EVALUATION OF THE PROGRAMME OF SYNCHRONIZED SWIMMING FOR PRE-SCHOOL CHILDREN

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Abstract

The aim of this research was to explore the benefits and possible effects of the beginners synchronised swimming programme on the kinanthropometric features of toddlers and pre-schoolers. Seven different kinanthropometric tests were used in order to prove the positive effects of the synchronised swimming programme, and of practicing sports in general, on these features.The participants of this research were twenty females between the ages of 5 and 6, attending the standard preschool programme, split into two equal-sized groups. The experimental group consisted of ten swimmers of the Synchronised Swimming Club Primorje Acqua Maris, while the control group consisted of ten girls who did not practise a sport. During the trial the experimental group was additionally exposed to the beginners synchronised swimming programme. The measurements of kinanthropometric features of both groups were done at the beginning and at the end of the trial period.In the conducted research, the final measurements of the experimental group showed exceptional improvement in comparison to their initial measurements.The research demonstrated the quality and significant benefits of the beginners synchronised swimming programme on the kinanthropometric features of toddlers and pre-schoolers.

Key words: *synchronised swimming, kinanthropometric features, pre-school age, kinesiologic activities programmes*

Introduction

Sport is a set of physical activities performed by people for competitive reasons. It is a set of different motor abilities where an athlete's features and knowledge in trainings and competitions become prominent. There are several types of sports like professional sport, amateur, club, school, recreational or sport for all, disabled persons' sport and military sport (Milanović, 2010).
It has been proved in this paper that sport can be excellent as a contribution to health and its significance for children's development (health fitness) has been described. It is important to emphasize that engaging in any type of kinesiologic activity, being it a sport or an individual children's physical activity, can help the maintenance andimprovement of the child's whole mental and psychic health. Many researches have proved that physical activities directly influence the normal functioning of the vascular and respiratory system, diminish the amount of body fat and influence the prevention of serious chronical diseases occurrence (Hrasky et al., 1996). Due to these reasons, it is important to involve children into any kind of physical exercising from the earliest age so that they could acquire the habit and make exercising a part of their life which will significantly affect their growth and development, health and the normal functioning of the whole body. Synchronised swimming is based on health, excellent physical and body readiness and knowing the basics of swimming, but it also requires strength, an excellent swimming technique, resistance, a high level of concentration and motivation, as well as a sense of space and rhythm.

Physical inactivity and obesity are, unfortunately, widespread in the world and cause various health problems. Therefore, sports activities are recognised and appreciated as one of the best ways of improving one's physical and psychic health and as a good "fighter" against various diseases encountered through the childhood and adulthood. It is considered that, to be acquired, physical activity and moving habits should be practised from an early age, i.e. from preschool (Hraski et al., 1996).

There are numerous programmes to train non-swimmers, recreational activities, but also various water sports which have a significant influence on small children's health by stimulating the immune system and forming the resistance shield for many diseases, especially in the most delicate period – childhood.

This paper's aim is to analyse the effects of the synchronised swimming programme for children of an early and preschool age based on the results obtained in the conducted study and the assessment of the girls' improvement of kinathropologial features under the influence of the

synchro swimming programme for girls attending regular kindergarten.

Methods

For the needs of the research part of the paper the sample of twenty girls aged between five and six was divided into two equal groups – 10 girls in the experimental and 10 girls in the control group. Both groups had the same number of five-year-old girls and six-year-old girls attending regular kindergarten educational programmes.

The sample of variables consisted of seven specific tests (Findak, 2003): body height (ATV), body mass (ATT), standing long jump (MSDM), side skips (MBPO), creeping with a ball (MPUL), running with changes of direction (MTPS), continuous three-minute running (F3).

Before the conduction of the study, each girl swimmer's parents gave their personal consent. The initial and final measurements were conducted with both the experimental and control group, while the period between them was four months.

