

CHEST DEVELOPMENT AT BABIES INVOLVED IN SWIMMING ACTIVITIES

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Abstract: The article considers the chest development of children involved in a suggested adapted swimming program for infants aged between 6 months and 3 years. The goal of the conducted analysis is to prove the utility of swimming with regards to the development of infants’ chests. It is doubtless that swimming exercises develop the young child’s organism in its complex totality – from the formation of physical and breathing culture to the development of a firm musculature. Regular swimming is incredibly beneficial to the breathing nervous systems. While swimming the organism is saturated with oxygen, which has a relaxing effect on it. Swimming is among the few physical activities, which have an even effect on all muscle groups. The trainings are unique also from the point of view of the environment in which they take place. Exercises in water significantly contribute to the recreational impact on the organism of the infant, as it trains it, psychologically relaxes it, strengthens it, improves its health and habits. The motion possibilities for the baby in water are considerably more than in a different environment. Additionally, due to the higher density of water in comparison to air, the circulation of the child's organism is ameliorated, the musculature is strengthened, the breathing, cardiovascular, and nervous systems are improved. Swimming is regarded as one of the prophylactic sports for it provides special conditions: the horizontal body position. In the process of swimming water puts pressure on the body which enforces the lungs and the heart to make more attempts to sustain the normal parameters, which has a positive effect on the cardiovascular system. Swimming has a favorable effect on physical development, being the ideal sport for children of all ages, from the main process of growing, to the strengthening of the body. Immersed in water, a baby experiences plenty of new sensations and influences related to the physical properties of water. Water is a few times heavier and denser than air, thus having a strong mechanic pressure on the infant's body. The hydrostatic pressure has an even, massaging impact on the entire body. It presses the multiple blood vessels located in the skin, relaxes the peripheral blood circulation and, hence, the heartbeat.

Keywords: swimming, children, chest

Water's pressure on the chest deepens breathing and acts as a powerful prophylactic against stagnant lungs conditions, allowing for the development of the chest's volume. (Мънгова Сн., Н.Стефанова, 2000)

One of the main methods for examination in the sports practice is the anthropometric method for examining the physical development through measuring the human body. (Слънчев, П, 1998)

The anthropometric index that was examined in our research is the chest. The chest is a fundamental anthropometric indication that is a part of the assessment of the healthy physical development of the individual, following height and body weight. Through the measurements of the chest one acquires an impression of the general development of the body and the lungs. (Минева. М, 1985)

In our research we have examined children involved in swimming activity aged between 6 months and 3 years. Subjects of examination were nine girls and nine boys. The results of the tested were compared with the adopted indexes for a mean value in the norm.(table 3)

For the purposes of our research anthropometric examinations were done in order to determine the momentary condition of physical development of the babies and the dynamics of the examined index as a consequence of the applied methodology for swimming training. The results of the applied variational analysis of the anthropometric indexes are depicted in tables 1 and 2. Within the adopted guaranteed probability P=95%, significance level $\alpha = 0,05$, and sample size of 9, the critical value of the asymmetry As and excess Ex of the distribution are respectively: AS 0,05 = 1.374 and Ex0,05 = 2,668.

Table 1: Girls chest in pause

Girls											
№	Anthr o. index chest	me	N	X min	X max	R	\bar{X}	S	V %	As	Ex

	(in pause)										
Age/mounths											
1	6	sm	9	42	45	3	43,8	1,6	3,7	-1,5	
2	12	sm	9	45	49	4	46,8	1,5	3,3	0,5	-1,3
3	18	sm	9	48	53	5	50	1,7	3,4	0,9	-0,1
4	24	sm	9	51	57	6	53,7	2,2	4,1	0,3	-1
5	36	sm	9	54	61	7	57,8	2,4	4,2	-0,1	-0,1

Of N=9 and $\alpha = 0,05$, the critical value of $As_{0,05} = 1,374$ and $Ex_{0,05} = 2,668$

Table 2: Boys chest in pause

Boys												
№	Anthro. index chest	me	N	X min	X max	R	_	S	V %	As	Ex	
Age/mounths												
1	6	sm	9	45	46	1	45,7	0,6	1,3	-1,7		
2	12	sm	9	47	50,5	3,5	49	1,3	2,7	-0,6	-0,6	
3	18	sm	9	48	54	0,7	51,1	2,4	4,7	-0	-1,8	
4	24	sm	9	51,5	58,5	7	55	2,7	5	0,01	-1,8	
5	36	sm	9	55,5	63	7,5	59,5	2,8	4,7	-0,1	-1,6	

Of N=9 and $\alpha = 0,05$, the critical value of $As_{0,05} = 1,374$ and $Ex_{0,05} = 2,668$

Table 3: Adopted norms chest in pause

Age	Chest in pause			
	boys		girls	
	x +/- s	x +/- s	x +/- s	x +/- s
6 mounths	45,3	2,4	43,9	2,6
12 mounths	48,5	2,4	47,4	2,4
18 mounths	50,4	2,5	49,1	2,7
24 mounths	51,4	2,7	50,1	2,5
36 mounths	53,3	2,9	52,2	3

In Table 1 the parameters characterizing the scattering of the mean values of the index, during each of the examined periods, determine the girls' group as indiscrete. Within the 6 months old girls the adopted indexes for mean value in the norm are 43.9 cm (x +/- s 2,6). At the first testing of children, when they begin swimming lessons we find the mean value at 43.8 cm, i.e. at the norm. At the next testing, when the children are 12 months old we observe that the subjects are again in the adopted norm – mean value at 46.8 cm, given 47.4 (x +/- s 2,4) at the norm. When 18 months old the infants continue their development in accordance with the adopted norm – 50cm, given a norm of 49,1 (+/- s 2,7). A difference in favour of the girls who swim begins to be recorded when the subjects reach the age

of 24 months, showing a mean value of 53.7cm given a norm of 50.1cm ($x \pm s$ 2,5). At the last testing the difference is even larger: 57.8 cm given a norm of 52.2cm ($x \pm s$ 3).

