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Development of physical qualities among 5–6 years old children who do swimming

Abstract

Swimming is an Olympic kind of sport in which sportsmen demonstrate their technical skills and speed and also set worldwide records. The chosen sport combines the possibility of harmonious development of the body, well-being orientation, and emotionality. The predominant orientation of the training process in the groups of initial training is the training and improvement of swimming skills in sporting ways, the development of overall endurance, flexibility and speed of movement. The **goal** is to improve the technique of development of physical qualities of 5-6 year-old swimmers at the stage of initial training. **Organization of the research.** We divided a school year symbolically into 2 semesters. There was an in-depth study of swimming techniques like crawl and backstroke and familiarization with the elements of swimming in a dolphin way during the first half of the year (October-December). The second half (January-May) was devoted to improving such swimming techniques as crawl and backstroke. **Results.** It is important to determine the target indicators - the final and intermediate (current), which can be judged on the implementation of tasks; develop a general scheme for constructing a training process; determine the dynamics of training parameters and loads, as well as the system of restoration of work, aimed at achieving the main and intermediate goals in order to maximize the implementation of our methodology. As a result, the best growth of the results was in the tests: flexion and unbending of the hands in lying position: Control Group (hereinafter CG) – 9,71%; Experimental Group (hereinafter EG) – 15, 21%; body inclination forward in sitting position: CG – by 6,34%; EG – 12,62%; burpee: CG – 8,65%; EG – 16,34%; high jump: CG – 8,37%; EG – 14,03%. **Conclusions.** The obtained results testify the ef-

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fectiveness of our improved methodology, which aim is to use specially selected exercises and has an alternative percentage distribution of all components of sports training.

Keywords: stage of initial training, advanced methodology, young athletes.

Introduction

Nowadays, our state is facing acute health problems of the younger generation, upbringing children's need for a healthy lifestyle and healthy leisure. These issues were repeatedly discussed by the public, specialists in various fields of activity, and the mass media. Without contradicting the complexity and variability of the solution of this problem, in our opinion the priorities should be the means of physical culture and sports [5], [7], [13].

Pre-school age is the most favorable time for swimming as the process of upbringing. Different types of swimming are very effective for complex improvement of physical qualities. Physical qualities in children are manifested through motor skills and abilities that, in turn, are stipulated by a sufficient level of their development [4], [10], [15].

This sport is a unique kind of physical activity, whose specific features of its impact on the child's body are associated with active motions. In this case, the human body falls under the influence of double effects: on one hand – physical exercises, on the other – unique properties of water, where exercises are being performed. It cannot be forgotten that water is of special importance for the human body, which consists of 80% of water (and brain cells of 90%), all vital essential processes occur in the aquatic environment of the organism, and the first 9 months of the development of the human body occur in the aquatic environment [2], [6], [11], [16].

Early physical development is a set of exercises, methods and actions directed for physical development. Undoubtedly, starting to swim early influences the improvement of the physical development of the child [3], [8], [9], [13].

Swimming is a physical activity, the basis of which is the retention and movement of a person in the water in the required direction. While swimming, which is a way of massaging the skin and muscles, the child overcomes significant water resistance, constantly training the musculoskeletal system, where a distinctive type of gymnastics takes place [5], [9], [10], [14].

The analysis of the literature showed us that many authors were engaged in the consideration of this problem, in particular P. Kopylov [9], I. Pilyarska [11], C. Felfe, M. Lechner, A. Steinmayr [3]; V. Arefiev [1], A. Helena, A. Daniel, S. Sandra, M. Aldo [5], T. Krusevich [13], and O. Tomenko [14] – engaged in the study of motor activity, a differentiated approach to the process of physical education. The study of the peculiarities of the physical training of young swimmers was carried out by G. Voloskova, D. Diachkov, S. Maximova, I. Polunkova, P. Lukashov [16], D. Grichik, Y. Solonets [4], D. Lavrenteva [10], I. Tarabrina

[12], however, the problem of the development of physical qualities of children aged 5–6 using swimming needs further improvement. Owing to this, the problem of improving the method of development of physical qualities in children aged 5–6 engaged in swimming, which is due to the theme of our study, is relevant.

