swimming skills held through swimming tests for exercising and non-exercising student established is significant growth in results in the end of the research.

The applied specialized swimming training methodic in the university gives an opportunity for forming and developing swimming skills.

The developed methodic in compliance with individual typological peculiarities of students, reporting the degree of their motor and psychic development allows to increase the efficiency of swimming training of students.

References:

- Boychev, Kl., Lekina, D. (1998) Swimming, University Publishing House "Neofit Rilski" [Swimming. In Bulgarian]. Blagoevgrad (in Bulgarian)
- Bulgakova, N. Zh., Chebotareva, I. V. (1996) Оценка физического развития и двигательной подготовленности пловцов и школьников 11-16 лет, не занимающихся спортивным плаванием //Физическая культура: образование, воспитание. - № 1. - С. 49-52. (in Russian)
- Daniel A. Marinho^{1,2}, Nuno Garrido^{2,3}, Tiago M. Barbosa^{2,4}, Rui Canelas^{1,2}, António J. Silva^{2,3}, Aldo M. Costa^{1,2}, Victor Machado Reis^{2,3}, Mário C. Marques¹. (2009) - (MONITORING SWIMMING SPRINT PERFORMANCE DURING A TRAINING CYCLE. This article has been downloaded from JPES Journal of Physical Education and Sport Vol. 25, no 4, December, 2009 e – ISSN: 2066-2483 p – ISSN: 1582-8131
- Dzhonev, S. (2004) Social Psychology. Volume 5. Research design. Statistical processing – SPSS. Interpretation, SOFI-R, Sofia. (in Bulgarian)
- Dilova-Neykova, Tsv. (2003) Research of the impact of ideomotor training on some attention qualities. International scientific conference. Kinesiology, volume II, Boyka, Veliko Tarnovo (in Bulgarian)
- Eleni Zetoul¹; Vernadakis Nikolaos²; Bebetos Evaggelos (2014) - The effect of instructional self-talk on performance and learning the backstroke of young swimmers and on the perceived functions of it. Journal of Physical Education and Sport ® (JPES), 14 (1), Art 5, pp.27 - 35, 2014 online ISSN: 2247 - 806X; p-ISSN: 2247 – 8051; ISSN - L = 2247 - 8051 © JPES
- Lekina, D. (2014). Students' accelerated mastering of swimming styles. Dissertation. Blagoevgrad. (in Bulgarian)
- Lekina, D. (2016). Lifelong swimming. Monography, University "Neofit Rilski", Blagoevgrad (in Bulgarian).
- Messinis S. & Platanou T. (2010) - Pacing device for swimming. mechanical construction of constant speed. This article has been downloaded from JPES Journal of Physical Education and Sport Vol 26, no 1, March, 2010, e – ISSN: 2066-2483 p – ISSN: 1582-8131
- Trifonova-Grigorova, A. (2007). Compiling tests, Pedagogue 6, Sofia (in Bulgarian).
- Vezenkov, SR (2011) Applied Human Neurophysiology. Biofeedback and EEG-neurofeedback. Neofit Rilski Press, Blagoevgrad (in Bulgarian)