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Transformation Processes of Young Childrens Basicmotor Abilities, Affected by Specific Swimming program

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Abstract
The aim of the research is to determine the level of change in basic motor abilities of non-swimmers, under the influence of the experimental swimming program The study was conducted on a sample of 70 entities, age of 6-9 years, boys and girls, divided into two separate groups according to gender. Basic aim of the swimming program was learning and development of tehnical knowledge in swimming tehniques, breaststroke, freestyle and backstroke. Duration of the experimental swimming program was 90 days. To monitor motor abilities we choose simple and well known tests: agility on the ground, agility in the air, coordination with bat, lifting the trunk, lying hull lift, lying leg lift, flex with stick, straddle bend forward, forward bend on the bench. The study data of the initial and final measurements were subjected to discriminant analysis, with the aim of determining significant difference between the two points of measurement. The variables of basic motor skills that have sustained change are the variables that assessed flexibility and strength.

Key words: **Transformation processes, basic motor abilities, specific swimming program, discriminative analysis.**

Introduction

Managing the training process requires knowledge of the factors that correlate with positive changes under the influence of kinesiology operators. More studies tends to the solution of this task , treating different indicators of sport effects , apllying different statistical analyzes. Scientists, swimming coaches and teachers of physical education and health, which are involved in swimming training, should permanently strive to improve new swimming teaching methods . Trainers task should be to affects with a very designed basic training,on development of multidimensional swimmer (Faccioni, 2006). Constant by using identical methods of teaching and coaching swimming, the assumption is that you will receive identical results. Any person who is involved in swimming can create innovative strategies that can in some way contribute to the qualitative effects of training. Swimming is an activity that involves the ability of a man to keep his place or to be moving on the water surface with his own movements of his own locomotion (Rađo,I.., 1998). Recent scientific research has been done on the territory of Bosnia and Herzegovina, suggest that different swimming programs, in addition to improving swimming techniques, can greatly affect the motor potential respondents of different populations (Rađo,I., I., 1998.; Solaković, E., 2007.; Popo, A. 2006, Đedović, D., 2006.). The aim of of this study is to determine the level of change in basic motor abilities of non-swimmers, under the influence of the experimental swimming program.

Methods

The sample of respondents

The study was conducted on a sample of 70 young boys and girls of school age (6 – 9 years old), attends school swimming in the water sports club association „Dami“. Girls and boys were clinically healthy with no psycho – physical disorder. Participiants of the program, did not have any motor information on the tehiques of swimming, so they all belonged to the category of non – simmers.

Sample of variables

Sample of variables for assessing the basic motor skills. Variables to evaluate coordination:

1.Agility on the ground (MAGONT)
2.Agility in the air (MKTOZ)
3.Coordination with the bat (MKTOSP)

Variables to evaluate repetitive strength:
1.Lifting the trunk (MRCDTT)
2.Shelter troops lying (MRCZTL)
3.Lifting the leg lying (MRCDNL)

Variables for assessing the flexibility:
1.Flex with stick (MFLISKR)
2.Straddle forward bend (MFLPRR)
3.Lean forward on the bench (MFLPRK)

Methods of data processing

Discriminant analysis was used to analyze quantitative changes in basic-motoric abilities under the influence of experimental program.

Specials of applied programs

In this section of the research work the basic characteristics in the applied experimntal program of swimming were listed, with the number of trainings and their duration, also with specific characteristics of the autor and his innovation when it comes to training facilities. Non – swimmer training program, which was implemented, consisting of 36 units of training, whose leadership was under the supervision of experienced swimming coaches who are sport teachers. Duration of this program is deployed at three months, training sessions were three times a week, lasting 90 minutes. An important aspect of the program had been administred before the start of the swimming school: entrance interview with the parent ond child attendant, filling questionnaires from parents, the formation history of child for future coaches. Introducting the group leader with the children on the basis of written history teacher prior to their arrival at the pool. Constant, close cooperaion between parents and swimming teacher, and also effect on the child by the parents instructions. During the swimming school children are working in groups of 8 – 10 students or in similar groups based on age, sex, relationship to the aqueous medium and precisely defined initial status. Staff responsible for supporting child care was also on the pool, so tere was no time waste for other things of swimming teachers.Classes at the pool is implied use methods adapted for the age of children, like : communication, analytic – syntetic pedagogical method and method of play. In the introductory part of the lesson we have done warm – up exercises, stretching and exercises aimed at developing motor skills (strenght of abdominal and back muscles, shoulder belt flexibility, coordination) through modern exercises programs: aqua gym, aqua aerobics, aqua jogging, aqua pilates and water polygons for children. Different equipment was applied with the aim of diversity training, incluing: bats, solid rubber, soft ball, sinking objects and pool noodles.Strength training at younger ages we do, so we can teach children the proper technique of the exercise they are doing with own weight (push – ups, sit-ups, squats), medicine ball, dumbbells and equipment for withdrawing (Vorontsov, 2006).

