THE INVESTIGATION OF THE LEVEL OF PRESCHOOL CHILDREN WITH EYESIGHT PROBLEMS FUNCTIONAL STATE

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Annotation. Separate characteristics of the functional state of preschool children with eyesight problems are shown in the article. The study included children of all age groups: younger, middle and older – 35 girls and 42 boys. During testing were determined: the functional state of cardiovascular and respiratory systems, the vestibular analyses, the length of sound audibility during the air conduction are determined in the article. The results suggest that the functional state of preschool children with vision problems somewhat below normal. Baseline data of the age dynamics of the functional state of preschool children with vision problems revealed that performance improved with age. In the sexual aspect, it was found that the performance of boys, mostly higher than that of girls.
Key words: functional state, children, preschool age, problems of sight.

Introduction.

Study of scientific - methodological literature and experience of advanced practice shows that for preschool age children with vision problems it is difficult to master curriculum subjects due to in-patient treatment of visual organs, low level of readiness for learning and high requirements of modern educational programs, which are oriented, mainly, on healthy children [1, c. 321; 2, c. 3-4; 6, c. 7]. V.F. Kruchinin, B.V. Sermeyev state the fact that motion deficit of children, having vision problems, results in functional changes of cardiac vascular and respiratory systems and, consequently, it negatively affects on physical state of a child [4, c. 17]. The same data were obtained by O.V. Davidenko, V.P.Semenenko, L.O. Fandikova, who affirm that diseases of cardiac vascular and respiratory systems, organs of hearing are the most frequent among children with vision problems [3, c. 114; 7, c. 147-148].

As it was noted by E.S. Vilchkovskiy (2008), preschool age children's ability to keep equilibrium develops gradually, in the process of improving vestibular, muscular and vision functions' analyzers, which are under control of central nerves system. In support of this idea, V.F. Kruchinin (1982), B.V. Sermeyev (1983) and B.G. Sheremet (1984) noted the importance of these analyzers' role in formation of motion skills and habits. The authors think fairly, that with the absence or significant worsening of visual perception, formation of motion analyzer especially suffers, search-orientation activity becomes complicated and it makes orientation during physical exercises fulfillment more difficult [4, c. 18; 5, c. 3-4]. A little bit later, such scientists as D.O. Silantyev and N.G. Baykina (2001) continued to study the reasons of difficulties in movements at physical training of children, having vision problems. They point at significant difficulties, which children with vision problems have, when estimating space characteristics: position, movements, directions, distance, size and shape of objects (lagging from norm is 5-30%).

Interconnection of physical preparedness and functional state of children of different age analyzers was studied by: A. Ivanova (2001), I. Maslyak (2004), L. Shesterova (2004), Ye. Moiseyenko, N. Terentyeva (2007), I. Kuzmenko (2009), Helen Lomaxa (2011), Hillary Lakea (2009), Julie Mughala (2010). They established that functional state of certain sensory systems exerts significant affect on the speed of physical abilities development and mastering movements by children, particularly by preschool age children.

The present work has been fulfilled as per the plan of Scientific and Research works of Kharkov humanitarian pedagogical academy.

Purpose, tasks of the work, material and methods.

The purpose of the research: to determine indicators of preschool age children with vision problems functional state indicators.

The methods of the research. Theoretical analysis and generalization of scientific-methodological sources, acumetry (air) method, functional tests with changes of body position and dosed muscular load, Shtange's test , Romberg's test, methods of data statistical processing.

Organization of the research. The research was carried out in September 2011 in specialized preschool educational establishment No.160, Kharkov. 35 girls and 42 boys took part in the research. All children related to preparatory and special health groups.

Results of the research.

Sound audibility duration indicators under air conductivity of preschool children of experimental and control groups are given in table 1. Sound audibility duration indicators, under air conductivity, are improving coinciding with age and it is attested by the data, obtained during the present research.

Table 1.

Sound audibility duration indicators under air conductivity (c)

Groups	Young group		Medium group		Elder group	
	B	G	B.	G.	B.	G.

