THE INFLUENCE OF SWIMMING ON PSYCHOMOTRICITY AT PREPUBERTAL CHILDREN

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Abstract: This article presents some aspects regarding the influence of swimming on growing and developing process at children at prepubertal age (11-13 years), and especially the influence on the achieved adjustments at psychomotricity level as a stabilizing factor of evolution, of body scheme' s attitude in static and dynamic.

Introduction: Psychomotricity is considered a branch of applied psychology and it seeks to integrate the motric functions with psychic ones, and it aims the integration of motric functions with the psychic ones, as an effect of education and development of nervous system. As particular objectives, psychomotricity follows the development of kinesthetic, of perception and of complex presentation of movement, development of basic and applicative abilities and motor skills; improving motor skills. Through exercise there are developed a series of motric elements that will be integrated in the whole coordination.

There is structured a certain global scheme of postures where the position of a body segment is well defined. [1].

In order to understand the importance of psychomotricity on the processes of growing and developing during children's period of prepubertal we will present some general aspects that can highlight the issue from this research. After M Epuran, (1976), the elements that are components of psychomotricity, are: body scheme, coordinated dynamic, segmental and general; static coordination – balancing; perceptual motric coordination (space perception, of rhythm and own movements); speed movements; ideomotor. [4,5].

The sense of *static and dynamic balance* allows the appreciation of body segments position and body position in space. The vestibular system collects information regarding body position on the afferent nervous ways and it sends them to the cortex and at the same time the

extra pyramidal system controls muscle contraction and the visual analyzer perceives the changes of body segments positions. [1].

The complexity of movements that are required to be performed in aquatic environment in order to achieve the maintaining of buoyancy in balance or the movement in water or immersion, it requires a sensor-motor adaptation that is atypical to humans. For movement coordination in aquatic environment, swimming develops psychomotor skills processing the information of analyzers involved in the effort specific to swimming. Vestibular system stability actions through exciting vestibular receptors, causing tonic reflex in the muscles that perform the movement (scapular – humeral belt, back, pelvic belt) [2,3].

Material and method: In order to achieve the proposed experiment, it proceeded to the selection of a witness group and an experimental group with a degree of homogeneity sufficiently high in order to allow performing imposed tests and programs without to create any difficulty in execution. The witness group is composed of 30 pupils, 11-13 years, class VI and class VII, 15 girls and 15 boys, the experimental group is composed in the same way as the witness group. At the beginning of the experiment, the groups have been tested for psychomotricity (4 tests), from which two of them are based on static and dynamic balance, and the other two are based on coordination and speed. After testing both groups, the witness group will continue the program of physical exercises within the physical school education lessons contained in the curricula, and the experimental group will be introduced in a program specific to swimming technique for a 6 months period, 3 hours per week. The program is done on 4 stages, from which the first one is of 18 hours and its main objective is the initiation in swimming techniques and methods, the other three stages are allotted both to swimming technique (technical elements), elements of developing the motor qualities and elements of awareness and correcting the attitude of body posture in static and dynamic. In table no1.1 there are presented the results from psychomotor tests, achieved during the experiment.

Table no 1 - Results of psycho motor index of subjects from the pedagogical experiment at initial-final testing (n=15)

