Ovidius University Annals, Series Physical Education and Sport / SCIENCE, MOVEMENT AND HEALTH
Vol. XXI, ISSUE 2, 2021, Romania
The journal is indexed in: Ebsco, SPORTDiscus, INDEX COPERNICUS JOURNAL MASTER LIST,
DOAJ DIRECTORY OF OPEN ACCES JOURNALS, Caby, Gale Cengage Learning, Cabell's Directories

Science, Movement and Health, Vol. XXI, ISSUE 2, 2021
June 2021, 21 (2): 184 - 188
Original article

INTERDISCIPLINARY INVESTIGATIONS REGARDING THE USE OF CONTRACT REGIMES ON SWIMMERS 10-12 YEARS OLD

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Abstract

Objectives. The present study aims to verify the effectiveness of the use of the plyometric method of physical training, combined with technical procedures specific to swimming and exercises designed to increase muscle volume and strength in a group of 30 children aged 10 to 12 years, females, separate into two groups, namely the control group and the experimental group. We started this research from the premise that the use in combination of plyometric contraction regimes and techniques for developing specific muscles for swimming, to which are added kinesiology methods, can lead to the development of general and specific motor capacity, increasing sports performance.

Methods. In the experimental research itself we performed a preliminary study based on the use of the following methods: bibliographic study method, observation method, questionnaire survey method, which determined the level of knowledge of 13 instructors on the application of the plyometric method in swimming training, the graphic method, the method of the pedagogical experiment, the method of measurements and control tests through which we aimed to obtain the most accurate information on the targeted characteristics (motor, psychological, sociological, etc.), on the basis of which to formulate predictions and statistical-mathematical method which determined the degree of homogeneity of the studied phenomenon, as well as the degree of correlation.

Results. The results of anthropometric measurements, as well as those of functional tests have shown that, to a large extent, the composition of the two groups - experimental and control, is homogeneous for each of them. Therefore, we started the experimental research from a position of balance between the two variables - the experimental group and the control group, which allowed an accurate evaluation of the final results.

Conclusions. In the preliminary study, the research hypotheses confirm that plyometrics is a training method complementary to classical training, and the knowledge of the plyometric method by swimming instructors shows the effectiveness of its application to increase sports performance. At the same time, it is possible to observe the level of satisfaction on swimmers, which is increased in the case of applying the plyometric method within the combined training.

Keywords: plyometrics, contraction regimes, kinesiology techniques, swimmers, performance.

Introduction

Research targeting swimmer athletes aged between 10 and 12 years shows that plyometric training applied complementary to swimming-specific training has a positive effect especially on the start of swimming. (Bishop, s.c. 2009).

Another important factor of sports training is "physical training", practically an inseparable part of it at any stage of becoming and completing sports. (Gemina Cosma and others, Pregătirea fizică în sportul de performanţă, Univ Publishing House, Craiova, 2017, p. 9).

It represents, according to a definition in the Romanian specialized literature, "the level of development of the motor possibilities of the individual, reached in the process of systematic

între stadiile evolutive si performanţa la înot, Assistant Professor Narcis Neagu, PhD, Polytechnic University of Bucharest).

At this stage of sports training, the intensity of training is gradually increased. Despite the vulnerability to accidents and emotional situations, children's bodies and abilities develop rapidly.

However, there are variations in performance mainly due to differences in growth and development. Particular attention should be paid to the development of motor skills and qualities.

The improvement of sports performance certainly depends on the style of improvement in the training process, the emphasis being on motor skills, effort capacity, as well as technique, elements that require continuous improvement. We can thus start from the

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Received 04.02.2021 / Accepted 18.05. 2021

repetition of physical exercises". (Nicu Alexe, Terminologia educaţiei fizice și sportului, Stadion Publishing House, 1973).

In the case of children, muscle training should be done taking into account the fragility and sensitivity of muscle tissue (Mark-Janesen Law), requiring the gradual introduction of weight training exercises. Thus, the sudden alternation of the load must be avoided, the static work in favour of the dynamic one must be avoided and comply with an optimal recovery time after the strength training. (Marathon, Vol III • No. 1 • 2011, Relaţia

The present research aims to contribute to the development of more efficient training methods, superior to the classic ones, in which the risk of injuries is minimized and through which increased performances can be obtained.