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		Indicators $\overline{X}$ ± m					
Right ear	*n*	*15*	*11*	*14*	*11*	*13*	*13*
	Experimental	6,97± 0,19	6,50± 0,05	7,62± 0,04	7,13± 0,03	8,80± 0,03	8,34± 0,03
	n	*14*	*10*	*12*	*10*	*13*	*10*
	Control	6,79± 0,03	6,38± 0,04	7,70± 0,04	7,16± 0,02	8,79± 0,02	8,51± 0,06
	t	0,96	1,88	1,48	0,72	0,21	1,89
	p	>0,05	>0,05	>0,05	>0,05	>0,05	>0,05
Left ear	Experimental	6,78± 0,04	6,28± 0,04	7,65± 0,06	7,31± 0,06	8,89± 0,03	8,45± 0,05
	Control	6,82± 0,02	6,19± 0,02	7,78± 0,04	7,20± 0,02	8,82± 0,03	8,43± 0,07
	t	0,96	1,93	1,77	1,80	1,96	0,86
	p	>0,05	>0,05	>0,05	>0,05	>0,05	>0,05

Study of sound audibility duration indicators under air conductivity depending on sex showed that results prevail among boys but this difference is not authentic (p>0,05). As a result of analysis different audibility of right and left ears was found. So, children of medium and elder experimental groups have audibility indicators of left ear higher than of the right one. The same trend was observed in the results of medium control group children.

Comparing of audibility duration results of preschool children, having vision problems, with average quantitative indicators, offered by M.I. Zemtsova (1987) witnesses that the tested children have high indicators. This is explained by hearing compensatory function of children with vision problems.

The results of Romberg's test showed vestibular analyzer's functional low level of preschool children with vision problems, comparing with indicators by V.A. Shishkina in co-authorship (2000). In our opinion it is connected with the fact that visual analyzer promotes maintaining a posture.

Comparing initial data of vestibular analyzer's functional state of preschool children with vision problems, with respect to their sex, it should be noted that indicators of boys are higher to some extent than the same of girls (see table 2).

Table 2

Indicators of vestibular analyzer functional state

Groups	Young group		Medium group		Elder group	
	B	G.	B.	G.	B.	G.
	Indicators $\overline{X}$ ± m					
n	*15*	*11*	*14*	*11*	*13*	*13*
Experimental	1,33± 0,11	1,36± 0,11	2,50± 0,12	2,45± 0,12	3,77± 0,37	3,69± 0,16
n	*14*	*10*	*12*	*10*	*13*	*10*
Control	1,43± 0,11	1,30± 0,10	3,33± 0,17	2,40± 0,11	3,85± 0,20	3,50± 0,16
t	0,62	0,42	1,62	0,33	0,18	0,85
p	>0,05	>0,05	>0,05	>0,05	>0,05	>0,05

When comparing indicators of young, medium and elder groups, it was found that they were gradually increasing in coincidence with age both of boys and girls. It is explained by the fact that within the period of preschool age child's coordination of unconditioned movements is significantly improving. In every next age group, preschool children's movement actions are fulfilled more accurate and efficient. Though, the authenticity of difference between them was not observed (p>0,05).

Comparing criteria of breath-holding functional test evaluation, which were offered by V.A. Shishkina in co-authorship, with respiratory system functional state indicators of preschool children with vision problems, it should be noted that they are, to some extent, lower than the standard ones. It is explained by the limitedness of movements that negatively affects on respiratory system functional state. Indicators of experimental group children are a little bit higher than of control group children, but no authenticity of difference between them was observed (p>0,05).

Table 3

Indicators of respiratory system' functional state

Groups	Young group		Medium group		Elder group	
	X	G.	X.	G.	X.	G.
	Indicators $\overline{X}$ ± m					
n	*15*	*11*	*14*	*11*	*13*	*13*
Experimental	16,40± 0,20	14,45± 0,23	17,50± 0,30	16,00± 0,18	18,77± 0,23	16,77± 0,15
n	*14*	*10*	*12*	*10*	*13*	*10*
Control	16,14± 0,27	14,40± 0,15	17,42± 0,27	16,20± 0,17	18,08± 0,36	17,40± 0,34
t	0,76	0,20	0,53	0,81	1,62	1,70
p	>0,05	>0,05	>0,05	>0,05	>0,05	>0,05

The results, given in table 3, witness that maximal by time breath holding was manifested by preschool children of elder groups. With this, indicators of respiratory system's functional state are increasing, coinciding with age. By the data of E.S. Vichkovskiy intensive process of formation of lungs and respiratory tracts tissues finish up to 7 years old age.