Results and Discussion

Analysis of quantitative changes in motor skills at boys

By analyzing Table 3, we can see that the values of the treated area are obtained by Box's test. The differences between the covariance matrix of the initial and final measurements, were tested based on it can be notice a significant difference in the analyzed covariance matrix (sig.008). The values in Table 4, which deals with the significance of isolated discriminant functions, show that the isolated one discriminant function that shows a relatively high value (Canonical Correlation .85), and on the basis of which we can say that there is a high interconnection of treated variables. Insight into the strength of discriminant function was also confirmed on the basis of data obtained in Table 5 Wilks' Lambda, where he established varnish statistically significant difference, considering that it is .274, which gives a significant difference at the level of .001. Based on the data matrix structure within the Table 6, it is possible to recognize several variables that are segregated from the rest because of the biggest general difference between two points of measurement. Example to this are the following variables: MRCDTT - lifting the trunk, MFLPRK - bending on the bench and MRCZTL - shelter troops lying. Different exercises on land with a small weight, a large number of repetitions improves muscular endurance (Šiljeg, K., Sidnik, J., 2007).

Table 1. The results of Box' s test

Box's M		81,409
F	Approx.	1,575
	df1	45
	df2	17989,655
	Sig.	,008

Table 2. Significanceof isolateddiscriminant function

F.	Eigen.	% of Variance	Cumul. %	Canon. Correl.
1	2,651	100,0	100,0	,852

Table 3. Wilks' Lambda

Test of Function	Wilks' Lambda	Chi-sq.	df	Sig.
1	,274	89,998	9	,000

Table 4. Structure of discriminant function (boys)

Varijabla	Funkcija
MRCDTT	,509
MFLPRK	,433
MRCZTL	,425
MAGONT	-,361
MKTOSP	-,300
MFLISKR	-,190
MRCDNL	,175
MKTOZ	-,123
MFLPRR	,042

Table. 5. Cluster centroids

Grupa	Function
1	-1,607
2	1,607

After a global analyzing of boys results in quantitative changes , it can be concluded that the program and with its facilities and duration primarily affected the variable strength of the hull, the flexibility of the lower back and the back of the upper leg. The existing result can be explained by the fact that the entire swimming program pervaded material intended for improving and developing strength of respondents. In fact, in the introductory part of the training- activities that have been realized were water polygons, shaping exercises, aqua aerobics, water gymnastics. All these activities have been focused on preparing the body for the upcoming efforts, and of course for the specifics of this experimental swimming program, strengthening the muscles that support the spinal column (stomach and spinal muscles). In the further of the training swimming elements were adopting,also components of three basic swimming techniques for freestyle, backstroke and breaststroke. Therefore it can be assumed that a large number of praticular movements was realized, with hands, feet, isolated on land and in water, as well as a lot of swimming in the pool with diferent swimming tehniques, especially near the end of the program implementation. Thinking of the period after the children had mastered most of the content of the training process of swimming. Constant repetition of movement with their own weight has certainly left its mark on the increase of strength, especially the functional strenght. In his research of the transformation process in swimming with the population of students, Rađo (1998) presents the obtained results and explain relevant items related to the process of testing and its impact on the ultimate outcome of the testing. Based on these results, it can be determined that there was a significant shift in the global test of motor ability in the interval which included swimming program. The largest contribution to the discriminant function have tests that are a measure of coordination, repetitive strength and flexibility. Contribution to these changes probably can be overwritten to the experience gained by the participants during the first measurement, in which they introduced complexity and structure of movement - a collection of activities covered by the applicable measuring instruments. The global improvement of the results, which was achieved in the second measurement , is probably a result of reducing the time required to understand and remember the order of the tasks in the tests, which is always present, at the first encounter with the complex motor functions. It is also important to emphasize that the assumption is been present how many respondents at the start swam over to “force”, because they did not know the technique of swimming. At the end of training, in the final part of every training units Pilates exercises, stretching and relaxation exercises appropriate to the age of young children have been done. The aim was to stretch the muscles, increase spinal mobility, range of motion in the joints and relax. All the exercises were designed to be easy to adopt, not to be too hard for the heterogenous group of children participants of the program, to be dynamic and interesting because of , the absence of attention to children in this age. Variable MFLPRR - straddle forward bend is the one with the least significant transformation. The explanation can be found in the fact that the exercises to increase the flexibility of the inguinal were realized only through passive stretching in the final part of the lesson, while during the adoption training of swimming techniques, did not paid much attention to the same, it also did not specially permeated through the swimming program. Based of the table 7.centroidi group, was confirmed that the transformation occurred in favor of the final measurement, in the first three variables with the highest projection in the discriminant functions, and also at coordination variables with slightly lower projection. In fact, inverse scaling, based on the negative, it is clear that the young swimmers needed less time to realize the out the tests in this area as the part of the final measurement.

