

## PECULIARITIES OF MORPHO-FUNCTIONAL CONDITION OF YOUNG SWIMMERS IN THE PERIOD OF BASIC TRAINING

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**Annotation.** The article is devoted to the research of optimal moving regime for young children. The aim of the article is to analyze data of morpho-functional condition of young swimmers in the period of basic training. 45 swimmers aged from 8 to 10 years were surveyed in dynamics of two years of their initial training preparation. The harmony, the level of physical development, the dynamics of morpho-functional condition data of young swimmers under the influence of regular swimming training have been defined. It has been defined that 60,00% of swimmers in the first year of training have harmonious physical development which was increased to 76,67% in the second year of training in the investigated group. The number of children with high level of physical development increased from 2,22% to 10,00% with the increase of their sports experience. Positive dynamics of indicators of vital capacity of the lungs, chest circumference at rest, chest circumference at breath, chest circumference at exhalation, chest excursion for children of the second year of training under the influence of systematic swimming training was determined. The moving regime of young swimmers can be considered as means of the improvement of children physical development in younger school age with disharmonious physical development.

**Key words:** children, morpho-functional condition, physical development, functional capabilities, swimmers.

### Introduction

In the Concept of governmental targeted social program of physical culture and sports development for 2012-2016 it is mentioned that life style of population of Ukraine and the state of physical culture and sports' sphere threat health and are a certain challenge for Ukrainian state at present stage of its development. Comparing with 2007 the quantity of persons, who were related to special medical group, increased by 40%, that caused reduction of children and youth, who are trained in children-junior sports schools by 110 thousand persons.

Measures of Ministry of Health Protection (MHP) HAMH of Ukraine concerning fulfillment of Governmental program "National plan of actions concerning realization of UN Convention about children rights" in 2011 for the period up to 2016 include prevention of children's obesity by provision of high quality school food, by prohibition of "fast food" sale in schools and nearby areas, by ensuring sufficient physical load (accessibility of sport sites, sport circles).

Searching of optimal junior school age children's motion regime is of priority in many researches [5, 6, 8, 9, 12, 13]. Low level of motion regime influences negatively on indicators of junior school age children's physical conditions [1,3,[http://www.euro.who.int/\\_data/assets/pdf\\_file/0010/74746/E90711.pdf](http://www.euro.who.int/_data/assets/pdf_file/0010/74746/E90711.pdf)].

For example, prevalence of children's obesity in European region is intensively expanding, by the data of WHPO, (in 70-tees of 20<sup>th</sup> century, annual increment of this indicator was about 0.2% in 80-tees – 0.6%, in 90-tees – 0.8% and in 2000 – it was 2%) In Europe 10-30% of children of 7-11 years old have excessive mass of body [[http://www.euro.who.int/\\_data/assets/pdf\\_file/0010/74746/E90711.pdf](http://www.euro.who.int/_data/assets/pdf_file/0010/74746/E90711.pdf)].

As per the data of I.L. Babiy's work only 8.0 – 10.0% of junior school age children in Ukraine have satisfactory organism's adapting abilities, 14.0 – 26.5% - have unsatisfactory adapting functions, main part of junior school age children (57.2 – 68.4%) have strain of adapting abilities and 10.0 – 17.0% - have upset of adapting. Only 60.30% of junior school age children have normal mass of body, deficit of body mass – 8.54% of children, excessive body mass – 21/82%, obesity – 9.34% of junior school age children. Results of Ruffiet's test witness that 0.9 – 1.0% have high level of functional abilities, the level higher than middle – 2.1 – 2.7%, middle level– 9.8 – 12.0%, the level lower than middle – 51.4 – 57.1%, low level– 29.4 – 33.6% of junior school age children [1].

As per the data of V.R. Kuchma there are negative trends to worsening of functional indicators of 8-10 years old children's respiratory functions [3].

Development of health related children physical culture and sports shall be oriented on choosing of optimal motion regimes, which would facilitate not only improvement of children's general state but also minimize children's traumatism during physical culture or sport trainings. In this aspect it is interesting to pay attention to motion regime of junior swimmers, as far as it significantly positively influences on physical condition and functional state of child organism's systems and has minimal risk of traumatism, comparing with other kinds of sports [2, 9, 11].