A similar analysis is observed with the boys (table 2). All five testing periods establish the group as indescrete. At the beginning of the experiment we register a mean value of 45.7cm, given a norm of 45.3cm ($x \pm s$ 2.4). At the age of 12 months the examined subjects continue to fall within the norm: 49cm, given a norm of 48.5cm ($x \pm s$ 2,4). When the infants are 18 months old, those participating in the experiment begin to develop their chest and to overtake the standard norm with a little: mean value of 51.1cm, given a norm of 50.4cm ($x \pm s$ 2,5). Here too, as with the girls, a considerable difference begins to be observed at the age of 24 months. The mean value is 55 cm, given a norm of 51.4cm ($x \pm s$ 2.7). At the last testing we find the most significant difference: 59cm, given a norm of 53.3cm ($x \pm s$ 2.9).

From the analyzed results of both the girls and the boys we observe that the progress in the chest development occurs after the infants have been engaged in swimming lessons for 18 months. These results give us the reason to posit that children who are engaged in the adapted swimming program for babies develop their chest considerably more than their peers. To prove the advantage of swimming for the development of the chest of this contingent of people, we have examined the indexes of the chest during inhalation and exhalation when the tested subjects reached the age of 3 years (tables 4, 5, 6, and 7). The results were again compared to the adopted mean value in the norm (table 8).

Table 4: Girls chest (of inhalation)

Girls											
Nº	Chest (Of inhalation)	me	N	X min	X max	R	\bar{X}	S	V %	As	Ex
Age/mounths											
1	36	sm	9	56,2	63,6	7,4	60	2,5	4,2	-0,1	-1

Of N=9 and $\alpha = 0,05$, the critical value of $As_{0,05} = 1,374$ and $Ex_{0,05} = 2,668$

Table 5: Girls chest of exhalation

Girls											
Nº	Chest (Of exhalation)	me	N	X min	X max	R	\bar{X}	S	V %	As	Ex
Age/mounths											
1	36	sm	9	53	59,8	6,8	56,6	2,3	4,1	-0,1	-0,9

Of N=9 and $\alpha = 0,05$, the critical value of $As_{0,05} = 1,374$ and $Ex_{0,05} = 2,668$

Table 6: Boys Chest of inhalation

Boys											
Nº	Chest (Of inhalation)	me	N	X min	X max	R	\bar{X}	S	V %	As	Ex
Age/mounths											
1	36	sm	9	57,6	65,4	7,8	61,7	2,9	4,7	-0,01	-1,5

Of N=9 and $\alpha = 0,05$, the critical value of $As_{0,05} = 1,374$ and $Ex_{0,05} = 2,668$

Table 7: Boys chest of exhalation

Boys											
N ₂	Chest (Of exhalation)	me	N	X min	X max	R	\bar{X}	S	V %	As	Ex
Age/mounths											
1	36	sm	9	54,5	61,7	7,2	58,4	2,7	4,7	0,08	-1,6

Of N=9 and $\alpha = 0,05$, the critical value of As_{0,05} = 1,374 and Ex_{0,05} = 2,668

Table 8: Adopted norms chest in and ex halation

Age	Chest (sm)							
	Of inhalation				Of exhalation			
	boys		girls		boys		girls	
	x +/- s		x +/- s		x +/- s		x +/- s	
3 years	55,6	3,2	54,4	3,2	52,3	3,2	51,2	3

From tables 4 and 5 we determine the girls' group as indiscrete according to both indexes. In the girls (table 4) the mean value of inhalation is 60cm, given a norm of 54.4cm (x +/- s 3.2), while the exhalation one is 56.6cm, given a norm of 51.2cm (x +/- s 3). In the boys we also register a considerably higher values given the norm, 61.7cm, at a norm of 55.6cm (x +/- s 3.2) for inhalation, and 58.4cm, given a norm of 52.3cm (x +/- s 3.2) for exhalation. The large discrepancy of values between the tested subjects and the adopted norms confirm the above-written: participation in the adapted swimming program develop the infant's chest, thus improving the breathing system, the lungs and the heart.

CONCLUSIONS

Exercises in water environment (swimming) are completely appropriate and beneficial for the infant's organism since earliest age. In summary, analyzing the results of our research it is established that through swimming exercises the chest of the child is developed significantly more, which ameliorates the workings of the breathing system, the lungs and the heart.

SUGGESTIONS

Despite the modest number of babies involved in swimming activities in our country, parents ought to be keen on this proven beneficial practice.

More researches are needed for the examination of the capacity of this kind of physical activity and the role of water environment for the improvement of the physical functioning of this age group.

LITERATURE

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