Nr. Crt.	*Testing*	*Subjects groups*	*Initial testing - boys*			*Final testing - boys*			*t*	*P*	*Initial testing-girls*			*Final testing -girls*			*t*	*P*
			X±m	*S*	*Cv*	*X±m*	*S*	*Cv*			*X±m*	*S*	*Cv*	*X±m*	*S*	*Cv*		
1.	Flaming o test (sec)	**E**	25,13 ±6,41	7,93	0,32	34,07 ±6,08	7,53	0,22	3,20	<0, 01	32,40 ±11,79	14,67	0,45	36,60 ±11, 36	12, 95	0,35	0,80	>0, 05
		M	24,87 ±7,09	9,05	0,36	25,73 ±6,21	8,01	0,31	2,27	<0, 05	31,53 ±9,50	3,17	0,42	33,47 ±12, 76	15, 03	0,45	0,37	>0, 05
	t; P	**E-M**	0,08//>0, 05			3,00/<0, 01					0,17/>0, 05			0,60/>0, 05				
2.	Test of dynamic balance (10 m/sec)	**E**	9,53 ±0,50	0,52	0,05	8,53 ±0,56	0,64	0,07	4,70	<0, 001	9,60 ±0,69	0,91	0,09	8,40 ±0,69	0,83	0,10	3,77	<0, 01
		M	9,60 ±0,64	0,83	0,09	9,20 ±0,56	0,77	0,08	1,36	>0, 05	9,73 ±0,59	70	0,07	9,33 ±0,62	0,72	0,08	1,53	>0, 05
	t; P	**E-M**	,26/>0, 05			2,57/<0, 05					0,44/>0, 05			3,28/<0, 01				
3.	Japanese Test (4 m-10 touches/sec)	**E**	19,07 ±1,01	0, 91	0,09	17,33 ±0,89	1,11	0,06	3,86	<0, 01	17,40 ±1,17	1,40	0,08	14,87 ±0,94	1,30	0,09	5,12	<0, 001
		M	20,87 ±1,34	0, 70	0,07	19,33 ±1,69	2,23	0,12	2,14	<0, 05	18,13 ±1,59	2,10	0,12	16,33 ±1,51	1,88	0,11	2,47	<0, 05
	t; P	**E-M**	,29/<0, 01			3,11/<0, 01					1,12/>0, 05			2,48/<0, 05				
4.	Adams Test (nr.rep/15 sec)	**E**	17,20 ±6,27	8,74	0,51	21,73 ±4,41	6,20	0,29	1,63	>0, 05	17,60 ±5,52	6,65	0,38	21,40 ±3,20	4,29	0,20	0,52	>0, 05
		M	17,67 ±7,82	9,63	0,54	20,27 ±7,42	9,34	0,46	0,75	>0, 05	18,67 ±6,27	81	0,42	20,27 ±5,69	7,25	0,36	0,58	>0, 05
	t; P	**E-M**	,13/>0, 05			0,50/>0, 05					0,40/>0, 05			0,52/>0, 05				

Note: E- experimental group; n-15, f-14: P – 0,05; 0,01; 0,001. n-15, f-28: P – 0,05; 0,01; 0,001.M- Witness group. t – 2,145 2,977 4,140. t – 2,048 2,763 3,674

The experimental group was evaluated (10 tests specific to swimming), after finishing the first stage (initiation) of the swimming

program, after going through the other 3 stages of the program, it was made the final testing, the results being presented in table no 2.

Table no 2 – Subjects' results of the indices specific to swimming, included in the pedagogical experiment (n=15)

