

Swimming skill assessment based on swimmers' achievements at the XVII World Aquatics Championship in Budapest-2017

OLEKSIY GANCHAR¹, NATALIYA TERENTIEVA², IVAN GANCHAR³

¹Odessa Maritime Academy, Odessa, UKRAINE

²Chernihiv Collegium" named after T.G. Shevchenko, UKRAINE

³Odessa Maritime Academy, Odessa, UKRAINE

Published online: June 30, 2018

(Accepted for publication May 11, 2018)

DOI:10.7752/jpes.2018.02106

Abstract:

Purpose: to determine the winner-swimmers skill development level by the result of final rounds at the World Aquatics Championship in Budapest-2017. Material: the winner-swimmers' result analysis at World Aquatics Championship on 23 - 30 Jul 2017 in Budapest, among 76 men and 74 women who received gold, silver and bronze medals from the strongest 23 countries. Results: the article reveals some similarities and differences in the swimming skill level assessment among men and women swimmers of different age, winners of the XVII world Aquatics Championship in Budapest-2017. The general difference of the highest and lowest swimmers' results according to the received awards is 956 (men points) and 960 (women points), the difference is 6 points. Conclusions: it is necessary to count the total award number (gold, silver and bronze) (men – 974 – 953 – 942 = 956 the difference is 21 and 11 points, women – 981 – 957 – 943 = 960, the difference is 24 and 14 points) to make a top list more correctly, as the separate estimation (firstly only gold, then only silver and bronze) doesn't show real swimmers' achievements through medals. The standard top list is based on separate estimation, in such a way the participant country getting only one gold award takes higher position than the countries with greater award number.

Key words: World Championship, men swimmers, women swimmers, achievement winners' assessment, team rating.

Introduction

Reliable information about various ways for actualizing prospective physical capacities in achieving better results in swimming among men and women participants is of great importance at the modern level of its development, which can be gained while training and improving their motor skills for swimming using various strokes. Especially it can be really revealed and evaluated with the swimmers' participation at the most representative level of high class swimmer competitions, such as the World Aquatics Championships, including swimming, which are now held every odd-numbered year. At the prestigious competitions like the World Aquatics Championships the best swimmers from around the world compete in motor swimming skill development presenting their native modern means, methods and approaches which are the basis of the swimming training in every country.

So objective information on similarities and differences in the swimming skill development among the participants of different sex, age and qualification will determine, develop and implement the objective assessment criteria of their physical condition for the standard evaluation function realization in various elements of the modern system of physical education and sport. The research is done according to the Scientific and research work plan of Odessa National Maritime Academy on the theme "The technology of swimming skill intensive training and improvement in different age groups" as planned in Ukraine for 2008-2016, Registration card № 0108U001487.

Theoretical analysis and synthesis of the available publications on the physical education and sport theory and methodology, the availability of specific information on the gender difference data in swimming competitions among young people and adults are presented only occasionally (Ganchar, 2002, 2006, 2006, 2007, 2007).

Although there are some publications on the specifics of women's swimming training, both by home scientists (Korop, Kononenko, 1981; Onopriienko, 1981; Platonov, 2000, 2004; Firsov, 1976), and foreign authors (Bartkowiak, 1995; Colwin, 1994; Costill, 1992; Counsilman, 1994; Giehl, 1996; Hannula, 2001; Maglisch, 2003; Schramm, 1987; Schubert, 1990; Walter, 1985).

At the same time the most interesting for swimming specialists are the features of the differences between the results of women and men at the prestigious competitions, such as the World Aquatics Championship finals, where swimming is an integral part, including open water marathon swimming.

The aim of the study is to reveal the swimmers' skill development level according to the results of the World Aquatics Championship final in Budapest-2017. The objectives of the study are: 1) to determine the dominant differences and similarities in the swimming physical condition by practical results at World Aquatics Championship in Budapest, 2017; 2) to implement the most significant results of the study into assessment to improve swimming physical condition in different age groups. On the basis of the theme study the target of the study is the swimming physical condition dynamics of young people and adults at long standing training levels and sport swimming skill improving.