The research was fulfilled as per topic of scientific & research works of sports medicine and valeology department of physical culture Institute of Sumy state pedagogic university, named after A.S. Makarenko "Physiological-hygienic and psychological-pedagogic foundation of health related activity in educational establishments", (state registration No. 0109U004945).

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

*The purpose of the work* is to analyze indicators of morpho-functional state of junior swimmers on initial stage of training.

The object of the research is initial training of junior swimmers. The subject of the research is morpho-functional state of 8-10 years old swimmers of first and second years of initial training.

*The task of the research:*

1) determination of harmonicity and physical conditions of junior swimmers under influence of systemic swimming trainings;

2) study of dynamics of morpho-functional state indicators of junior swimmers.

*The methods and organization of the research:* we fulfilled observation of 8-10 years old children group, who attend swimming trainings at children-junior sport school of Sumy, in dynamics of two years of their initial training. Observation was carried out in 2011 and covered 45 children of first year of training (group A<sub>1</sub>), in 2012 – the children of the same group at second year of their training (group A<sub>2</sub>). Sex-age division of children in studied groups was the same. Training regime included 6 hours every week with duration of every training – 45 minutes. The course of initial swimming training consisted of three stages: 1) mastering of warming up exercises in water during nine lessons (diving in water and long exhale under water; sliding on breast and on back (the longer – the better); jumping in water from low board with legs downward; 2) mastering of four methods of swimming, simple jumps in water (10<sup>th</sup>-21<sup>st</sup> lessons – mastering of simplified swimming on back and crawl on breast; 22 – 30 lessons – mastering of simplified breaststroke and butterfly; simple jumps into water and simple turns; 3) revision of swimming skills on the base of one or two methods, selected, considering the bents of a disciple.

Anthropometric indicators (body length (BL), body mass (BM), chest circumference (CC) were determined as per commonly adopted methodic, with the help of regional tables of standards [7]. On the base of the obtained data we appraised harmonicity and physical condition (PC). Functional abilities of children's organisms were determined by the data of spirometry, hand dynamometry and Ruffiet's index  $\text{Py}\phi'e$  [4].

### Results of the researches

By the data of body mass and length in the studied group, during two years, children with harmonious PC dominated, with it: during second year of training (group A<sub>2</sub>) specific weight of harmoniously developed children was bigger (76.60±4.88%), than of group A<sub>1</sub> swimmers (60.00±5.66%), ( $p>0.05$ ). Quantity of children with disharmonious excessive BM was greater in group A<sub>1</sub> (24.44±4.96%), comparing with group A<sub>2</sub> (23.33±4.88%), ( $p>0.05$ ). Children with BM deficit were found only in group A<sub>1</sub> (15.65±4.20%), ( $p>0.05$ ), (see fig.1). The data of our research witness that the problem of disharmonious development of children with excessive weight actually exists and it coincides with previous researches [1].

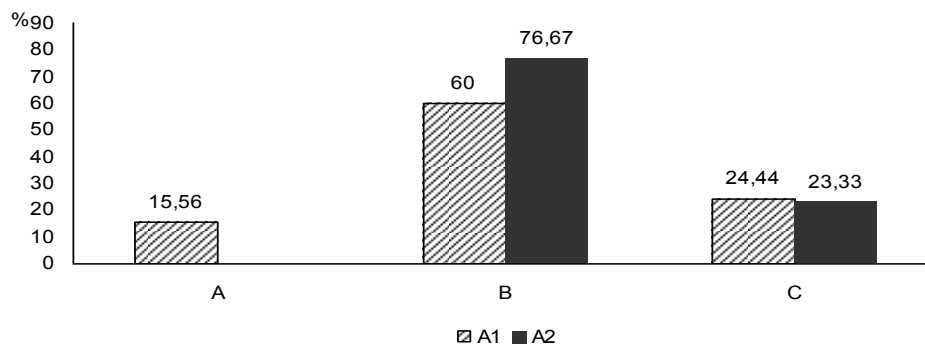


Fig.1. Division of 8-10 years old swimmers by harmonicity of physical conditions (%)

Notes: A – disharmonious physical condition with weight deficit; B – harmonious physical condition; C – disharmonious physical condition with excessive weight; A<sub>1</sub> – group of first year of training; A<sub>2</sub> – group of second year of training

Estimation and comparative analysis of children PC level in dynamics of two years points at prevailing quantity of children with middle level of PC, though greater quantity of children with high PC level was found in group A<sub>2</sub> (10.00±3.46%), comparing with swimmers of first year of training of group A<sub>1</sub>(2.22±1.70%), ( $p>0.05$ ), (see fig.2).