Nr. Crt.	*Testing*	*Subjects groups*	*Initial testing*			*Final testing*			*t*	*P*
			X±m	*S*	*Cv*	*X±m*	*S*	*Cv*		
1.	***Chest float (sec)***	**G**	10,85 ±2,69	3,70	0,34	15,35 ±2,87	3,71	0,24	3,32	<0, 01
		B	13,52 ±4,29	5,01	0,37	16,72 ±3,66	4,49	0,27	1,84	>0, 05
2.	***Back float (sec)***	**G**	11,95 ±4,93	6,03	0,50	16,87 ±3,88	5,01	0,30	2,43	<0, 05
		B	14,24 ±4,03	4,89	0,34	17,68 ±2,43	2,83	0,16	2,36	<0, 05
3.	***Chest slip (m)***	**G**	5,40 ±0,67	0,83	0,15	6,80 ±0,53	0,68	0,10	5,07	<0, 001
		B	5,60 ±0,72	0,83	0,15	6,67 ±0,53	0,62	0,09	4,00	<0, 01
4.	***Back slip (m)***	**G**	5,53 ±0,84	0,99	0,18	6,53 ±0,50	0,52	0,08	3,46	<0, 01
		B	5,07 ±0,51	0,80	0,16	6,33 ±0,49	0,62	0,10	4,85	<0, 001
5.	***Chest slip with foot movement crawl 12,5 m (sec)***	**G**	18,21 ±0,86	1,12	0,06	16,83 ±0,63	0,83	0,05	3,82	<0, 01
		B	15,34 ±0,68	1,02	0,07	14,07 ±0,65	0,88	0,06	3,66	<0, 01
6.	***Chest slip with foot movement bras 12,5 m (sec)***	**G**	21,18 ±1,42	1,79	0,08	18,99 ±0,78	1,01	0,05	4,12	<0, 01
		B	19,16 ±0,91	1,12	0,06	17,37 ±0,64	0,89	0,05	4,87	<0, 001
7.	***Chest slip with arms movement crawl 12,5 m (sec)***	**G**	17,40 ±0,48	0,70	0,04	16,40 ±0,59	0,78	0,05	3,70	<0, 01
		B	14,38 ±0,84	1,08	0,07	13,48 ±0,56	0,80	0,06	2,58	<0, 05
8.	***Chest slip with arms movement bras 12,5 m (sec)***	**G**	18,89 ±0,84	1,06	0,06	17,94 ±0,55	0,70	0,04	2,86	<0, 05
		B	17,45 ±1,03	1,38	0,08	16,26 ±0,89	1,13	0,07	2,58	<0, 05
9.	***Swimming in crawl coordination 25m (sec)***	**G**	27,90 ±1,11	1,44	0,05	24,64 ±1,48	1,77	0,07	5,51	<0, 001
		B	26,66 ±0,88	1,06	0,04	23,15 ±1,40	1,68	0,07	6,82	<0, 001
10	***Swimming in bras coordination 25m (sec)***	**G**	32,91 ±1,25	1,59	0,05	30,08 ±1,51	1,87	0,06	4,44	<0, 001
		B	31,81 ±1,44	1,68	0,05	29,12 ±1,46	1,69	0,06	4,36	<0, 001

Note: E- experimental group; n-15, f-14: P – 0,05; 0,01; 0,001.
M- Witness group t – 2,145 2,977 4,140

In order to achieve technical tests of swimming there have been made initiation lessons, the followed objectives did not consist in the performance of swimming technique, but only in assimilation and implementation of technical elements specific to swimming in order to improve the psychomotricity performance, especially the balance, coordination and awareness of correct body posture. According to the presented table, at tests of static balance (chest float) there can be seen a better evolution at girls, 10,85 with an average error ±2,69 initial at 15,35 average error ±2,87 final, t= 3,32 (P<0,01) and boys 13,52 with an average error ± 4,29 initial at 16,72 average error ± 3,66. The test of dynamic balance (front and back slip) Δ is between 1.07 m and 1.4 m, small differences are due to the technique that was not sufficiently fixed. At the other swimming tests, arms or legs, coordination swimming arm and crawl there are obtained positive results, but there are not major differences between the initial and final tests.

We will show graphic in figure 1 the swimming test in crawl coordination 25 m in order to highlight the evolution of the tested subjects.

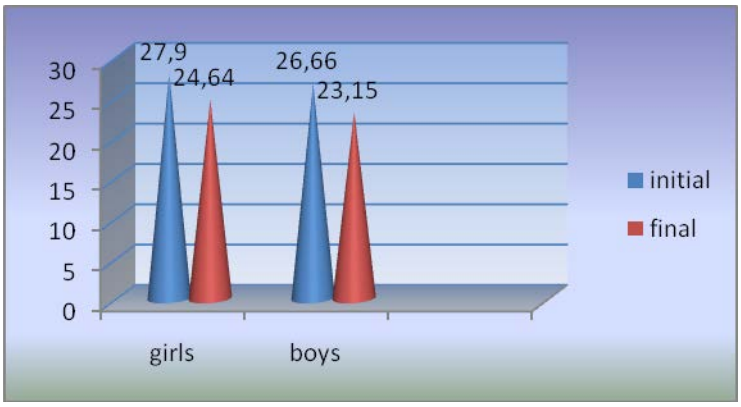

Fig.1 Results' dynamic at the test of swimming in coordination crawl 25 m achieved by the subjects included in the experiment

The results of psychomotricity tests confirm and bring a plus in strenghtening the argumentof the issued hyphotesis regarding the positive influence on psychomotricity by applying specific means of swimming at children at prepubertal age. In figure 2 we will present the evolution of the subjects from the tested groups in the experiment of static balance.