Thus, I will demonstrate that physical training by implementing plyometrics is superior to classical training, the results thus obtained in the development of motor skills, strength and speed being much improved.

Training using the plyometrics method will consist of using a combination of contraction regimes. The demonstration will be made by comparing the results obtained at the level of the experimental group, which will practice the combined trainings, with those of the control group, which will benefit from the usual program, within some trainings carried out in the same time interval.

Physical training will be combined, in complex training, with technical training. In the practical research part we also used the muscle and joint balance technique, in order to highlight that the degree of mobility and the strength of various muscle groups are improved with the help of kinesiology.

Methods

In conducting this research we used the study and results of personal training on two groups of children, one being the experimental group and the other the control group.

In the case of the experimental group we applied a program based on the use of the plyometric method, muscle and joint balance using electrostimulation, as well as some elements of kinesiology, combined with classical training, using Power Plate vibrating platform and Balance system-suit. The children in the control group underwent classic exercises.

In order to determine the manifestations of the researched phenomena, we used the measurement method, as those operations through which we can organize, in the form of order of magnitude (frequency, intensity, volume, rhythm, etc.), the quantified expression of the phenomenon, by comparing with a criterion, based on rules for

premise that improving strength and power will positively influence performance in swimming events. At the same time, we start from the idea that adequate training, with modern means, can be achieved in optimal conditions and with remarkable results if it is supervised by knowledgeable professionals.

In the studied age range 10 - 12 years, there is an elongation of muscle fibers, their thickness registering only minor changes, and at the level of the extensor muscles there is an uneven increase in muscle strength.

objective training conditions. We used the two forms of the observation method, namely: direct observation and indirect observation, both before and during the research. Thus, in order to be able to determine the concrete conditions for carrying out the trainings that are the object of the present research, the direct observation was performed in the presence and with the direct involvement of the researcher in the activities of registration of the existing material base. Regarding indirect observation, a method applied throughout the research, it aimed at studying planning documents and evidence, specifically by watching training, this activity providing important information given that some phenomena cannot be accurately observed when they occur at a very high speed.

We used the survey method through the questionnaire that was sent to specialists, in this case 11 swimming instructors. The conclusions resulting from the evaluation of the questionnaires led to a better efficiency of the training activity in the field, with direct implications in the increase of sports performances.

The method of the pedagogical experiment was applied on two groups of subjects of 15 children aged between 10 and 12 years, females. The two groups: one called experimental, was subjected to combined training - classical and plyometric and which also benefited from the application of specific methods of kinesiology, and the other named by the control group on which no variable acts, ie that group that will be subjected just the classic workout.

Therefore, in this case we are dealing with two variables, namely: plyometric training and physical therapy. The trainings performed as well as the initial and final testing of both batches were performed both on land and in water.

Results

We used the following measurements and tests: anthropometric measurements, functional tests, general motor tests on land and in the aquatic environment.

The statistical indices calculated by the statistical-mathematical method were the arithmetic mean, the standard deviation and the coefficient of variability, formulas applied on both groups of subjects determining the degree of homogeneity and the degree

assigning values. Through testing, we aimed to obtain information as accurate as possible on the targeted characteristics (motor, psychological, sociological, etc.), based on which predictions can be made (Tudor, 2005, p. 34).

The method of the bibliographic study allowed the use of scientific data on motor skills, technical-tactical luggage and how to approach issues related to the topic presented.

The method of observation involves organized and at the same time conscious follow-up based on a plan of the training process, in order to track the motor behavior of swimmers, more precisely, involves systematic tracking of certain factors in component and is conditioned by some individual morpho-functional features, but also by ambient temperature or degree of fatigue.

During the present research, in land training, balance-suit exercises can be extremely useful in training athletes with elastic bands and pulley systems against which the human body is stimulated to work, thus developing strength, ability of passive and active moving and muscle flexibility.

Complex structures containing force + speed + mobility

Theme: force + speed + mobility (concentric + eccentric).

Objective: to develop strength + speed + mobility specific to the upper limbs.

of correlation.

The evaluation of the experimental investigations was performed on the experimental group, simultaneously with the performance of the same tests on the control group, in order to obtain comparative results that would allow the verification of the initially formulated hypotheses.