The subject of the study is the features of similarities and differences in the swimming skill development among the participants of different sex and age at the World Aquatics Championship in Budapest in 2017.

Research methods

Theoretical analysis of literature (analyzed are 10 modern publications of the Ukrainian authors and publications of 10 leading foreign specialists in sport swimming), synthesis of documentary materials (synthesis and subsequent analysis subjected to formal protocols of the past Championships world Aquatics Championships that are hosted on websites, one of which is swimrankings.net), comparative monitoring experiment (with its help received data to compare average data in achievements of swimmers-men and women winners in 26 sports and swimming marathon distances), mathematical Statistics (its use was necessary to determine the average values in the achievements of swimmers at different distances, age, evaluation of swimming in points).

Research results and Discussion

At the XVII World Aquatics Championship final in Budapest in 2017, held on 23 - 30 Jul 2017, medals went to representatives of 23 countries who competed in 49 kinds of swimming program for men and women, including swimming open water marathon (Table 1).

Table 1. Results of the participation of the strongest teams of swimmers at the final competitions of the XVII World Championships of Aquatics in 23 - 30 Jul 2017 Budapest, Hungary

№ rating	Medals of the Portici parting countries	Gold		Silver		Bronze		Total		Total
		men	women	men	women	men	women	men	women	men / women
1.	United States	8	10*	5**	5	4	6	17**	21*	38+3*
2.	Italy	2*	1	**	-	2*	1**	4****	1**	5+6*
3.	Russia	2	1	1	2	3*	1	6*	4	10+1*
4.	Australia	-	1	1	4	1	3	2	8	10
5.	China	3	-	-	3	1	3	4	6	10
6.	Hungary	-	2	3	1	1	1	4	4	8
7.	Brazil	-	1*	4	-	-	**	4	1***	5+3*
8.	Great Britain	4	-	1	-	2*	-	7*	-	7+1*
9.	France	1**	*	-	*	1*	-	2***	**	2+5*
10.	Japan	-	-	3	1	3	-	6	1	7
11.	Netherlands	*	-	1	2*	-	1	1*	3*	4+2*
12.	Sweden	-	3	-	1	-	-	-	4	4
13.	Canada	-	1	-	-	1	2	1	3	4
14.	Spain	-	1	-	2	-	-	-	3	3
15.	South Africa	1	-	-	-	1	-	2	-	2
16.	Ukraine	-	-	1	-	1	-	2	-	2
17.	Denmark	-	-	-	-	-	1	-	1	1
18.	Poland	-	-	1	-	-	-	1	-	1
19.	Singapore	-	-	-	-	1	-	1	-	1
20.	Germany	-	-	-	1	-	-	-	1	1
21.	Egypt	-	-	-	-	-	1	-	1	1
22.	Belarus	-	-	-	-	-	1	-	1	1
23.	Ecuador	-	-	-	*	-	-	-	*	*
Total medals received		21	21	21	22	22	21	64	64	128
Marathon swimming*		4*	3*	4*	3*	4*	4*	12*	10*	22*
Total medals received		25	24	25	25	26	25	76	74	150

Note: *-marked received medals in swimming in the open water (Marathon);
in relay 4 x 1250 m (2 men +2 women), prize medals showing men in a column.

At the same time the largest number of prize awards including gold, silver and bronze medals went to US representatives (total number – 41, 19 men, 22 women). Then and there, as the rating fell, we could see swimmers from Italy – 11 (8 men, 3 women), Russia – 11 (7 men, 4 women) Australia – 10 (2 men, 8 women), China – 10 (4 men, 6 women), Hungary – 8 (4 men, 4 women), Brazil – 8 (4 men, 4 women), Great Britain – 8 (8 men), France – 7 (5 men, 2 women), Japan – 7 (6 men, 1 women), the Netherlands – 6 (2 men, 4 women), Sweden – 4 (4 women), Canada – 4 (1 men, 3 women), Spain – 3 (3 women). South Africa – 2 (2 men), Ukraine – 2 (2 men), Denmark – 1 (1 woman), Poland – 1 (1 man), Singapore – 1 (1 man), Germany – 1 (1 woman), Egypt – 1 (1 woman), Belarus – 1 (1 woman), Ecuador – 1 (1 woman). Thus, among the men the most successful were swimmers from the USA (19), Italy (8), Great Britain (8), Russia (7), Japan (6), France (5), China (4),