The purpose of the research: to improve the technique of development of physical qualities of swimmers aged 5–6 at the stage of initial training.

Material and methods of research

Participants: The study was conducted from September 2016 to May 2017 based on the Motor Sich Sport Complex. 48 children aged 5–6, who were divided into experimental and control groups, participated in it. The experiment was attended by boys, 5–6 years old, who, for health reasons, were included in the main medical group.

Organization of research. Swimming is an Olympic sport, in which the goal is to cover the distance as big as possible, without breaking the swimming technique that is being used.

Priority direction of the advanced methodology: physical, valeologic, patriotic and ethical development, as well as development of responsibility and professional self-determination in accordance with individual abilities.

The system of various sports training is the most important part of the training of athletes. Parameters and ratios of this work are shown in Table 1 and are mandatory in the system of planning and controlling sports training.

Table 1. The ratio of the training process by types of sports training at the stage of initial training of young swimmers

Training sections	Initial stage of training	
	Control group	Experimental group
Total physical training (%)	57–62	52–57
Special physical training (%)	18–22	23–27
Tactical, theoretical training (%)	—	1–2
Participation in competitions (%)	0,5–1	0,5–1

Source: own research.

When implementing our methodology, we divided a school year symbolically into 2 semesters. There was an in-depth study of swimming techniques like crawl and backstroke and familiarization with the elements of swimming in a dolphin way during the first half of the year (October-December). The second half (January-May) was devoted to improving such swimming techniques as crawl and backstroke. When implementing our methodology, we divided the school year

conditionally into 2 semesters. In the first half-year (October-December), there was an in-depth study of technique of swimming by methods of rill on the chest and back and familiarization with the elements of swimming in a dolphin kick. By the end of the stage, athletes must swim the crawl and backstroke for 25 m from the starting point with an assessment of technology.

Lessons were conducted on coping with water and training swimming techniques like crawl and backstroke. For our methodology, we used the 36-lesson program. Swimming training consisted of preparatory, main and final parts.

In the preparatory part of the training, tasks were reported; the organization of young athletes and their functional and psychological preparation for the main part were carried out. It involved walking, jogging, general-development, special-preparation and simulation exercises. The beginning of the training session has always been in the «dry» pool.

In the main part of the training the tasks of mastering the elements of swimming technique were solved. The participants studied and perfected the technique of sporting ways of swimming, starts and turns.

The final part of the training is aimed at gradually reducing the load and bringing the body to a relatively calm condition by means of slow swimming. Conducting games in the final part improves the emotional state of young athletes and facilitates the transfer of training load. This greatly increases the interest in the classes. The training was completed with summing up.

In the first 12 classes, water exploration, the study of the elements of sport swimming techniques, jumping into water, as well as general development and special physical exercises were settling. From the 13th lesson on, the study of the elements of sporting swimming technique, as well as exercises for studying the ways of swimming crawl and backstroke, continued. At the 24th (control) training session, the following exercises were performed: swimming with the help of movements with the legs in crawl and backstroke – 15 m; swimming backstroke crawl; swimming crawl with breath hold-up on inhalation; jumping into water from the marks whilst bending.

Further on, the study involved the elements of sporting swimming techniques, but the focus was on exercises for studying the crawl and the backstroke, the starts and turns during the swim. The 36th (final) training session was devoted to the implementation of control exercises: swimming with the help of movements of the legs during the crawl and the backstroke – 20–25 m; swimming the backstroke crawl – 20–25 m; swimming the crawl – 15–20 m.

Training was conducted in a shallow pool. This is due to the fact that if the pool does not have a «paddock» and training begins with deep water, the pace of development of exercises is significantly reduced, especially for children of 5–6 years of age.