The initial measurement with girl swimmers was conducted in the period from 30 January to 3 February 2017. Measurement with kindergarten girls was conducted in the period from 6 February to 10 February 2017 on the same principle as for swimmers, in three days. To avoid differences in measuring conditions, the schedule of days and exercises was the same for both groups, which means that on the first day the tests for the evaluation of body height, body weight and three-minute continuous running were conducted; on the second day the standing long jump and the side skips were measured; on the third day the creeping with a ball and running with changes of direction tests were conducted.

The study was repeated after a four-month period in which swimmers were involved in the synchronised swimming programme, while kindergarten girls were not in the same programme. The final measurement for swimmers was conducted in the period from 29 May to 2 June 2017, while the same was conducted a week later for kindergarten girls, namely from 5 June to 9 June 2017, under the same principle and in the same order as for the initial measurement.

The obtained research results were processed by the programme STATISTICA 12 (StatSoft) and Microsoft Excel, while results were presented through arithmetic means and standard deviations. The statistical significance of differences inside and between the groups was studied by applying the Student's t-test for independent and dependent samples. The value $p<0.05$ was considered statistically significant.

Results and discussion

Table 1 Differences in the initial and final measurement between groups

VARIABLE	INITIAL MEASUREMENT		
	AS ± SD	t	p
ATV exptl.	124.20±6.49	-0.08	0.94
ATV ctl.	124.45±7.79		
ATT exptl.	25.22±5.11	-0.66	0.52
ATT ctl.	26.71±4.96		
MSDM exptl.	134.40±11.50	5.16	0.00
MSDM ctl.	107.40±11.90		
MBPO exptl.	26.10±6.28	3.47	0.00
MBPO ctl.	18.40±3.13		
MPUL exptl.	12.80±4.08	-1.84	0.08
MPUL ctl.	16.50±4.86		
MTPS exptl.	8.10±1.37	-0.82	0.42
MTPS ctl.	8.50±0.71		
F3 exptl.	512.00±34.25	4.66	0.00
F3 ctl.	432.00±42.11		

VARIABLE	FINAL MEASUREMENT		
	AS ± SD	t	p
ATV exptl.	125.60±6.78	-0.11	0.91
ATV ctl.	125.25±7.52		
ATT exptl.	25.50±4.68	1.27	0.22
ATT ctl.	28.25±5.02		
MSDM exptl.	139.30±11.70	-6.10	0.00
MSDM ctl.	109.10±10.59		
MBPO exptl.	29.50±4.79	-4.92	0.00
MBPO ctl.	20.30±3.46		
MPUL exptl.	8.90±1.37	2.39	0.03
MPUL ctl.	12.40±4.43		
MTPS exptl.	7.30±1.16	2.65	0.02
MTPS ctl.	9.40±2.22		
F3 exptl.	522.00±23.94	-7.29	0.00
F3 ctl.	418.00±38.24		

The obtained results show that in the first two variables (body height and body mass) there are no statistically significant differences, which indicates that girls from both the experimental and control group were of a relatively equal body structure. Moreover, there are no statistically significant differences in the initial measurement between the control and experimental group with regard to the creeping with a ball test (MPUL) used for the evaluation of coordination and to the running with changes of direction test (MTPS) used for the evaluation of agility. It can be concluded that there were no significant differences at the beginning of measurements done for the two variables. Statistically significant differences in the initial

measurements were proved in the standing long jump test used for the evaluation of lower extremities' strength (MSDM), in the side skip test used for the evaluation of repetitive power (MBPO) and in the three-minute continuous running test (F3) for the evaluation of aerobic resistance. The experimental group achieved statistically better results than the control group in regard to statistics. It is assumed that such results originate from exercises conducted following the programme of the synchronised swimming training, like exercises for the explosiveness of the arms and legs in water (boost, barracuda), exercises of aerobic resistance in swimming (200 – 400 m technique crawl), various water exercises for the development of coordination (quick changes of movements, changes in moves). In a research conducted by the author Skender et al. (2006), it has been proved that final measurement tests for the ability of aerobic resistance (measured by the test swimming 200 m crawl) and the power of upper extremities (measured by the basic backstroke position in 25 m) showed statistically better result regarding their significance than the initial measurement of the same variables. The synchronised swimming programme, with its various exercises and tasks conducted in the water, but also on the power dry land training, directly influences the children's kinanthropological features. Based on them, the experimental group showed statistically better results regarding their significance in the initial training than the control group in which children did not practise any sport and did not have everyday direct contact with exercises influencing the kinanthropological features. The final measurement results, disregarding body height and weight, indicate statistically significant differences in all relevant variables after the conduction of the synchronised swimming programme in a four-month period. Results have shown that regarding tests for the evaluation of lower extremities' strength (MSDM), repetitive power (MBPO), coordination (MPUL), agility (MTPS) and aerobic resistance (F3), the experimental group showed statistically better results regarding than the control group.