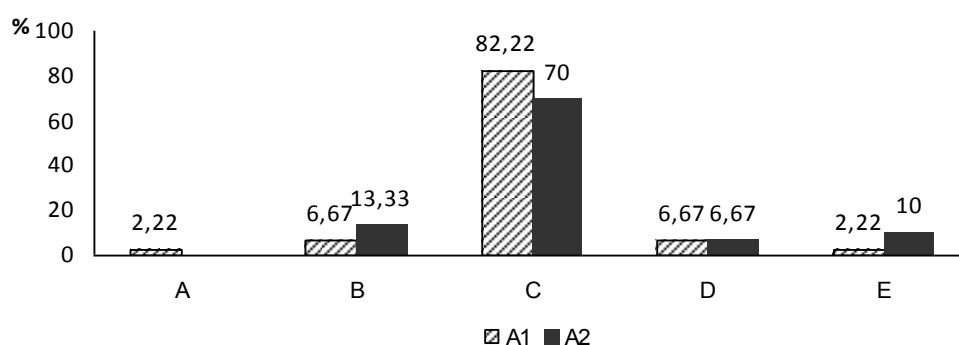


Fig 2. Division of 8-10 years old swimmers by physical conditions' level (%)

Notes: A –low level of physical condition; B –physical condition lower than middle; C –middle level of physical condition; D – higher than middle level of physical conditions; E – high level of physical conditions; A<sub>1</sub> – group of first year of training; A<sub>2</sub> – group of second year of training

We found positive dynamics of PC indicators under influence of systemic swimming trainings (see table 1). Indicators of body mass, as per tables of standards, were high for children of this age in both groups and it witnesses about excessive weight of junior swimmers. Relative increment of body mass and body length indicators of A<sub>2</sub> swimmers shows that girls develop quicker than boys.

Table 1

*Average indicators of 8-10 years old swimmers of the studied groups (abs. fig.).*

Indicator	Group A <sub>1</sub>		Group A <sub>2</sub>		Annual relative increment (%)	
	Boys	Girls	Boys	Girls	Boys	Girls
Body mass, kg	32.7±4.9	30.0±6.3	35.6±5.3	34.5±6.3	8.7	15
Body length, cm	137.3±6.8 <i>t=3.24</i> *	130.1±8.1 <i>t=3.48</i> ■	138.2±6.6	140.8±6.8	0.7	8.2
CC in rest, cm	67.9±5.3	65.1±5.9	71.7±4/9 <i>t=2.5</i> ▲	68.3±5.6	5.6	4.9

Notes: \* - confident difference between boys and girls' indicators of group A<sub>1</sub>; ▲ - confident difference between indicators of groups A<sub>1</sub> and A<sub>2</sub> boys; ■ - confident difference between groups A<sub>1</sub> and A<sub>2</sub> girls.

Analysis of respiratory system's functional state of 8-10 years old swimmers witnesses that indicators of VCL, CC of inhale, CC of exhale, excursion of chest are higher in group A<sub>2</sub>, than in group A<sub>1</sub>. With it, boys indicators of VCL, CC of inhale, CC of exhale are higher than the girls' ones both in absolute figures and by rate of increment. Strength of right and left hands' muscles of group A<sub>2</sub> swimmers was higher, comparing with swimmers of group A<sub>1</sub> (see table 2). By absolute indicators boys hands' muscles are stronger than the girls' but the rate of increment of boys' strength is lower than the girls'.