In the second half of the year (January-May), time was devoted to improving the technique of swimming the crawl and the backstroke crawl. The second half of the year was also divided into two parts, which are related:

- Part I (mid January–March), taking into account winter holidays;
- Part II (April–May).

The first part included 33 classes. First training sessions were aimed at restoring the knowledge and skills a kid acquired during the first half of the year. At the 18th lesson, the athletes performed: swimming with the help of movements of their legs while performing crawl and backstroke – 30–35 m; swimming on the back – 30–35 m; swimming the crawl – 25–30 m.

At the 33rd lesson: swimming with the help of movements of legs of the rabbit on the chest and back – 40–45 m; swimming the backstroke crawl – 40–45 m; swimming crawl – 35–40 m.

During the second half of the second semester, more efforts were directed onto improving the technique of swimming in the studied ways, in 57 lessons: swimming both crawl and backstroke with the help of movements of the legs – 50–55 m; swimming the backstroke crawl – 50–55 m; swimming the crawl – 45–50 m; repulsion from the side – 45–50 m.

We used the following components for the implementation of our methodology: theoretical training, general physical training, special physical training, training and improvement of swimming skills in sporting ways, development of overall stamina, flexibility and speed of movements, control trials.

Tests of general and special physical training were used in the study. The results for all of our tests were translated into a 5-point system. This is due to the fact that at junior school age children will be better targeted at the dynamics of their achievements.

- I. General physical training: shuttle run 4×9 (sec) – development of agility, finishing dash, movement coordination (testing, then coordination of abilities); long jump from space (cm) – develops such qualities as strength, speed, learns to navigate in space, concentrate efforts (testing of speed-strength abilities); bending and extending the arms in lying position (quantity) – testing the strength of the muscles of the hands; torso forward from sitting position (cm) – flexural testing [15].
- II. Special physical training.
 1. Jump up with repulsion (cm) – testing the strength of the muscles of the hands and the ability to concentrate efforts. The result is determined by a mark (up to 1 cm) on the perpendicular marking, to which the participant reached out with the tips of the fingers.
 2. Scatter on the podium (quantity) – testing speed-strength abilities. Description of the test: for 30 seconds, as fast as possible, jump up and down the podium with two legs, with the height of the podium 25 cm. The result is determined by the implementation of exercises, quantity in 30 seconds.
 3. Equilibrium (c) is a test that is characterized by a state of real estate, a rest, in which the child's body is under the influence of equal, opposing forces. Description of testing: performed in standing position on one leg.

The stopwatch is activated when the child takes the starting position – a stand on one leg, switches off – with a loss of equilibrium. When performing the test, insurance is required. The result is determined by the exercise during which time the child will not move in a particular position.

4. Barrier of obstacles (c) – testing of dexterity. Description of the test: the swimmer must overcome the obstacle course, and run round 10 skeins. The best result, measured by a stopwatch with an accuracy of one second, is taken into account; the best result is recorded [17].

Statistical analysis. For a better understanding of the growth of our young athletes, we took into account their age and developed a 5-point system. The results for all of our tests have been translated into this system. We also used the coefficient of variation in order to know how much the sample is homogeneous.

Research results. There is no periodization of the training process for the initial training stage, which means that in the annual cycle there are no training periods, and control competitions are conducted on the current material without any purposeful preparation for them. Taking into account the control and experimental groups in which the boys are equally divided, we demonstrate the results of the study in Table 2.