Table 2 Differences in the initial and final measurement inside a group

VARIABLE	EXPERIMENTAL GROUP		
	AS ± SD	t	p
ATV initial	124.20 ± 6.49	-8.57	0.00
ATV final	125.60 ± 6.78		
ATT initial	25.22 ± 5.11	-0.45	0.66
ATT final	25.50 ± 4.68		
MSDM initial	134.40 ± 11.50	-5.96	0.00
MSDM final	139.30 ± 11.70		
MBPO initial	26.10 ± 6.28	-5.35	0.00
MBPO final	29.50 ± 4.79		
MPUL initial	12.80 ± 4.08	3.65	0.00
MPUL final	8,90 ± 1.37		
MTPS initial	8,10 ± 1.37	4.00	0.00
MTPS final	7,30 ± 1.16		
F3 initial	512.00 ± 34,25	-1.10	0.29
F3 final	522.00 ± 23,94		

VARIABLE	CONTROL GROUP		
	AS ± SD	t	p
ATV initial	124.45 ± 7.79	-5.24	0.00
ATV final	125.25 ± 7.52		
ATT initial	26.71 ± 4.96	-1.64	0.14
ATT final	28.25 ± 5.02		
MSDM initial	106.78 ± 12.44	-0.88	0.41
MSDM final	110.00 ± 10.59		
MBPO initial	18.40 ± 3.13	-1.87	0.09
MBPO final	20.30 ± 3.46		
MPUL initial	16.50 ± 4.86	3.45	0.07
MPUL final	12.40 ± 4.43		
MTPS initial	8.50 ± 0.70	-1.49	0.17
MTPS final	9.40 ± 2.22		
F3 initial	432.00 ± 42.11	1.29	0.23
F3 final	418.00 ± 38.24		

The data which can be seen in Table 2 indicate that the female swimmers, girls from the experimental group, had an average growth of only 1 cm in four months, but their body weight remained the same. A great improvement can be seen with female swimmers in the standing long jump test where girls averagely jumped 5 cm longer than in the initial measurement. The results of the creeping with a ball test are also interesting. They improved their coordination for 4 seconds which represents an exceptionally good result and an observable improvement in a short period of time. The test for the evaluation of body height (ATV) gave statistically significant differences between the initial and final measurement in the experimental group. Thus, in the four-month period girls from the experimental group grew up significantly. Statistically significant differences can be also noticed in the standing long jump test used for the evaluation of lower extremities' power (MSDM), in

the test for the evaluation of repetitive power (MBPO), coordination in the test creeping with a ball (MPUL) and in the test for the evaluation of agility by running with changes of direction (MTPS). A decline could be observed in the tests running with changes of direction used for the evaluation of agility and in the test for the evaluation of aerobic resistance, the three-minute running. It is assumed that the decline in these two tests was caused by neglecting exercises in the area of agility and aerobic resistance in the four-month period. In this period, the control group girls were under the regular preschool programme as part of their educational institution. The results show that the control group of girls did not make a statistically significant improvement in either of the tests, except in the test physical height where it was proved that the girls grew up. This was expected from the beginning since children of a preschool age grow up quickly in a period of four months. The final measurement in the tests three-minute continuous running (F3) and running with changes of direction (MTPS) showed a decline in comparison to the initial measurement. The decline of the control group tells us that in the four-month period the examinees did not work on improving their abilities in both tests, i.e. in the area of agility and aerobic resistance. The results were processed by a dependent samples t-test, the statistical significance being $p<0.05$.

