

## PERFECTION OF HOE-TYPE MOTIONS OF SPORTSWOMEN SPECIALIZED IN SYNCHRONOUS SWIMMING IN BASE POSITIONS OF COMPULSORY EXERCISE

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**Annotation.** The features of implementation of standard hoe-type motion of sportswomen of the synchronous swimming are certain. In an experiment took part 16 sportswomen aged 8-11 years. Distinctions are exposed between the index of resulting speed of centre-of-mass biotlinks of overhead extremities of sportswomen and between kinematics and dynamic descriptions at implementation of a few types of standard hoe-type motion. It is recommended at the end of every mesocycle to conduct current control with the use of videosurvey. To conduct the analysis of video data and discussion of suffered sportswomen technical errors. It is suggested to draw on the complex of tricking into and imitation exercises, exercises on development of force and flexibility in joints, exercises on perfection of rhythm structure of motive action. It is recommended to execute motive actions on a background of considerable physical fatigue, emotional overvoltage, distraction, up-diffused attention, difficulty of activity of separate analyzers (motive actions with the closed eyes).

**Keywords:** synchronous, swimming, obligatory, program, hoe-type, motions, exercises.

### Introduction.

Last time still greater attention of many specialists has been paid to improvement of sportsmanship (V.I. Bobrovnik, 2007, B.G. Chirva, 2008, J. Sherlock, N. Perry, 2008, Yu. N. Kotov, 2009, R.F. Ahmetov, 2011, Yu.K. Gaverdovskiy, 2012). Technical sportsmanship includes: technical training and technique of motion actions (A.N. Laputin, 1999-2006, R. Enoca, 2000, V.V. Gamaliy, 2007, V. Zatsiorsky, 2012). Improvement of motion actions technique, in the opinion of many authors (K. Clippinger, 2007, Yu.V. Litvinenko, 2008, V.N. Baloban, 2009, R. LeMaster, 2010, I. Leod, 2010, V.A. Kashuba, A.S. Shulga, 2011, S.V. Krupenya, 2012 and other), seems to be an important and integral component of whole sports training system, because technique is one of decisive factors in realization of a sportsman's motion potential.

Most of authors underline the significance of training means' application with improving of motion actions technique in synchronized swimming [1, 4, 9, 10-13]. Sparse researches in the field of synchronized swimming point at the efficiency of their application in training process [3, 8].

But the methodology of training means application does not always correspond to the requirements of modern sports [7]. It causes a number of problems, the main of which is their incorrect application. Even the simplest training equipment can be not only inefficient, but influence negatively on improvement of motion abilities and technical sportsmanship, if used incorrectly [1, 4, 7, 9, 10].

At the same time, most of synchronized swimming coaches have intuitive approach, based on their own training experience, to the selection of training means and methodology of their application. It reduces the efficiency of training process and sometimes is a reason of synchronized swimming sportswomen's mistakes, when they execute basic positions of synchronized swimming mandatory program.

As per the group of authors [1, 4, 7], one of the most important links of sportswomen's technical improvement control is selection of various special preparatory exercises, which ensure manifestation of separate motion technique elements, purposeful for the given sportswoman.

In the existing works on synchronized swimming [2, 3, 5, 8] there are gymnastics exercises, choreographic exercises, but there are no special exercises directed to improvement of "standard" stroke movement's perfection. Besides, there is no information how such exercises must coincide with other training means and in which ratio they must be applied in annual training cycle or in its separate structures.

The work has been fulfilled as per plan of scientific & research works of National university of physical education and sports.

### Purpose, tasks of the work, material and methods.

*The purpose of the work:* improvement of stroke movements' technique efficiency of synchronized swimming sportswomen at the stage of preliminary basic training.

*The tasks of the research:* basing on the data of special scientific and research literature, studying of peculiarities of technical sportsmanship improvement; on the base of the resulting experiment data, development of practical recommendations, directed to improvement of "standard" stroke movement, which is used in synchronized swimming mandatory program.

*The methods of the researches:* analysis of special academic - methodological literature and advanced experience of leading specialists of technical sportsmanship, the method of video/computer analysis, the methods of mathematical statistics.

### Results of the researches.

On the base of the obtained, resulting experiment's data, there have been determined basic positions in synchronized swimming, which are used in synchronized swimmers' training at preliminary basic stage of multi year preparation. Considering the resulting experiment's data, we have found out the most substantial differences of "standard" strokes in basic positions of synchronized swimming mandatory program.

The obtained primary data lied in the foundation for development of the offered by us methodological recommendations on exercises complex for "standard" stroke improvement in basic positions of mandatory program.

After applying of the developed by us recommendations in experimental group in preliminary periods, average indicators of "standard" strokes' technique statistically authentically improved (table 1).