Table 2. Table of test results before and after the experiment of CG and EG% boys

Tests	1				2				3				4				5			
	CG		EG		CG		EG		CG		EG		CG		EG		CG		EG	
	before	after	before	after	before	after	before	after	before	after	before	after	before	after	before	after	before	after	before	after
Points	experiments																			
shuttle run 4 × 9	11	—	10	—	29,9	16	29	8	50,1	45,3	51,6	27	9	32,8	9,4	37,2	—	15,9	—	27,8
Long jump	7	—	7	—	26	11	27	5	63	49	61	37,1	4	20,4	5	26,6	—	19,6	—	31,3
flexion and unbending of the hands in lying position	8	—	9	—	38	7	33	2	48,2	65	53	52	5,2	19,9	5	28,4	—	8,1	—	17,6
Torso bending from sitting position	2	—	2	—	40	7	43	1	48	45,1	45	35,8	10	24,6	10	33,2	—	23,3	—	35
Jump up with repulsion	11,7	—	9	—	28,4	18	32	9,5	53,9	36	54	31,5	6	24	5	30	—	22	—	29
Scatter on the podium	18	—	17	—	21,8	14	23,3	6	60,2	39	59,7	28	—	26	—	34	—	21	—	32
Equilibrium	10	—	9	—	33,9	20,2	34,1	10	43,1	40,9	44,9	36,5	13	25,6	12	31,2	—	13,3	—	22,3
Barrier of obstacles	5	—	5	—	30,2	18	27,5	12	55,8	41	58,5	36	9	21,2	9	26,1	—	19,8	—	25,9

Source: own research.

In our study, we got the results translated into points. But to study the homogeneity of the group, we used the coefficient of variation.

The obtained data show that the groups are more homogeneous in terms of tests: «shuttle running 4 × 9 m» (V – 8,90% CG, V – 8,03% EG), «long jump» (V – 5,39 % CG, V – 6,26% EG), «bending and extension of arms in lying position» (V – 6,12% CG, V – 7,55% EG), «body tilt forward from sitting position» (V – 7,34% CG, V – 7,16% EG), «equilibrium» (V – 9,44% of CG, V – 9,62% EG). For tests: «jump up with repulsion» (V- 11,05% of CG, V – 11,26% of EG), «jumping on the podium» (V – 13,72% of CG, V – 14,11% of EG), «Barrier of obstacles» (V – 15,79% CG, V – 11,51% EG) – the variations in the results of measurements were average.

At the ball analysis of the indicators for the experiment, we note that all the data of the control and experimental groups are located on the marks from 1 to 4 points. But the data was more focused on scores from 2 to 4, and the percentage was almost the same.

When analyzing the score after the experiment, we note that the data has changed: the control group and the experimental group are located on the mark from 2 to 5 points in almost all tests. But the performance of the experimental group turned out to be more intense. Consequently, general physical training: shuttle run 4 × 9 (c) – improvement of results occurred: CG – by 6,27%; EG – 12,47%; long jump: CG – by 4,51%; EG – 11,64%; bending and extension of the hands in lying position: CG – 9,71%; EG – 15,21%; torso bending forward from sitting position: CG – by 6,34%; EG – 12,62%. Special physical training: jump up with repulsion: CG – 8,65%; EG – 16,34%; jump on the podium: CG – 8,37%; EG – by 14,03%; balance: CG – 7,12%; EG – 12,54%; Barrier: CG – 6,23%; EG – 9,51%.

Analyzing the above, we note that the method developed by us is effective and should be taken into account.

Discussion

Swimming is a physical exercise that contributes to the growth of the body of children. It positively affects the state of the central nervous system. Under conditions of increased being in water, the processes of thermoregulation improve, the body becomes hardened, and resistance to adverse environmental factors increases [2], [4], [5]. It is a result of the beneficial effects of the water environment and physical exercises on the human body. It improves the functioning of the internal organs, develops the cardiovascular and respiratory systems [8], [9], [11]. Swimming is a unique form of physical exercise and refers to most mass sports, both in our country and abroad [16].

Sports swimming is one of the most famous and well-known sports. This is due to the exceptionally high health and developmental significance of sports swimming for the human body.

