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INDIVIDUAL DIFFERENCES IN THE FORMATION OF SWIMMING TECHNIQUE OF YOUNG ATHLETES WITH DIFFERENT STRENGTH OF THE NERVOUS SYSTEM UNDER THE CONDITIONS OF APPLYING DIFFERENT TEACHING METHODS

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Purpose: to study the influence of methods of formation of swimming technique among 7–8 year old swimmers and the influence of their individual characteristics of the nervous system on the effectiveness of mastering physical exercises.

Material and methods: The study was conducted over three months with young swimmers (n = 141) who studied sports swimming techniques. They were preliminarily examined for the strength of the nervous system for excitation by three methods: physical activity – the slope type of the curve, tapping test, noise immunity.

Results: the influence of various methods of initial teaching in swimming on the success of the formation of motor skills in children of 7–8 years old with different strength of the nervous system relative to excitement was studied. The reproductive method, problem learning and their combinations were used. The children were divided according to the strength of the nervous system into groups: "strong", "average" and "weak".

Conclusions: according to the research results, it turned out that the most successful exercise training was when using the reproductive method in the first 2–3 lessons, followed by the use of problem learning. In relation to children with different strengths of the nervous system, then, according to the conclusions of many researchers, the average type in number exceeds other types combined and therefore one should focus on them. The training described above turned out to be the most effective for children with an average nervous system.

Keywords: strength of the nervous system, teaching methods, swimming

Introduction

During study, any motor actions must follow the basic principles of teaching, and for faster and better-quality teaching, the didactic proposes to take into account the individual characteristics of a person [1; 3; 5; 10; 14]. The relevance of this study is due to the need to find the most effective forms and methods of teaching movements, which would take into account the individual characteristics of the higher nervous activity of young athletes-swimmers, would contribute to an increase in cognitive activity, independence and the ability to creatively approach solving various problems not only in sports, but also in other fields of activity [2; 8; 10].

The object of the research is the formation of motor skills and abilities in swimmers at the age of 7-8 years.

The subject of the research is the individualization of the process of formation of swimming technique, taking into account the properties of the nervous system of children aged 7-8 years.

The purpose of the research is to investigate the influence of techniques for the formation of swimming technique among 7-8 year old swimmers and the influence of their individual characteristics of the nervous system on the effectiveness of mastering physical exercises..

Objective:

1. To reveal the features of the formation of motor skills in swimmers of 7-8 years old with different strengths of the nervous system and the influence of various teaching methods on the process of formation of motor skills.

2. To determine the effectiveness of the combination of various teaching methods in the process of motor skills formation among young swimmers 7-8 years old with different strength of the nervous system.

Material and Methods of research

The study was carried out over three months with young swimmers (n = 141) who studied the technique of sports swimming methods. They were preliminarily examined for the strength of the nervous system for excitation by three methods: motor - the nature of the slope of the curve (SC) [10; 11], tapping test [6; 7], noise immunity [12; 15]. According to the survey results, they were divided into three typological groups: "weak", "medium" and "strong". As in the studies of other authors [7, 10, 12], and in ours, we got the number of "average", which exceeded the "weak" and "strong" combined.

In each group, the mastering of the swimming technique took place according to a separate method. In the first group, the reproductive method was used [3; 5, 8], in the second - problematic [1, 4, 13; 16] and in the third - a combination of these methods in a different sequence.

At the beginning of training and at the end of each lesson, all children performed a control test, which contained all those elements of the technique that were studied in the lesson. The execution of the test was accompanied by measuring the time of its execution, the number of movements (frequency), the number of errors and the assessment for the technique by the method of expert assessment (n = 4) according to a previously developed scale.

Results of the research

In the "strong" group, a statistically significant ($p<0,05$) improvement in the time of the control test took place only in the "reproductive" class (Table 1), and the increase in their score was generally statistically insignificant in all groups

(Table 2). However, one of the reasons for this phenomenon can be considered a small number of subjects with a strong nervous system who took part in the experiment.

In representatives of the weak type, significant changes in time occurred in all groups, except for the "reproductive-problem" group, while the absolutely best time (7,94 s) among all children was shown in the last lesson by the "weak" in the "reproductive" group.