For swimmers, onshore training is performed in order to maintain a proper fitness, the exercises are intended to stretch and strengthen the muscles that they use during swimming.

The aim is to develop mobility, and the optimal biological period is between 11 and 13 years for girls, with the specification that mobility also has a genetic

Muscle action: latissimus dorsi; anterior deltoid; brachial triceps.

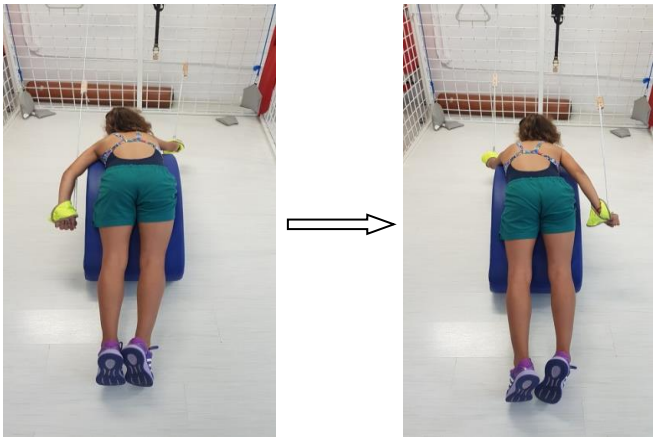
Staff: 15 athletes.

Description: lying face down on the therapeutic pillow, pull the arms alternately on the strings of the Balance – Suit device.

Dosage: 3 series X 20 seconds.

Variants: arm tractions simultaneously.

- Methodical indications: the body remains lying on the therapeutic pillow throughout the exercise;
- for a more correct position, the legs are extended and with the tips supported on the ground;
- the gaze is oriented forward;
- the movement of the arms is performed in a coordinated way.



Picture no. 1: Position 1 Picture no. 2: Position 2

Alternating arm traction to the Balance - Suit system

Table no. 1 Statistical-mathematical parameters for the "50 m speed test"

Statistical parameter	The experimental group		The control group	
	Start time	Time out	Start time	Time out
Average	8,31	8,07	8,35	8,20
Standard deviation	0,14	0,28	0,16	0,14
CV%	1,69%	3,54%	1,91%	1,81%

Medium Difference (Ge - Gc)	Start time -0,04	Time out -0,13

CV, coefficient of variability, Ge, experimental group, Gc, control group

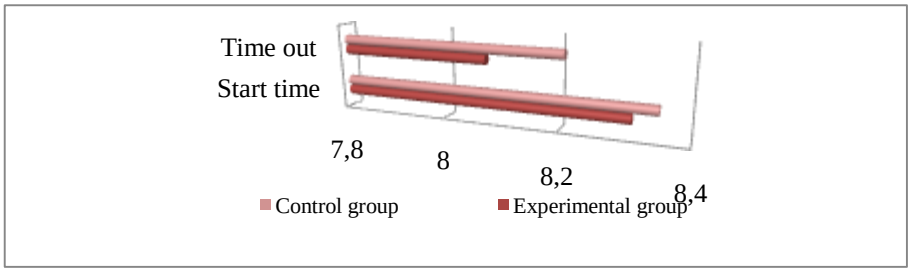


Figure no. 1 Evolution of the "50 m speed test"

Complex structures that contain strength + speed + endurance

Theme: force + speed + endurance (eccentric + concentric).

Objective: to develop the strength and speed specific to the upper limbs.

Muscle action: quadriceps; abdominals; latissimus dorsi.

Staff: 15 athletes.

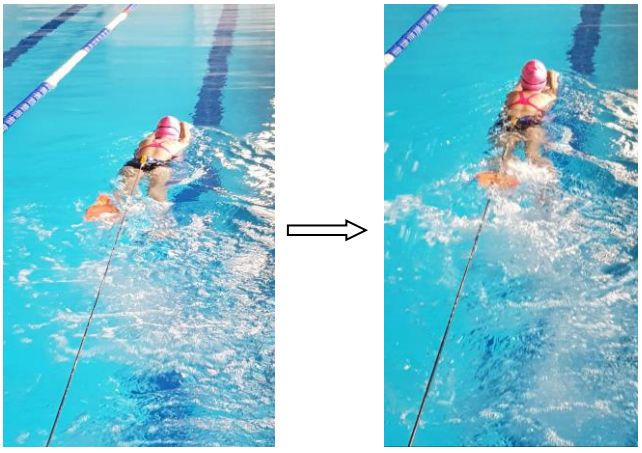
Description: fasten the Mad Wave elastic cable to the start block of the pelvis, position the belt around the waist and slide the lap with swimming paws, keeping the arms outstretched forward.