Table 1

*Bio-mechanical parameters of "standard" stroke movement in experimental group before and after experiment.*

Measured indicators				Experimental group (n=8) before experiment		Experimental group (n=8) afterexperiment	
					S		S
Raising phase	Phase time (sec.)			0, 245	0, 050	0, 24	0, 04
	Angle characteristics ( $\angle \alpha, ^\circ$ )	Shoulder joint	Right	49, 375	7, 269	44, 875	0, 83
			Left	43, 625	4, 274	37, 625*	0, 52
		Elbow joint	Right	123, 750	10, 807	127, 25	0, 89
			Left	130, 750	7, 592	140, 625*	0, 74
		Wrist joint	Right	178, 875	6, 813	162*	0, 76
			Left	176, 500	7, 653	166*	0, 53
	Masses centers' speed of separate bio links (V, m/c)	Shoulder	Right	0, 118	0, 030	0, 12	0, 01
			Left	0, 146	0, 078	0, 19	0, 01
		Forearm	Right	0, 394	0, 110	0, 44	0, 08
			Left	0, 476	0, 174	0, 49	0, 07
		Wrist	Right	1, 170	0, 272	1, 23	0, 27
			Left	1, 165	0, 252	1, 820*	0, 10
	Distribution of resistance forces (P, H)	Wrist	Right	0, 58	0, 20	0, 98*	0, 47
			Left	0, 54	0, 19	2, 02*	0, 20
	Distant grip phase	Phase time (sec.)			0, 070	0, 019	0, 07
Angle characteristics ( $\angle \alpha, ^\circ$ )		Shoulder joint	Right	58, 625	9, 471	45, 75*	0, 89
			Left	53, 375	4, 138	42, 5*	0, 53
		Elbow joint	Right	158, 500	4, 567	169, 875*	0, 64
			Left	161, 625	7, 170	171, 25*	0, 46
		Wrist joint	Right	195, 375	13, 700	176, 25*	0, 71
			Left	189, 125	13, 141	175, 125	0, 64
Masses centers' speed of separate bio links (V, m/c)		Shoulder	Right	0, 289	0, 191	0, 4	0, 10
			Left	0, 289	0, 367	0, 51	0, 07
		Forearm	Right	1, 213	0, 663	0, 60*	0, 24
			Left	0, 460	0, 179	0, 55	0, 08
		Wrist	Right	0, 887	0, 475	0, 98	0, 15
	Left		0, 818	0, 436	1, 317*	0, 23	

	Distribution of resistance forces (P, H)	Wrist	Right	0, 53	0, 37	0, 38 *	0, 11
			Left	0, 47	0, 35	0, 69 *	0, 27
Adduction phase	Phase time (sec.)			0, 180	0, 043	0, 22	0, 04
	Angle characteristics ( $\angle\alpha, ^\circ$ )	Shoulder joint	Right	54, 500	10, 379	46, 375	0, 52
			Left	51, 500	4, 781	45, 125*	0, 64
		Elbow joint	Right	162, 500	9, 442	174, 5*	0, 53
			Left	163, 750	5, 874	174, 125*	0, 83
		Wrist joint	Right	189, 625	7, 070	186, 5	0, 53
			Left	186, 125	7, 019	199, 75*	1, 04
	Masses centers' speed of separate bio links (V, m/c)	Shoulder	Right	0, 153	0, 145	0, 08	0, 01
			Left	0, 155	0, 088	0, 08	0, 01
		Forearm	Right	0, 473	0, 133	0, 49 *	0, 05
			Left	0, 568	0, 242	0, 64	0, 06
		Wrist	Right	1, 192	0, 245	1, 476*	0, 37
			Left	1, 210	0, 185	1, 49	0, 39
	Distribution of resistance forces (P, H)	Wrist	Right	1, 00	0, 41	1, 07	0, 51
			Left	1, 06	0, 44	1, 09	0, 55
	Close grip phase	Phase time (sec.)			0, 110	0, 028	0, 075*
Angle characteristics ( $\angle\alpha, ^\circ$ )		Shoulder joint	Right	48, 000	6, 761	44, 75	1, 04
			Left	43, 625	7, 009	37, 75*	0, 71
		Elbow joint	Right	133, 750	13, 615	137, 5	0, 53
			Left	135, 500	12, 939	140, 75	0, 71
		Wrist joint	Right	182, 375	7, 763	166, 375*	0, 52
			Left	180, 875	7, 605	166, 625*	0, 52
Masses centers' speed of separate bio links (V, m/c)		Shoulder	Right	0, 239	0, 230	0, 29	0, 01
			Left	0, 134	0, 079	0, 33*	0, 05
		Forearm	Right	0, 282	0, 178	0, 24	0, 05
			Left	0, 375	0, 252	0, 28	0, 04
		Wrist	Right	1, 985	0, 938	3, 615*	0, 70
			Left	0, 454	0, 299	1, 495*	0, 39
Distribution of resistance forces (P, H)		Wrist	Right	3, 50	3, 79	0, 92*	2, 25
			Left	0, 19	0, 22	0, 99*	0, 61

Notes \*-  $P \leq 0, 01$ .