The development of criteria and methods for assessing the qualities of children, a differentiated approach in their physical education, is of great importance at this age [1], [15]. Improvement of the development of physical abilities of children in the process of initial training of young swimmers is carried out in accordance with the general pedagogical and special principles, taking into account the biological laws of the development of the organism [4], [10].

The developed technique consisted of two semesters, which were also divided into certain parts for more qualitative control over the success of young athletes. We took into consideration the fact that everyone who is engaged in sports training, individual in their physiological parameters which, significantly or not, very much affect the success of his or her sports training. The purpose of our technique is to maintain the optimum dynamics of the development of physical qualities and functional capabilities. Much attention was paid to providing equipment for classes in the pool. Due to the fact that our athletes are very young, we pay much attention to our duties as a trainer in our method.

Given the stage of initial training, where there is no periodization of the training process, we conducted control competitions without accentuation and in the form of the game so that young athletes did not experience negative emotions and fear of the tests.

The obtained data during the introduction of the improved methodology show that we not only confirmed the research of scientists [5], [11], [12], [16], but also supplemented them with a percentage correlation before and after the experiment of the control and experimental groups.

Thus, the improved technique for children aged 5–6, engaged in swimming – is, on one hand, the process of using various physical education methods with a health purpose, and on the other – a scientific direction, which develops and improves the basis of the method of constructing a training process for swimming. This indicates that the developed technique improves the system of training sports reserve, and is important for the young.

Conclusions and perspectives of further research

We have analyzed the state of the existing methods and means of development of general and special physical training for children aged 5–6, engaged in swimming.

We have improved methods for the development of physical qualities for young swimmers 5–6 years old, which included: theoretical knowledge; general physical training; special physical training; technical and tactical training; mobile games.

The analysis of the ball scoring after the experiment showed that the data from the control group and the experimental group were ranked at a mark of 2 to 5 points in almost all tests. But the performance of the experimental group turned out to be more intense. Consequently, the best growth of the results was in the tests: bending and extension of the hands in the focus: CG – 9,71%; EG – 15,21%; tilt of the trunk forward from sitting position: CG - by 6,34%; EG – 12,62%; jump up with repulsion: CG – 8,65%; EG – 16,34%, and jump on the podium: CG – 8,37%; EG – 14,03%. These tests most clearly show that the improved technique is indeed positive and can be used during training sessions for children aged 5-6 who are engaged in swimming.

Prospects for further study of the problem are related to the study of the adaptation of the body of young athletes training load at other stages of the training of swimmers.

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Розвиток фізичних якостей дітей 5–6 років, які займаються плаванням

Анотація

Плавання – це олімпійський вид спорту, в якому спортсмени показують свою технічну майстерність і швидкість, а також встановлюють світові рекорди. Обраний вид спорту поєднує можливість гармонійного розвитку організму, оздоровчу спрямованість, емоційність. Переважною спрямованістю тренувального процесу в групах початкової підготовки є навчання та вдосконалення навичок плавання спортивними способами, розвиток загальної витривалості, гнучкості та швидкості рухів. Мета – удосконалити методику розвитку фізичних якостей плавців 5–6 років на етапі початкової підготовки. Організація дослідження. Навчальний рік ми умовно розділили на 2 півріччя. У першому півріччі (жовтень–грудень) відбувалося поглиблене розучування техніки плавання способами кріль на грудях і на спині і ознайомлення з елементами плавання способом дельфін. У другому півріччі (січень–травень) відводяться на вдосконалення техніки плавання кролем на груді та спині. Результати. Для максимальної реалізації нашої методики необхідно: визначити цільові показники – підсумкові і проміжні (поточні), за якими можна судити про реалізацію поставлених завдань; розробити загальну схему побудови тренувального процесу; визначити динаміку параметрів тренувальних та навантажень, а також системи відновлення працездатності, спрямованих на досягнення головних і проміжних цілей. Отже, найкращий приріст результатів відбувся у тестах: згинання і розгинання рук в упорі лежачи: КГ – на 9,71%; ЕГ – на 15,21%; нахил тулуба вперед із положення сидячи: КГ – на 6,34%; ЕГ – на 12,62%; стрибок вгору з відштовхуванням: КГ – на 8,65%; ЕГ – на 16,34% та вистрибування на подіум: КГ – на 8,37%; ЕГ – на 14,03%. Висновки. Отримані результати свідчать про ефективність удосконаленої нами методики, яка спрямована на використання спеціально підібраних вправ та має альтернативний відсотковий розподіл всіх складових спортивної підготовки.