Analysis of quantitative changes in motor skills at girls

Boxes test (Table 8) confirmed the statistical significance (p = .001), there with terms were acquired for entry into further mechanical processing of data obtained for girls. Based on the value of the canonical correlation .66, presented in Table 7, it is possible to conclude that there is a significant connection and that in further analysis larger number of variables will acqired, which have a high contribution to the discriminant function.Values of discriminant strength was expressed over 'Wilk lambda test (Table 10), and in this case is relatively high .560.

Table 6. The results of Box' s test

Box's M		203,144
F	Approx.	3,895
	df1	45
	df2	16097,390
	Sig.	,000

Table 7. Significanceof isolateddiscriminant function

F.	Eigen.	% of Variance	Cumul. %	Canon. Correl.
1	,786	100,0	100,0	,663

Table 8.Wilks' Lambda

Test of Funct.	Wilks' Lambda	Chi-sq.	df	Sig.
1	,560	37,975	9	,000

Table 9. Structure of discriminant function (girls)

Varijabla	Funkcija
MFLRK	,711
MRCZTL	,452
MRCDNL	,393
MRCDTT	,316
MKTOSP	-,287
MAGONT	-,253
MFLISKR	-,248
MKTOZ	-,245
MFLPRR	,146

Table 10. Cluster centroids

Gruop	Function
1	-,874
2	,874

Based on previous research, it is well known that girls have a higher elasticity compared to boys. This knowledge could be linked to the final result and assume that girls have a better starting point compared to boys at the initial testing, and that the extra work through the implementation of the content experimental swimming program did really great progress. Taking the general size of the numerical values of variables tested as the part of discriminant function in boys and girls, we can see the difference in favor of girls. In a study from 1988., where training was realized with adult non-swimmers, the authors have demonstrated the dominance of training results of girls . It is surprising that at the end of training the girls were most successful, although they at the beginning of the experiment had _ most modest results and they showed the most modest background. Is obvious that girls have the ability to quickly acquire motor movements in the water,it can be because of some disposition of the constitutional character (higher percentage of body fat, the lighter bones) and as previously observed being relaxed in performing some of tasks. Next to the varijables of flexibility,in the analysis of Table 11, other variables with high projections on isolated discriminant function have variable MRCZTL - shelter troops lying down, MRCDNL - lying leg lift. Development of specific strength in young athletes strength in water is an important factor in the good-establishment swimming techniques (Vorontsov, 2006). Based on the correlation applied to the first discriminant function, with variables which are different in first from the the second test, it can be concluded as by boys, variables that dominate were repetitive strength of the hull and flexibility. The difference compared to boys is a variable with a maximum projection. In girls it is flexibility, which represents the forward bend on the bench, while in boys that is strength of the abdominal muscles, which is represent by lifting the trunk. Comparing the results from the below table with the conclusions reached by Rađo (1998.)the similarities can be recognized . Rađo in his work discuss that maybe swimming program with his specific content situational type and also volume increased workload favorable impact in the first place affect growing of agility, strength and flexibility. The variable with the lowest projection in both boys and girls is the same, and it is a variable straddle forward bend. Even girls has a higher projection, compared to the other variables in the presented structures discriminant function, it can be underline that in this part of the program not so much importance was given to stretching this part of body which subjects passed Explanation of larger projections mentioned variables for girls, it is possible to find in the fact that girls have had a more pronounced body flexibility compared to boys in the beginnig. High numerical value of the variable shelter troops lying in girls and boys, indicating a significant increase in strength of thoracic back muscles. Knowing well the program which was implemented in three months, it can be conclude that this increase is a result of the dominant practicing breaststroke and backstroke crawl technique during the training. To make conclusions about the effectiveness of the program, it is possible to underline, that the quarterly cycle primarily positive effect on increasing flexibility, also to a large extent on the strength of the hull. Group centroid analysis was confirmed that the numerical values of the variables are in favor of the final measurement