Hungary (4), Brazil (4), among the women were the swimmers from the USA (22), Australia (8), China (6), Russia (4), Sweden (4), Hungary (4), Netherlands (4), Brazil (4), Italy (3), Spain (3), Canada (3).

It is necessary to mention the successful results of many swimmers from the CIS countries in these competitions. The XVII World Aquatics Championship in Budapest 2017 gave Russian swimmers 3 gold, 3 silver and 4 bronze medals. Julia Efimova – 200 m breaststroke, E. Rylov – 200 m on the back; A. Chupko – 200 m breaststroke received gold medals. 3 silver medals were received by the women's team – combined relay race 4x100 m (A. Fesikova, Yu. Efimova, S. Chimrova, V. Popova); the men's team – 4x200 m relay freestyle (M. Dovgalyuk, M. Vekovishev, D. Izotov, A. Krasnykh); and Julia Efimova – 50 m breaststroke, 4 bronze medals were received by A. Krasnykh – 200 m freestyle, K. Prigoda – 100 m breaststroke, Y. Efimova – 100 m breaststroke, men's team 4x100 m combined relay – E. Rylov, K. Prigoda, A. Popkov, V. Morozov and E. Dratsev open water marathon swimming 25 km. Ukrainian swimmers also received 2 awards: M. Romanchuk – 1500 m freestyle got a silver medal and A. Govorov – 50 m butterfly got a bronze medal. Belarusian swimmer A. Gerasimenia was awarded a bronze medal in swimming 50 m on the back. Swimmers from other CIS countries started less successfully at the World Aquatics Championship that requires great attention to develop better physical condition for swimmers, taking into account modern trends in sport training and improvement.

We also obtained informative data, which characterize the winners and prize-winners in swimming of different strokes, both among men and women, taking into account their age-specific characteristics (Table 2). This allows us to examine in detail the state of swimmers' swimming physical condition, and also to reveal the features of their results dynamics, both among men and women in different age groups. At the same time, the greatest women participant age predominance over men participants was in marathon swimming for 10 km (6 years), in marathon swimming for 5 km (5 years), in marathon swimming for 25 km (3 years), in swimming 100 m butterfly (3 years), 200 m on the back (2 years), 400 m complex swimming (2 years). Although the men were older than the women in swimming competition 50 m on the back (5 years), 50 breaststroke (4 years), 50 m butterfly (4 years), swimming 100 m on the back (3 years), in the mixed relay 4x100 m combined (3 years), in the mixed relay marathon swimming 4x1250 m (3 years), 100 m freestyle (2 years), relay 4x200 m freestyle (2 years).

Table 2. Average results summary table final race the winners the age of the XVII and World Championships of Aquatics in 23 - 30 Jul 2017 Budapest, Hungary