For determination of preschool children, having vision problems, cardiac vascular system's state we conducted functional test for dosed muscular load and test with changes of body position, which permitted to estimate capabilities of children health state and to dose more accurately physical loads during training (see table 4, 5).

Table 4

Indicators of cardiac vascular system's functional state (test with changes of body position)

			Before load				After load				
			Indicators $\overline{X}$ ± m								
			B.	t	G	t	B.	t	G	t	p
Young group	E	BPav.	107,33± 0,29	0,45	107,09± 0,32	1,94	118,40± 0,19	0,93	118,18± 0,31	1,91	>0,05
		BP g..	68,54± 0,28	1,84	70,27± 0,63	0,67	79,00± 0,12	0,73	81,91± 0,89	0,22	>0,05
		HR	118,87± 0,41	1,44	120,82± 0,52	0,83	130,00± 0,37	1,98	132,00± 0,32	1,46	>0,05
	C	BP av.	107,14± 0,30	0,45	108,00± 0,34	1,94	118,07± 0,30	0,93	117,40± 0,26	1,91	>0,05
		BP g.	69,14± 0,18	1,84	69,50± 0,97	0,67	79,29± 0,35	0,73	81,70± 0,31	0,22	>0,05
		HR	118,21± 0,19	1,44	121,30± 0,26	0,83	129,14± 0,23	1,98	131,40± 0,26	1,46	>0,05
Medium group	E	BP av.	105,64± 0,39	1,99	105,82± 0,35	1,80	116,71± 0,21	1,54	115,91± 0,43	0,93	>0,05
		BP g.	67,57± 0,36	1,64	68,69± 0,24	0,50	79,64± 0,38	1,53	79,73± 0,48	1,19	>0,05
		HR	118,64± 0,29	1,87	119,73± 0,27	1,23	129,86± 0,27	1,35	130,55± 0,30	1,87	>0,05
	C	BP av.	104,92± 0,22	1,99	106,70± 0,34	1,80	117,17± 0,20	1,54	116,40± 0,31	0,93	>0,05
		BP g.	68,25± 0,21	1,64	68,30± 0,34	0,50	80,58± 0,49	1,53	79,10± 0,22	1,19	>0,05
		HR	117,92± 0,25	1,87	120,20± 0,27	1,23	130,42± 0,31	1,35	129,70± 0,34	1,87	>0,05
Elder group	E	BP av.	103,77± 0,51	1,47	105,54± 0,38	1,67	116,00± 0,41	1,80	116,15± 0,40	1,82	>0,05
		BP g.	64,31± 0,46	0,77	65,69± 0,40	0,77	78,38± 0,31	1,70	79,23± 0,64	1,65	>0,05
		HR	109,62± 0,31	1,84	109,85± 0,40	1,41	128,08± 0,41	1,57	127,85± 0,24	0,93	>0,05
	C	BP av.	104,69±	1,47	106,30±	1,67	116,92±	1,80	117,00±	1,82	>0,05

			0,37		0,26		0,31		0,30		
		BP g.	64,77± 0,39	0,77	66,10± 0,34	0,77	79,08± 0,27	1,70	78,10± 0,25	1,65	>0,05
		HR	110,38± 0,28	1,84	110,50± 0,24	1,41	129,08± 0,49	1,57	128,20± 0,29	0,93	>0,05

Table 5

Indicators of cardiac vascular system's functional state (test for dosed muscular load)