By the results of our researches, with improving of synchronized swimmers' strokes we paid special attention to improvement of leading for the given motion action characteristics of "standard" strokes technique. In its turn, on the base of comparative analysis, the given differences were found between masses centers' speed indicators of synchronized swimmers' superior limbs and between kinematical and dynamic characteristics, which were studied in horizontal and frontal planes of several "standard" strokes kinds' executing.

As the basis of the offered methodological recommendations we have used the developed by us average statistical models of stroke movement of the first and the second kinds as well as indicators of technique, which, by correlation analysis results, had a close connection with the model ones.

As we know, motion actions technique shall be improved not only by determination of bio-mechanical indicators, but also by objective criteria, which are evaluated by referees during fulfillment of mandatory program's elements. These technical elements are used not only in mandatory synchronized swimming program but also in optional programs.

As the basic tasks of technical sportsmanship improvement, we put the tasks, adapted for methodological recommendations on synchronized swimming: achievement of high stability and rational variability of motion actions, which are synchronized swimming strokes' basic technique; improvement of motion actions' structure, their dynamics and kinematics, considering sportswomen's individual features, that presumed, in some cases, individual selection of special exercises, the quantity of their repetitions and individual tasks.

When developing the recommendations, we took in consideration such didactic principles as purposefulness and practicality, controllability, positive motivation, systematic character, sense and perceptive "obviousness", readiness, regularity and gradualness, methodical dynamism and progression, firmness and flexibility, acceptability and principle of stimulating difficulties, principle of formal-heuristic unity [7, 9].

In the developed by us recommendations on improvement of synchronized swimmers strokes' technique, preparatory and imitation exercises are used as well as exercises for development of strength and joints, engaged in the given motion action, flexibility and exercises for improvement of rhythm structure of the given motion action.

Besides, we took in consideration the fact that with executing of „standard" stroke there shall be ensured conditions, which facilitate mastering of motion actions and at initial stages it affects positively. As facilitating conditions we used such mandatory program's positions as standard position "on back", position "grouping". Besides, these positions were fulfilled with the help of "noodles".

With this, at later stages of strokes technique improvement process of synchronized swimmers, conditions, hampering exercises both in gym and in water, were used.

And at final stage of strokes technique improvement process of synchronized swimmers, we used means for hampering motion actions with different states of organism. So, sportswomen fulfilled motion actions against the background of significant physical tiredness (both: exercises in gym and in water); increased emotional tension (as a rule in the process of competition activity); distraction, distributed attention; impeding separate analyzers' activity (first of all fulfillment of exercises with closed eyes) and etc.

The offered physical exercises, directed to improvement of "standard" stroke technique, were included in complex of physical exercises, depending on their complexity and orientation for correction of certain technical elements.

As we know, in sports practice prompt, current and stage by stage control is used [7, 9, 10]. At the end of every mesocycle current control was conducted with using of video filming. The analysis of video materials and mistakes, made by sportswomen, carried out together with every sportswoman. Such kind of data analysis gave actual information about progress in improvement of strokes' technique.

An important part of "standard" stroke movement's improvement is gaining of superior limbs muscles' strength, as just arms and especially wrists take main load. Due to this fact we developed exercises for strengthening of shoulder's, forearm's and wrist's muscles.

Physical exercises are divided into two main groups: exercises, fulfilled in gym and exercises, fulfilled in water. Gym exercises also are divided into several groups: exercises complexes No.1-3 serve to warm up arms muscles' for the forthcoming work and to relax muscle in intervals between exercises with loads; exercises complexes No.4-8, oriented for strengthening of arms' and particularly wrists' muscles, presume involving of more than 60% of muscles' mass in work and in connection with this they are of overall character; exercises complexes No.9-13 are directed to improvement of separate elements of "standard" stroke movement (first of all of model parameters and all characteristics, which, according to correlation analysis, are connected with model ones); exercises complexes No.14-17 are directed to improvement of "standard" stroke movement and influence on endurance of certain muscles' groups, which are directly engaged in stroke movements of synchronized swimmers; exercises complex No.18 serves to development of arms muscles' strength and co-ordination (play method). Exercises complexes on water No.19-23 directly influence on improvement of "standard" strike movement.

As far as physical exercise, as main mean of physical training, is, in itself, multidimensional, multi component and multi structural then the effect of its application is also ambiguous. A coach, applying certain physical exercise, must have complete information about its content and the results of its application.

The offered by us exercises are oriented not only at improvement of "standard" stroke movement's technique, but also at strengthening of muscles, engaged in the given motion action.

Such exercises can be applied at initial stages of main part of training. After this, they were complicated and replaced; with this, easier exercises were included in the content of special warming up.

#### **Summary.**

The recommendations on improvement of technical sportsmanship presume sequential solution of correction of motion actions technique with observing the main tasks of technical sportsmanship improvement process.

The given practical recommendations will be implemented in the training process of synchronized swimming for sportswomen of 12 years old and younger. Besides, on the base of the obtained data comparative bio-mechanical models of "standard" stroke movement will be developed.

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