The results of swimmers			Distance, how to swim	Age swimmers		
men	women	difference		men	women	± difference
21,28	23,84	2,56	50 m Freestyle	24	24	0
47,64	52,42	4,78	100 m Freestyle	25	23	+2
1.44,88	1.55,03	10,15	200 m Freestyle	23	24	-1
3.43,05	4.01,04	17,99	400 m Freestyle	23	22	+1
7.41,64	8.15,12	33,48	800 m Freestyle	22	19	+3
14.40,23	15.45,52	1.05,29	1500 m Freestyle	22	22	0
24,47	27,21	2,74	50 m Backstroke	31	26	+5
52,50	58,42	5,92	100 m Backstroke	25	22	+3
1.54,28	2.05,97	11,69	200 m Backstroke	22	24	-2
26,37	29,65	3,28	50 m Breaststroke	28	24	+4
58,43	1.04,74	6,31	100 m Breaststroke	23	24	-1
2.07,24	2.21,11	13,87	200 m Breaststroke	22	24	-2
22,79	25,13	2,34	50 m Butterfly	28	24	+4
50,43	56,02	5,59	100 m Butterfly	20	23	-3
1.53,75	2.05,55	11,80	200 m Butterfly	27	28	-1
1.55,95	2.08,21	12,26	200 m Medley	23	24	-1
4.07,80	4.31,43	23,63	400 m Medley	23	25	-2
3.10,79	3.32,46	21,67	4×100 m Freestyle	24	23	+1
7.02,52	7.45,62	43,10	4×200 m Freestyle	22	20	+2
3.28,87	3.53,06	24,33	4×100 m Medley	24	23	+1
	3.21,66	-	Mixed, 4×100 m Freestyle	22	23	-1
			Mixed, 4 × 100 m Freestyle	22	23	-1
1.36,27	1.45,38	9,11	Mixed, 4×100 m Freestyle	22	23	-1
	3.40,34	-	Mixed, 4×100 m Medley	23	20	+3
1.48,35	1.52,35	4,00	Mixed, 4×100 m Medley	23	20	+3
54.35,2	59.09,3	4.74,1	5000 m the Marathon	22	27	-5
1:51.58,4	2:00.15,3	8.57,9	10000 m the Marathon	23	29	-6
5:02.47,4	5:21.88,5	19.41,1	25000 m the Marathon	27	30	-3
	54.18,00	-	Mixed, 4x1250 m Freestyle	95	92	+3
25.86.60	28.31.40	2.44.80	Mixed, 4x1250 m Freestyle	95	92	+3

Absolute values of the difference in the swimmers' results increases according to the length of the distance and are determined less according to the strokes: at a distance of 50 m, the greatest difference is observed in swimming breaststroke – 3,28 seconds, then on the back – 2,74 s., freestyle 2,56 s., butterfly – 2,34 s., for 100 m the results were: breaststroke – 6,31 s., on the back – 5,92 s., butterfly – 5,59 s., freestyle – 4,78 s.

We also present the swimmers' result assessment, having won gold, silver and bronze medals, ensuring their demonstration on the FINA point table which allowed them to be compared according to a single achievement assessing criteria (Table 3).

Table 3. Monitoring achievements award-winning swimmers of the XVII World Championships in Aquatics in 23 - 30 Jul 2017 Budapest at distances of swimming FINA points table