Dosage: 3 series X 20 seconds.

Variants: with hands held close to the body.

Methodical indications:

- the body is stretched on the water;
- breathing is done by pulling the head forward;
- the same rhythm of the legs is maintained.



Picture no. 3: Position 1 Picture no. 4: Position 2

Slide and Glide front crawl with swimming paws and elastic resistance

Table no. 2 Statistical and mathematical parameters to the sample "25 m swimming in coordination crawl"

Statistical parameter	**The experimental group**		**The control group**	
	Start time	**Time out**	**Start time**	**Time out**
Average	28,72	28,10	29,06	28,77
Standard deviation	1,17	1,13	1,13	1,15
CV%	4,08%	4,04%	3,88%	4,00%
Medium Difference	Start time -0,34		Time out -0,67	

(Ge - Gc)

CV, coefficient of variability, Ge, experimental group, Gc, control group

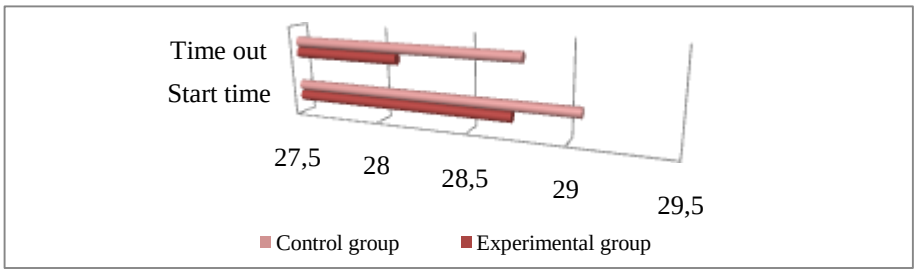


Figure no. 2 Evolution of the sample "25 m swimming in coordination crawl"

Discussions

Given that swimming is a complex sport that combines a lot of effort with technique, specific programs are designed, morpho-functional resulting an improvement of the quality of motor skills by mastering the procedures and techniques adopted.

Strength training plays a very important role in terms of developing performance capacity and influencing the process of growth and physical development.

At the age of 10-12, the differences between the muscle groups are remarkable and the lessons through which the skill is developed are recommended, one of the motor qualities that in turn develops the technique, precisely to strengthen the perception and execution of movements in each lesson.

All these combinations of factors do nothing but increase the level of specific efficiency, especially in the competitive phase. Also, special attention must be paid to psychological factors, which are very important in the training and competition process, based on the coach, who brings a contribution by conducting in educational conditions, for athletes to cope with the volume of training and correct form of integration.

Plyometric training does not develop aerobic capacity, which is why it is recommended to return by pause between the number of repetitions and sets, but also the strength developed by plyometrics is clearly superior, especially in the concentric phase.

Regarding the selection area, we are looking for subjects who are able to react quickly (at the right age) in speed and strength training, they are able to self-improve from one stage to another, ultimately resulting in increased efficiency. Regarding the dosing of the effort in children and juniors, we are trying to avoid the overload or underload, so in this way the real chances of progress can be increased.

The combination of exercises in plyometrics make it possible to reach a maximum muscle strength in a relatively short time, resulting in the speed - force capacity, known as power. Research proves that through "stretch - shorten" process the muscle will be able to contract faster and more energetic. Pliometry is much more effective by coupling with other contraction regimes.

By introducing the balance - suit system in the training programs, the quality of physical exercises was positively influenced, by positioning and posturing the subjects according to the appropriate age (10-12 years) and growth spurts.

Thus, after a period of accommodation with the balance-suit system, the outfit provided by it and the specific materials, athletes perform more easily the exercises provided in physical training.

In the process of physical training, the training in water, in terms of young swimmers, we have focused on the elimination of limiting factors such as fatigue performance by endurance training in water.

The actual research aimed to eliminate neuromuscular and mental fatigue, which led to a qualitative increase in training lessons and psychological factors.

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