Children with a middle nervous system in all groups had a statistically significant improvement in both time and control test scores. Among all children, the highest score for the technique (12,57 s) was received by the "strong" in the "reproductive-problem" group ($p<0,05$), and the lowest score (10,20 s) was obtained by the "strong" in the "reproductive" group.

All children, with the exception of the "strong" and "average" children in the "reproductive-problem" group, reduced the number of movements until the end of the training when performing the control test (Table 3). The greatest shifts in the number of movements occurred in the "problem-reproductive" and "problem" groups, but in the first of them statistically significant ($p<0,05$) changes occurred only in the "average", and in the other - in all children.

Over the entire period of training, children of the strong type still could not achieve a significant improvement in time, although they improved it steadily from the first to the last lesson. Representatives of the average type achieved a significant ($p <0.05$) result in the fourth lesson and did not worsen it to the end in the future. Subjects with a weak nervous system in the sixth lesson and then in the eighth, achieved a statistically significant ($p<0,05$) improvement in time. The given data give reason to believe that the use of such a technique is more conducive to success in teaching people of the middle type, but at the same time, relatively good results in the learning process were shown by representatives of other typological groups.

Table 1

Time of execution of the control test at the beginning and at the end of training (s)

Type of nervous system	Terms of registration	GROUP							
		Reproductive-problematic		Problematic-reproductive		Reproductive		Problematic	
		$\overline{X}$	δ	$\overline{X}$	δ	$\overline{X}$	δ	$\overline{X}$	δ
Strong		(n = 8)		(n = 9)		(n = 8)		(n = 8)	
	Initial	13,00	7,02	12,78	3,09	11,97	1,26	11,30	1,49
	Final	9,60	2,60	10,45	2,72	9,50	1,02	9,13	0,61
	Difference	3,40 (26,15%) p > 0,05		2,33 (18,23%) p > 0,05		2,47 (20,63%) p < 0,05		2,17 (19,20%) P > 0,05	
Average		(n = 14)		(n = 16)		(n = 15)		(n = 15)	
	Initial	12,21	2,49	10,46	2,29	11,11	2,15	10,81	2,12
	Final	9,21	0,74	8,77	1,03	8,25	1,41	7,96	1,21
	Difference	3,00 (24,57%) p < 0,01		1,69 (16,16%) p < 0,05		2,86 (25,74%) p < 0,01		2,85 (28,86%) p < 0,01	
Weak		(n = 14)		(n = 12)		(n = 10)		(n = 12)	
	Initial	11,39	3,40	11,03	1,07	11,96	3,05	11,92	2,36
	Final	9,17	1,72	9,30	0,85	7,94	0,76	8,41	0,68
	Difference	2,22 (19,49%) p > 0,05		1,73 (15,68%) p < 0,01		4,02 (33,61%) p < 0,05		3,51 (29,45%) p < 0,01	

Table 2

Assessment for the technique of performing the control test at the beginning and at the end of training (points)

Type of nervous system	Terms of registration	GROUP							
		Reproductive-problematic		Problematic-reproductive		Reproductive		Problematic	
		$\overline{X}$	δ	$\overline{X}$	δ	$\overline{X}$	δ	$\overline{X}$	δ
Strong		(n = 8)		(n = 9)		(n = 8)		(n = 8)	
	Initial	9,33	2,90	9,28	1,72	8,13	1,50	8,17	1,99
	Final	12,57	2,75	11,00	2,28	10,20	2,11	11,07	2,91
	Difference	3,24 (34,73%) p > 0,05		1,72 (18,54%) p > 0,05		2,07 (26,46%) p < 0,05		2,90 (35,50%) p > 0,05	
Average		(n = 14)		(n = 16)		(n = 15)		(n = 15)	
	Initial	8,43	1,82	10,38	1,47	9,49	1,85	8,67	1,80
	Final	10,98	1,22	12,29	1,61	11,96	1,87	12,28	3,09
	Difference	2,55 (30,25%) p < 0,01		1,91 (18,40%) p < 0,01		2,47 (26,03%) p < 0,01		3,61 (41,64%) p < 0,01	
Weak		(n = 14)		(n = 12)		(n = 10)		(n = 12)	
	Initial	8,07	1,61	9,37	1,07	8,98	1,21	9,37	1,03
	Final	10,87	2,53	11,76	1,62	11,18	2,14	12,13	1,57
	Difference	2,80 (34,70%) p < 0,05		2,39 (25,51%) p < 0,01		2,20 (24,50%) p > 0,05		2,76 (29,46%) p < 0,01	