Conclusion

Based on the results obtained by discriminant analysis, there is a reasonable possibility discuss that occurred significant quantitative changes in motor abilities of boys and girls are present after three months of practicing an experimental training program for non-swimmers younger adolescents. Very important is that these changes occurred in motor skills coordination, which is known from previous studies, to be the best, most development in this younger age . Authors Malacko and Rađo (2004.) state that innateness for coordination is around 80%, so that the development of this capability should also commence in early childhood , in sensibility periods or “critical” stage, when they can be most optimal reaction on body to the coordinating of applied training facilities. Also, at increase abdominal strength and back muscles, then the flexibility that have a dominant role in the proper growth and development of children of this age. Authors Hadžikadunić and Balta (2000.) in their book about correcting posture of children note that the backspine is the wearer of body weight, and most of the load. Today’s youth grows faster, biological evolution is accelerating, but their muscle strength does not follow the rapid rast. Low mobility and modern lifestyles affect the development of a weak muscle. For children with underdeveloped musculature a inhently bad posture is formed. Specific activities implemented in the above-mentioned program, surely could contribute to the positive transformation of motor skills program participants and providing quality adoption planned records, and finally promoting swimming as a fun and interesting program and also different accompanying exercise that were done in the water. The importance of knowledge of swimming as a basic psycho-physical skill, is not falling, it is growing. Knowledge of swimming as a form of human activity which the people actively engaged in the developed countries, taking the lead among the sports and recreational activities. Seems to be a evolutionary process that is inevitable and that is being developed with the increase of civilization. In the developed countries of Western and Eastern European non-swimmer swimming training is an obligatory part of the educational process of education (Sink, I. 1988).

References

Faccioni, A. (2006) Speed and Condtioning Consultant; Young Athlete Conditioning. www.coachesinfo.com-article-295.

Đedović, D. (2006) Effects twenty-five hours of non - swimmers training of junior school age, Graduate work. Faculty of Sport and Physical Education, University of Sarajevo.

Hadžikadunić, M. Balta, S. (2000). Corrects posture in children of preschool age. Faculty of Sport and Physical Education, Sarajevo.

Malacko, J., Rađo, I. (2004). Technology of sport and sports training. Faculty of Sport and Physical Education, University of Sarajevo.

Popo, A. (2006) Effects twenty-five hours of non - swimmers training of junior school age, Graduate work. Faculty of Sport and Physical Education, University of Sarajevo. graduate work

Radjo, I. (1998). Transformation processes of motor and functional skills and various aspects of swimming. The doctor thesis. Faculty of Physical Education, Sarajevo.

Solaković, E. (2007). Effects of programmed swimming to improve swimming efficiency and success in performance swimming technique of students. Master's thesis. Faculty of Physical Education, Sarajevo.

Šiljeg, K., Sidnik, J. (2007). Goals and methodical benchmarks conception of inicial training cycle by 14 years swimmers, Conditioning prepering of athletes, Zagreb.

Šink, I. (1987). The current state of training non-swimmers and further directions, Proceedings of the Second Conference of Yugoslavien Swimming education Training Pančevo.

Vorontsov, A. (2006). Development of Basic and Special Endurance in Age-Group Swimmers. www.coacesinfo.com-article-295.

Vranešić-Hadžimehmedović, D. (2011). Transformation processes of basic motor abilities and morphological characteristics of programmed swimming program. Master's thesis. Faculty of Sport and Physical Education, Sarajevo.

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