Sailing distance, m	Average achievements swimmers-winners in swimming (points)									
	Busy places	men				women				
1 place		2 place	3 place	total	average	1 place	2 place	3 place	total	average
50 m Freestyle	966	950	928	2844	948	1005	984	970	2959	986
100 m Freestyle	983	941	939	2863	954	987	985	964	2936	979
200 m Freestyle	932	915	910	2757	918	954	943	943	2840	947
The sum	2881	2806	2777	8464	2820	2946	2912	2877	8735	2912
The average	960	935	926	2821	940	982	971	959	2912	971
400 m Freestyle	982	950	949	2881	960	976	938	918	2832	944
800 m Freestyle	944	938	934	2816	939	952	936	926	2814	938
1500 m Freestyle	983	979	944	2906	969	979	921	913	2813	938
The sum	2909	2867	2827	8603	2868	2907	2795	2757	8459	2820
The average	970	956	942	2868	956	969	932	919	2820	940
50 m Backstroke	962	943	937	2842	947	991	990	981	2962	987
100 m Backstroke	966	964	958	2888	963	1001	976	976	2953	984
200 m Backstroke	956	941	920	2817	939	961	957	943	2861	954
The sum	2884	2848	2815	8547	2849	2953	2923	2900	8776	2925
The average	961	949	938	2848	949	984	974	967	2925	975
50 m Breaststroke	1050	988	979	3017	1006	1008	990	949	2947	982
100 m Breaststroke	982	917	905	2804	935	1010	968	968	2946	982
200 m Breaststroke	1001	993	989	2983	994	988	944	941	2873	958
The sum	3033	2898	2873	8804	2935	3006	2902	2858	8766	2922
The average	1011	966	958	2935	978	1002	967	953	2922	974
50 m Butterfly	958	953	947	2858	953	979	891	890	2760	920
100 m Butterfly	997	953	941	2891	964	997	963	953	2913	971
200 m Butterfly	952	942	930	2824	941	919	916	903	2738	913
The sum	2907	2848	2818	8573	2858	2895	2770	2746	8411	2804
The average	969	949	939	2857	953	965	923	915	2803	934
200 m Medley	960	948	942	2850	950	979	958	919	2856	952
400 m Medley	975	946	937	2858	953	967	937	930	2834	945
The sum	1935	1894	1879	5708	1903	1946	1895	1849	5690	1897
The average	968	947	935	2850	952	973	948	924	2845	948
4x100 m Freestyle	971	967	942	2880	960	984	980	972	2936	979
4x200 m Freestyle	977	970	967	2914	971	991	981	959	2931	977
4x100 m Medley	990	976	964	2930	977	1006	983	971	2960	987
The sum	2938	2913	2873	8724	2908	2981	2944	2902	8827	2943
The average	979	971	958	2908	969	994	981	967	2942	981
Total	6818	6673	6596	20087	6697	6869	6696	6604	20169	6723
Total average	974	953	942	2869	956	981	957	943	2881	960
How to swim	1 place	2 place	3 place	total	average	1 place	2 place	3 place	total	average
Sprinters	960	935	926	2821	940	982	971	959	2912	971
Stayers	970	956	942	2868	956	969	932	919	2820	940
Backstroke	961	949	938	2848	949	984	974	967	2925	975
Breaststroke	1011	966	958	2935	978	1002	967	953	2922	974
Butterfly	969	949	939	2857	953	965	923	915	2803	934
Medley	968	947	935	2850	952	973	948	924	2845	948
Relay swimming	979	971	958	2908	969	994	981	967	2942	981
Total	6818	6673	6596	20087	6697	6869	6696	6604	20169	6723
Total average	974	953	942	2869	956	981	957	943	2881	960
Unlike max/min	51	36	32	114	38	37	58	52	147	49

At Budapest World Championship winners both men and women, who received gold medals do not have much difference in the point comparison (7 points), men (974 points) and women (981 points). This tendency is also currently central with silver winners (953 and 957 points, 4 points of difference) and bronze winners (942 and 943 points, 1 point of difference). Finally, the generalized distance difference between the maximum and minimum swimmers' results according to the point level is 956 points with men, and 960 points with women, the difference is 4 points.

The research presented in the table 3 shows the average point difference according to the distances, so men got 51, 36, 32 points (average 40), and women got 37, 58, 52 points (average 49), who received gold, silver and bronze awards.

Comparing men's results who received gold prizes we got such data. The highest points (1011 points) were got by the breaststroke gold winner swimmers, the second in this list are the results in swimming relay race

(979 points) the third group is long-distance freestyle swimmers (970 points) the next is butterfly swimmers (969 points), then we have complex swimmers (968 points) and back-stroke swimmers (961 points), and the last one is sprint freestyle swimmers (960 points). The average point number with gold winner men swimmers is 974 points.

And now we pay your attention to the women's gold medal results. The highest points (1002 points) were got by the breaststroke gold winner women swimmers, the second in this list are the results in swimming relay race (994 points) the third group is back-stroke swimmers (984 points) the next is sprint freestyle swimmers (982 points), then we have complex swimmers (973 points) and long-distance swimmers (969 points), and the last one is butterfly swimmers (965 points). The average point number with gold winner women swimmers is 981 points.

Analyzing men's results who received silver prizes we have such statistics. The highest points were in swimming relay race (971 points) and in breaststroke swimming (966 points), then there are long-distance freestyle swimmers (956 points) the next ones are butterfly swimmers (949 points) and back-stroke swimmers (949 points), then we have complex swimmers (947 points) and the least points were got by sprint freestyle swimmers (935 points). The average point number with silver winner men swimmers is 953 points.