Table 2

*Average indicators of 8-10 years old swimmers' of the studied groups functional state (abs. fig.).*

Indicator	Group A <sub>1</sub>		Group A <sub>2</sub>		Annual relative increment (%)	
	Boys	Girls	Boys	Girls	Boys	Girls
VCL, ml.	1224±245	1143±215	1468±337 <i>t=2.78</i> ▲	1267±260	19.9	10.8
CC of inhale, cm	71.9±5.1 <i>t=2.2</i> *	69.7±5.8	75.5±5.1 <i>t=2.37</i> ▲	72.2±5.0	5.0	3.6
CC of exhale, cm	66.2±5.6	63.7±6.1	69.4±4.8 <i>t=2.06</i> ▲	66±4.9	4.8	3.6
excursion of chest, cm	5.7±1.8	5.9±1.6	6.1±1.2	6.2±1.2	7.0	5.1
Right hand strength, kg	13.2±2.9	11.6±3.2	13.5±1.8	12.2±2.4	2.3	4.6
Left hand						

strength, kg	11.9±2.6	11.4±2.5	12.5±1.9	12.0±2.5	5.0	5.6
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Notes: \* - confident difference between boys and girls' indicators of group A<sub>1</sub>; ▲ - confident difference between indicators of groups A<sub>1</sub> and A<sub>2</sub> boys.

Analyzing indicators of functional abilities of junior swimmers' cardio-vascular system by Ruffiet's test we could come to conclusion that in both researched groups the level of physical workability lower than middle and low dominated. In percentage, children of group A<sub>2</sub> had better indicators of Ruffiet's index in comparison with swimmers of group A<sub>1</sub> (see fig. 5) that witness about better functional abilities of group A<sub>2</sub> children's cardio-vascular system.

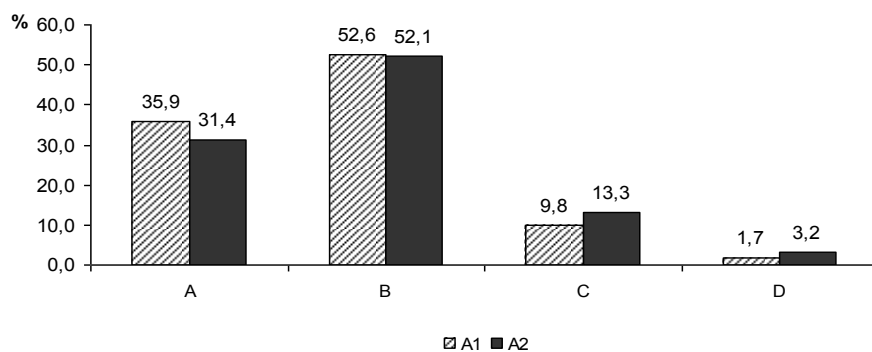


Fig.5. Division of 8-10 years old swimmers by indicators of Ruffiet's index (%)

Notes: A –low level of Ruffiet's index; B –lower than middle indicator of Ruffiet's index; C –middle level of Ruffiet's index; D – higher than middle level of Ruffiet's index; A<sub>1</sub> – group of first year of training; A<sub>2</sub> – group of second year of training

### Summary:

1. According to the results of our researches in dynamic of two years, 60.00% of first year swimmers had harmonious physical conditions. At the second year of training this indicator increased to 76.67%. With increasing of junior school age swimmers' sport experience, the quantity of children with high level of physical condition increased from 2.22% to 10%.

2. Under influence of swimming trainings there appeared positive dynamics by indicator of VCL, CC in rest, CC of inhale, CC of exhale, excursion of chest of children of the second year of training that witness about favorable development of respiratory system and about increasing of reserve abilities of children swimmers. The level of cardio-vascular system's functional abilities lower than middle and low dominated in the studied groups. In percentage, children with greater sport experience had better indicators of Ruffiet's index, comparing with swimmers-beginners that witness about higher functional abilities of cardio-vascular system of children with higher swimming experience.

3. We found positive dynamics of morpho-functional state indicators of junior school age children, which appeared under influence of systemic swimming trainings, and which was directed at improvement of these children's physical conditions. That is why motion regime of junior swimmers can be considered as a mean of improvement of physical conditions of children with disharmonious physical state.

*The prospects of the research* envisage development of practical recommendations concerning optimizing of junior swimmers' morpho-functional state.

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