By observing the anthropometric features of physical height and weight in Table 1 and by comparing them to the standards of the World Health Organisation (WHO) (Grgurić, 2008), it can be concluded that the examinees of the control group are above the average when it comes to physical height and weight, while the examinees from the experimental group are also among the above the average population when it comes to physical height, but average regarding the body mass index. According to the authors Findak et al. (1996), in the test standing long jump (MSDM) the experimental group belongs to the category of an above the average result, while the control group belongs to the below the average category. For purposes of comparison, the results of norms for girls attending the first grade of primary school in the Republic of Croatia have been considered, and they show that the experimental group, when compared to the one-year older generation, achieved an above the average result in this test. According to the same authors, in the continuous three-minute running test (F3), the experimental group showed an above the average result, while the control group showed a below the average result (the final measurement for both groups was used to make the comparison).

It can be deduced that neglecting basic exercises for the growth and development of children attending preschool institutions in the educational process does not lead to the improvement of children's kinanthropological features. There should be a programme in educational institutions similar to the school one which would impose an obligation to preschool teachers to carry out physical exercises lessons on a daily basis. In such a way not only would they preserve the children's health and diminish the occurrence of obesity from an earliest age, but they would influence the children's motor and intellectual abilities, the growth and development of muscles, the functioning of the respiratory and vascular system and the children's whole body functioning.

Conclusion

The synchronised swimming programme showed to be extremely good and significant in the improvement of children's kinanthropological features, i.e. significant in the contribution to their health. It can be said that the differences in health connected fitness among children of a young and preschool age engaging in synchronised swimming and children who are not engaged in a certain physical activities out of institutions are significant.

The need for organised physical activities for children, due to their positive advancements in growth and development, motor and functional abilities and functioning of the whole body, has been proved.

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VREDNOVANJE UČINAKA POČETNIČKOG PROGRAMA RADA SINKRONIZIRANOG PLIVANJA NA KINANTROPOLOŠKA OBILJEŽJA DJECE RANE I PREDŠKOLSKE DOBI

SAŽETAK

Cilj ovog rada bio je ispitati vrijednost programa rada sinkroniziranog plivanja procjenom kinantropoloških obilježja djece predškolske dobi. Provođenjem sedam različitih testova za procjenu kinantropoloških obilježja nastojao se dokazati pozitivan utjecaj programa sinkroniziranog plivanja, ali i općenito utjecaj bavljenja sportom. U istraživanju je sudjelovalo dvadeset djevojčica polaznica redovitog programa vrtića u dobi od 5 i 6 godina, podijeljenih u dvije jednake skupine. Eksperimentalnu skupinu činilo je deset plivačica Kluba sinkroniziranog plivanja Primorje Aqua Maris, dok je kontrolnu skupnu činilo deset djevojčica koje se ne bave sportom. U tom periodu eksperimentalna skupina bila je pod dodatnim utjecajem početničkog programa rada sinkroniziranog plivanja. Obje skupine mjerene su na početku i na kraju istraživačkog postupka.U provedenom istraživanju eksperimentalna skupina u finalnom je mjerenju pokazala izniman napredak s obzirom na inicijalno mjerenje na području kinantropoloških obilježja, dok je kontrolna skupina ostala na istome, te je u pojedinim područjima nazadovala. Dokazanaje kvaliteta i značajan utjecaj programa rada sinkroniziranog plivanja na kinantropološka obilježja djece rane i predškolske dobi, kao i veliki pozitivan utjecaj bavljenja tjelesnom aktivnosti, a pogotovo organiziranim sportskim aktivnostima od najranije dobi djetinjstva.

Ključne riječi: *sinkronizirano plivanje, kinantropološka obilježja, predškolska dob, programi kineziloških aktivnosti*

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