The points got by silver prize women swimmers are the following. The highest points were in swimming relay race (981 points), the second are back-stroke swimmers (974 points), then there are long-distance freestyle swimmers (971 points) and breaststroke swimmers (967 points), then we have complex swimmers (948 points) the next ones are sprint freestyle swimmers (932 points) and, and the least points were got by butterfly swimmers (923 points). So, the average point number with silver winner women swimmers is 957 points.

The points got by bronze prize men swimmers are presented below. So, the highest points were got by swimmers in relay race (958 points) and by breaststroke swimmers (958 points), then there are long-distance freestyle swimmers (942 points), butterfly swimmers (939 points) the next are back-stroke swimmers (938 points), then we have complex swimmers (935 points) and the least points were got by sprint freestyle swimmers (926 points). The average point number with bronze winner men swimmers is 942 points.

The points got by bronze prize women swimmers are detailed below. The highest points were received by swimmers in relay race (967 points) and by back-stroke swimmers (967 points), then there are long-distance freestyle swimmers (959 points) and breaststroke swimmers (953 points), then we have complex swimmers (924 points) the next ones are sprint freestyle swimmers (919 points) and, and the least points were got by butterfly swimmers (915 points). So, the average point number with silver winner women swimmers is 943 points.

The point research shows that the most essential discrepancy criterion is award number that can be got at the competition, and only then there is their quality, which is of great importance when the award number is equal, the advantage is got firstly by gold winners, then – silver ones and, thereafter, by bronze ones.

Our research allows us to make the following **conclusion**:

1. In Budapest the World Championship winners both men and women, who received gold medals do not have much difference in the point comparison (7 points), men (974 points) and women (981 points). This trend is also currently central with silver winners (953 and 957 points, 4 points of difference) and bronze winners (942 and 943 points, 1 point of difference).

2. The general difference of the highest and lowest swimmers' results according to the received awards is 956 (points, men) and 960 (points, women), the difference is 4 points. The research shows the average point difference: 51, 36, 32 points (the average 40) – men and 37, 58, 52 points (the average 49) – women. So, it is necessary to count the total award number (gold, silver and bronze) (men - $974-953-942=956$, women - $981-957-943=960$) to make a top list more correctly, as the separate estimation (firstly only gold, then only silver and bronze) doesn't show real swimmers' achievements through medals. The standard top list is based on separate estimation, in such a way the participant country getting only one gold award takes a higher position than the country with a greater award number, for example, Japan – 7 medals is below RSA – 2 medals, however Japan has more medals totally.

3. The research data can be really used to improve sport assessment system; to make progress in swimmers' participation at the most representative level of high class swimmer competitions, such as the World Aquatics Championships, which are held every odd-numbered year.

4. The revealed dynamics data of swimmers' results will allow estimating the condition of their physical condition including the gender approach while swimming skill development that can be a common standard for other swimmers.

5. The next research can present gender difference investigation with swimmers taking part in European championships as well as the Olympic Games, World Student Games including different distances (25 m and 50 m) in order to identify the result dynamics and the most essential aspects in modern swimming nowadays.

References

Ganchar I. L., & Yermakov S. S., & Ganchar A. I. (2002). Opredelenie reitinga stran-uchastnits chempionatov Mira po plavaniiu [Determination of the rating of the countries participating in the World Swimming Championships] S. S. Yermakov (Eds.), *Pedagogika, psikhologiya ta mediko-biologichni problemi fizichnogo vikhovannia i sportu – Pedagogy, psychology and medical-biological problems of physical*