			Before load				After load				
			Indicators $\overline{X}$ ± m								
			X	t	G	t	X	t	G.	t	p
Young group	E	BP av.	108,00± 0,43	0,43	107,27± 0,30	0,99	119,13± 0,25	0,25	117,64± 0,45	1,59	>0,05
		BP g.	69,07± 0,29	0,29	70,27± 0,72	1,27	79,67± 0,25	0,39	80,18± 0,56	0,87	>0,05
		HR	119,80± 0,31	1,63	121,18± 0,55	1,76	130,80± 0,39	1,62	132,27± 0,27	1,63	>0,05
	C	BP av.	106,71± 0,26	0,43	107,70± 0,35	0,99	117,64± 0,28	0,25	116,80± 0,27	1,59	>0,05
		BP g.	67,57± 0,28	0,29	69,20± 0,44	1,27	76,21± 0,37	0,39	80,80± 0,44	0,87	>0,05
		HR	119,21± 0,19	1,63	120,10± 0,29	1,76	130,07± 0,22	1,62	131,60± 0,31	1,63	>0,05
Medium group	E	BP av.	106,07± 0,32	1,81	106,64± 0,63	1,76	116,07± 0,30	0,99	117,55± 0,35	0,13	>0,05
		BP g..	65,64± 0,44	0,86	67,82± 0,42	1,73	77,93± 0,44	0,80	80,82± 0,59	1,79	>0,05
		HR	119,36± 0,34	0,25	118,36± 0,26	1,73	130,50± 0,28	1,81	131,64± 0,26	1,79	>0,05
	C	BP av.	106,92± 0,34	1,81	107,90± 0,35	1,76	115,58± 0,39	0,99	117,60± 0,23	0,13	>0,05
		BP g...	66,17± 0,42	0,86	68,80± 0,38	1,73	78,33± 0,25	0,80	79,70± 0,21	1,79	>0,05
		HR	119,25± 0,27	0,25	118,80± 0,27	1,73	131,33± 0,36	1,81	131,20± 0,23	1,79	>0,05
Elder group	E	BP av.	104,54± 0,35	1,18	106,31± 0,28	1,78	116,38± 0,53	1,72	116,85± 0,31	1,55	>0,05
		BP g..	63,31± 0,31	1,69	66,99± 0,55	1,51	79,31± 0,27	1,06	79,92± 0,39	1,54	>0,05
		HR	110,38± 0,30	1,92	110,31± 0,28	1,65	129,62± 0,51	1,03	130,38± 0,34	1,26	>0,05
	C	BP av.	103,92± 0,38	1,18	105,60± 0,28	1,78	117,38± 0,25	1,72	116,20± 0,27	1,55	>0,05
		BP g..	62,54± 0,34	1,69	67,80± 0,48	1,51	79,69± 0,25	1,06	79,20± 0,25	1,54	>0,05
		HR	111,15± 0,27	1,92	110,90± 0,22	1,65	130,23± 0,30	1,03	129,80± 0,31	1,26	>0,05

Comparing the registered results with evaluation criteria, offered by E.S. Vilchevskiy (2008), it should be noted that they are, to some extent, lower than normal. Regarding indicators of functional test with changing of body position, considering sex, it should be noted that boys' indicators are higher than the girls' ones. Exclusions are only indicators of young experimental group girls before load, and middle and elder experimental groups' girls after load.

The same trend was observed when analyzing the results of functional test with dosed muscular load, where boys' indicators are mainly higher than the girls' ones. Exclusions were only the indicators of elder control group girls after load.

Comparing of the studied indicators with respect to age witnesses that blood pressure value and hear rate are improving, coinciding age; exclusion is observed only in functional test with dosed muscular load (blood pressure indicators) of elder experimental group boys after load, but these difference is not authentic ($p>0,05$).

Comparing of results of two functional tests revealed that the best indicators, both: of boys and the girls, are registered in test with changing of body position. It is explained by less functional consumptions, than in test with dosed

muscular load. Exclusions are only indicators of medium experimental group girls (test with changing of body position).

Summary.

1. The results of the research permit to affirm that functional state indicators of preschool children with vision problems is a little lower than norms, given in literature sources.

2. Analyzing the research results of preschool children with vision problems functional state with respect to their sex, it was found that boys' indicators are, mainly, higher than the girls' ones.

3. Initial data of preschool children with vision problems age dynamic of their functional state permitted to establish that these indicators are improving, coinciding age.

The prospects of further researches lie in searching the ways for improvement of preschool children's functional state indicators.

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