Table 3

Number of movements during the control test at the beginning and at the end of training (number of cycles)

Type of nervous system	Terms of registration	GROUP							
		Reproductive-problematic		Problematic-reproductive		Reproductive		Problematic	
		$\bar{X}$	δ	$\bar{X}$	δ	$\bar{X}$	δ	$\bar{X}$	δ
Strong		(n = 8)		(n = 9)		(n = 8)		(n = 8)	
	Initial	13,33	0,58	21,75	5,19	18,33	2,52	16,67	1,16
	Final	16,00	4,36	16,25	6,55	16,00	0,00	13,00	1,00
	Difference	2,67 (20,03%) p > 0,05		5,50 (25,29%) p > 0,05		2,33 (12,71%) p > 0,05		3,67 (22,02%) p < 0,05	
Average		(n = 14)		(n = 16)		(n = 15)		(n = 15)	
	Initial	14,89	1,62	18,36	4,20	16,20	4,47	16,20	3,39
	Final	15,67	2,20	14,73	2,41	13,80	2,62	12,80	3,28
	Difference	0,78 (5,24%) p > 0,05		3,63 (19,77%) p < 0,05		2,40 (14,81%) p > 0,05		3,40 (20,99%) p < 0,05	
Weak		(n = 14)		(n = 12)		(n = 10)		(n = 10)	
	Initial	14,78	1,79	17,89	3,77	16,00	4,69	17,14	2,48
	Final	12,22	3,15	14,86	1,57	13,80	2,27	13,43	1,99
	Difference	2,56 (17,32%) p < 0,05		3,03 (16,94%) p > 0,05		2,20 (13,75%) p > 0,05		3,71 (21,64%) p < 0,05	

Evidence that this technique provides almost the same effect on the learning success of subjects with different strengths of the nervous system can be found in the fact that in the process of conducting all nine sessions, only in the third was a statistically significant ($p<0,05$) difference in results between the "mean "and" weak ", and in other cases there was no significance.

There was no significant improvement and assessment among the subjects of the "strong" type, although they showed a fairly high result in the last lesson – 12,57 points (Table 1). It should be noted that during the first seven lessons the swimmers of this group did not have significant changes and only in the eighth and ninth lessons slightly improved ($p<0,05$) their results. The same situation is observed in the dynamics of the growth of grades in "medium" and "weak", which after the second or third lessons began to show consistently mediocre results until the last lesson.

Still, it is necessary to single out children with a weak nervous system who, from the second session to the last, showed results that significantly exceeded the initial level of assessment. At the same time, swimmers of the intermediate type achieved a significant ($p<0,05$) improvement in it only in the last lesson. The analysis of marks for the technique of performing the control test emphasizes that the "reproductive-problem" technique did not reveal a clear typologically determined difference in the success of mastering movements by persons with different strengths of the nervous system. This is confirmed by the lack of statistical significance between the indicators of all three groups at each lesson.

Conclusions / Discussion

The results of the study showed that young swimmers of different types of the nervous system perceive the educational material in a different way, as a result of which the formation of motor skills in them occurs in different lengths of time and with peculiarities inherent only for this typological group. So, in the strong type of children, the formation of a skill proceeds more slowly than in others, regardless of the teaching method, it is expressed in a lag of 2-3 lessons in terms of

the time of the control test and the assessment for the technique of its implementation.

The strong type achieves the greatest success in problem-based learning, having an advantage in assessment over similar ones in other learning conditions by 1,91 points ($p<0,05$) and in the exercise time - by 0,72 s. ($p<0,05$).

Representatives of the average type equally effectively master motor actions when using any of the methods, but rather achieve a significant improvement in indicators in reproductive and reproductive-problem learning.

Persons of the weak type in 80% of cases master motor actions faster when using the reproductive method in teaching and, to a greater extent than others, react negatively to any abrupt changes in the conditions of the educational process.

The prospect of further research is to study the relationship between the strength of the nervous system and the characteristics of the competitive activity of athletes-swimmers.

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