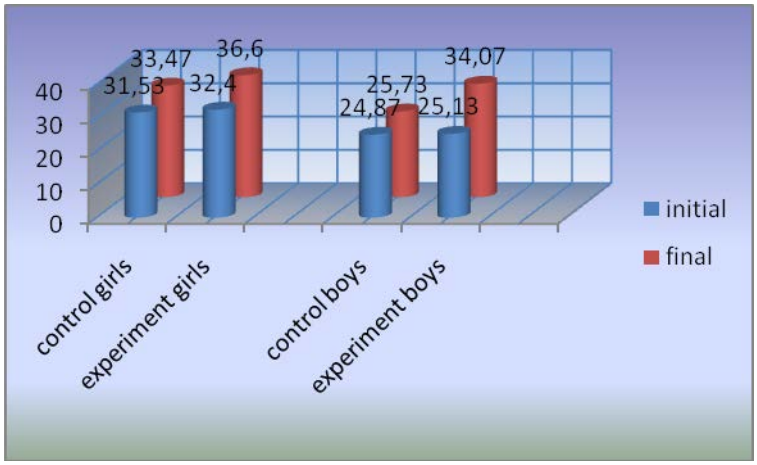

Fig.2 Results' dynamic at „Flamingo" test (static balance), achieved by the subjects included in the experiment

There can be seen a compliance between the results obtained at swimming tests (static balance) and static balance test obtained at psychomotricity testing where the subjects achieved positive results, in contrast to the achieved results at dynamic balance test where, at both tests, at swimming but also at psychomotric level the differences are lower. At „Adams" test there are achieved obvioulsy positive results, that confirms the beneficial influence on coordination and thus on psychomotricity in general, figure 3.

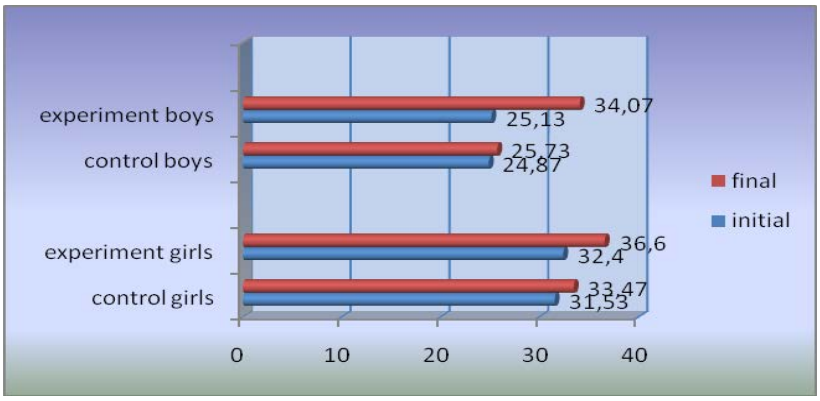

Fig.3 Results' dynamic at „Adams" test achieved by the subjects included in the experiment

Results and discussions:

Analyzing the obtained results after the tests achieved by the subjects included in the experiment there can be concluded the following:

Positive score achieved by the experimental groups at swimming tests transferred over the psycho motor tests, reveals a relevant influence on psycho motor parameters, especially at static balance and coordination-speed;

Differences between witness and experimental groups at the final psycho motor tests are visible, that shows the fact that the program achieved with means specific to swimming leads to the achieving of positive results. (Table no.1);

Witness group achieves a minimal improvement due to the increased natural growth, without the help of some specific programs.

Conclusions:

- Psychomotricity is a relevant parameter in ontogenesis of children growth and development (prepubertal age);
- Body posture in static and dynamic is directly influenced by degree and level of the psycho motor abilities;
- In order to raise the level of psycho motor level it is necessary the implementation of specific programs that requires anatomic and physiologic structures in the direction of proposed objectives;
- Swimming may produce adaptive changes in order to improve the psycho motor
- Level of training at prepubertal children leading to a correct body posture.

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