- education and sports, 8, 92-97 [in Russian].
- Ganchar I. L. (2006). Teoriia prepodavaniia plavaniia: tekhnologii obuchenii i sovershenstvovaniia: monografiia [Theory of swimming teaching: technology of teaching and improving]. Odessa: Astroprint [in Russian].
- Ganchar I. L. (2006). Metodika prepodavaniia plavaniia: tekhnologii obuchenii i sovershenstvovaniia. Chast II: uchebnik dlia studentov vuzov Ukrainy, Belarusi, Moldovy i Rossiiskoi Federatsii po spetsialnosti «Fizicheskoe vospitanie i sport» [Methods of teaching swimming: the technology of teaching and improving. Part II: a textbook for university students in Ukraine, Belarus, Moldova and the Russian Federation, who specializing in Physical Education and Sports]. Odessa: Druk [in Russian].
- Ganchar I. L., Ganchar A. I., Botnarenko F. A. (2007). Izuchenie dinamiki reitinga vystupleniia silneishikh plovtsov na chempionatakh Mira s 1973 po 2005 gg. [Studying the dynamics of the rating of the performance of the strongest swimmers at the World Championships from 1973 to 2005.] / Sesiunea anuala de comunicari stiintifice cu participare internationale "Educatiei Fizice si Sportului in slujba vietii si a pervomantei umane" (pp. 272-277). Brasov: Editura Universitatii "Transilvania" [in Russian].
- Ganchar I. L. (2007). Plavanie: teoriia i metodika prepodavaniia sportivno-pedagogicheskogo sovershenstvovaniia. Chast III: uchebnoe posobie dlia studentov vysshikh uchebnykh zavedenii Ukrainy, Belarusi, Moldovy i Rossiiskoi Federatsii po spetsialnosti «Fizicheskoe vospitanie i sport» [Swimming: theory and methodology of teaching sports and pedagogical perfection. Part III: a textbook for students of higher educational institutions of Ukraine, Belarus, Moldova and the Russian Federation, who specializing in Physical Education and Sport]. Odessa: Druk [in Russian].
- Korop Yu. A., & Kononenko Yu. A. (1983). Zhenskoe plavanie: Osobennosti i perspektivy [Women's Swimming: Features and Prospects]. Kyiv: Zdorovia [in Russian].
- Onoprienko B. I. (1981) Biomekhanika plavaniia [Biomechanics of swimming]. Kyiv: Zdorovia [in Russian].
- Platonov V. N., & Absaliamov T. M., & Bulatova M. M., Bulgakova N. Zh. et al. (2000). Plavanie [Swimming]. Platonov V. N. (Ed.) Kyiv: Olimpiiskaia literatura [in Russian].
- Platonov V. N. (2004) Olimpiiskii sport : informatsiia, statistika [Olympic sport: information, statistics]. Platonov V. N. (Ed.) (pp. 312-351). Kyiv: Olimpiiskaia literatura [in Russian].
- Firsov Z. P. (1976). Plavanie: spravochnik [Swimming: handbook]. Moscow: Fizkultura i sport [in Russian].
- Maglischo Ernest W. (2003). Swimming fastest. – Human Kinetics [in English].
- Bartkowiak E. (1995). Sportowa technika pluwania. Warszawa [in Poland].
- Counsilman J. E., Counsilman B. E. (1994). The New Science of Swimming. Prentice Hall College Div [in English].
- Giehl J. (1996). Richtig schwimmen. – München, Wien, Zürich : BLV [in Germany].
- Colwin Cecil M. Swimming. – Into the 21 st. Century (1994). Human Kinetics Publishers Champaign, Illinois [in English].
- Costill D. Z., & Maglischo E. W., & Richardson A. B. (1992). Handbook of sports Medicine and Schince Swimming. – London, Blackwell Scientific Publications LTD [in English].
- Hannula Dick, & Thornton North (2001). Swim Coaching Bible : Endorsed by World Swimming Coaches Association. Human Kinetics [in English].
- Schramm E. (ed.), et al (1987). Sportschwimmen: Hochschullerbuch. E. Schramm (ed.). – Berlin: Sportverlag [in Germany].
- Schubert M. (1990). Sports illustrated competitive swimming: techniques for champions. New York [in English].
- Walter G. (1985). Schwimmen von A bis Z : Gesamttred. Berlin: Sportverlag [in Germany].