Ключові слова: етап початкової підготовки, удосконалена методика, юні спортсмени.

Rozwój cech fizycznych u dzieci w wieku 5–6 lat uprawiających pływanie

Streszczenie

Pływanie jest sportem olimpijskim, w którym zawodnicy demonstrują swoje umiejętności techniczne i szybkość oraz ustanawiają rekordy świata. Ten wybrany sport łączy możliwość harmonijnego rozwoju ciała, pozytywnego samopoczucia i stosunku do świata. Dominujące nastawienie procesu szkoleniowego w początkujących grupach treningowych dotyczy doskonalenia sportowych umiejętności pływackich, rozwoju ogólnej wytrzymałości, gibkości i zdolności szybkiego poruszania się.

Celem jest poprawa techniki rozwoju cech fizycznych pięcio- i sześciolletnich pływaków na poziomie treningu dla początkujących.

Organizacja badań: Podzieliliśmy symbolicznie rok szkolny na 2 semestry. W pierwszym półroczu (październik–grudzień), obejmowało to dokładne poznanie stylów pływania, takich jak kraul i styl grzbietowy, oraz zapoznanie się z elementami pływania stylem motylkowym. Drugie półrocze (styczeń–maj) poświęcono doskonaleniu takich stylów pływania, jak kraul i styl grzbietowy. Wyniki: Ważne jest, aby określić wskaźniki docelowe – końcowe i pośrednie (bieżące), które można

ocenić na podstawie realizacji zadań; opracować ogólny schemat procesu treningowego; określić dynamikę parametrów treningowych i obciążeń, oraz system odnowy pracy, mający na celu osiągnięcie głównych i pośrednich celów, zmierzających do maksymalizacji i wdrożenia naszej metodologii. W wyniku tego, największy wzrost wyników nastąpił w testach: zginanie i prostowanie rąk w pozycji leżącej: Grupa Kontrolna (dalej GK) – 9,71%; Grupa Eksperymentalna (dalej GE) – 15,21%; pochylenie ciała do przodu w pozycji siedzącej: GK – 6,34%; GE – 12,62%; burpee (krokodylek): GK – 8,65%; GE – 16,34%; skok wzwyż: GK – 8,37%; GE – 14,03%.

Wnioski: Otrzymane wyniki świadczą o efektywności naszej ulepszonej metodologii, której celem jest zastosowanie specjalnie wybranych ćwiczeń i która pozwala osiągnąć alternatywny rozkład procentowy wszystkich składników treningu sportowego.

Słowa kluczowe: etap treningu początkowego, zaawansowana metodologia, młodzi zawodnicy.

Deklaracja konfliktu interesów

Autorzy deklarują brak potencjalnych konfliktów interesów w odniesieniu do badań, autorstwa i/lub publikacji artykułu *Development of physical qualities among 5–6 year old children who do swimming*.

Finansowanie

Autorzy nie otrzymali żadnego wsparcia finansowego w zakresie badań, autorstwa i/lub publikacji artykułu *Development of physical qualities among 5–6 year old children who do swimming*.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interests with respect to the research, authorship, and/or publication of the article *Development of physical qualities among 5–6 year old children who do swimming*.

Funding

The authors received no financial support for the research, authorship, and/or publication of the article *Development of physical qualities among 5–6 year old children who do swimming*.
