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THE EFFECTS OF STRENGTH AND SPEED TRAINING ON TRAINED AND UNTRAINED BOYS

(Preliminary communication)

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Abstract

Knowing the degree of motor skills development in certain age, making the precise model of training is the key, which will be exactly balanced percentage of specific exercises, aimed at maximum development of certain motor skills. The purpose of the research is to develop strength and speed with trained and untrained 12 years boys under the six weeks training influence with an emphasis on developing these skills. The aim is to determine how the applied program, with emphasis on strength and speed in a six-week period, affects the development of these abilities in trained and untrained boys, and where the positive effects could be seen. The research involved 51 boys at he age of 12. The variables are selected so as to be adapted to the aim of the research and to the examinees. The differences between the results of motor tests were analyzed using the initial and final measurement between groups and within each group of examinees separetly. It is obvious that the training program proved effects in improving some of the tested motor abilities in both groups. Greater impact has been established in the trained group.

Keywords: *motor abilities, motor tests, program of training, motor tests, initial measurement, final measurement, physical education, basketball, t-test*

INTRODUCTION

Quality motor function of man is conditioned by the good condition of the central nervous system, parts of locomotor and other functional characteristics of the organism. Due to the current way of life, the functions of the human body and its individual systemsbecome inactive. Therefore, well organized training models must always give incentives to all biological functions, which are formed during development. If there is no movement, the man's biological balance is disturbed (Gajic, 1985). Knowing the degree of motor skills development in certain age, making the precise model of training is the key, which will be exactly balanced percentage of specific exercises, aimed at maximum development of certain motor skills. Strength is developed and applied in a variety of activities and physical exercise training, which means that there are different kinds of formsd of force manifestation that was formed on the criteria of their action.

However, most of authors determined the existence of strength factors identified as: explosive, repetitive and static strength (Malacko, 1991). Gajić (1985) on the results of their research in our population, considered that the period from 11 to 14 years is very good for stimulating the development of explosive strength. Bompa (2001), believes that the most favorable period for strength development is about 12th year. According to Volkov (1981), sensitive period for explosive strength and stregth endurance development, starts about 8th year. As a critical phase in the period from 7 to 17 years of age should be set aside 8-9, 10-11, 13-14, especially 14-15 years.

Speed is a very complex motor skill. The heterogeneous nature of speed requires a different approach to it's research. Speed is consisted of different elements: speed of reaction, the frequency of movements, speed of a single movement, acceleration ability and maximal (locomotor) speed (Malacko, 1991). The speed of a single movement, the acceleration ability and maximal speed, should be developed early, because the some conditions for their development. However, theeir sensitive period strats later and ends later in a connection with these capabilities, explosive strength and maximal speed is developed until 16th year (Volkov, 1981). The speed of reaction and the fequency of movements are developing very early, in pre-school age, and a very dynamic period is between 7 to 11-12 years (Filin, 1974).

The purpose of the research is to develop strength

and speedwith trained and untrained 12 years boys under the six weeks training influence with an emphasis on developing these skills. The aim is to determine how the applied program, with emphasis on strength and speed, for six week period, affects the development of these abilities in trained and untrained boys, and where the positive effects could be seen.

METHODS

The model of implemented training lasted for six weeks. Three training sessions were performed per week and lasted for 1 hour. Light warm-up running was carried out before each training session as well as moderate intensity exercise design. The dynamic loads were used and they were appropriate to 12 years boys. The long term static loads were avoided (Malacko,1991).

The research involved 51 boys in 12 years age. The sample was divided into two groups. The first group was consisted of 29 boys who regučarly attended basketball training sessions at least for two years. The other group included 22 boys who had been not involved in prior research with organized and programmed form of execise, exept physical education.

The variables are selected so as to be adapted to the aim of the research and to the examinees. For assessing the strength and speed, folowing tests were selected:
Strength

1. Jump from place (SDM)
2. Throwing medicine ball from lying position(BML)
3. Lifting the hull on the bench (DTK) Speed
4. Taping hand (TAP)
5. Taping foot (TAN)
6. Sprint 20 meters (20m)

Testing was conducted in the school hall. Each subject was in sports equipment. The test was attended by three assistants. The props which were used during the testing are: meter, 3 kg heavy medicine ball, the Swedish bench, plank for hand taping, the equilibrium banch for foot taping, and the Brower Timing Systems, IRD-T175-S, for running speed. All tests, except lifting the hull on the bench, which was once performed, were caried out three times. And recorded the best achieved result (Metikoš, Prot, Hofman, Pintar, & Oreb, 1989).

Model training was carried out as follows:
First week: I - horizontal ladders, combination of different types of skip; II - Circuit Training with medicine ball exercises 10 to 20 repetitions; III - ball games.
Second week: I - ground-based skills in place of the upper extremities; II - Circuit Training
with elastic exercise bands 8 to 20 repetitions; III - running in the hall.
Third week: I - ground-based skills in place of the lower extremities; II - point games in
sections 80 and 100 meters; III - basketball.
Fourth week: I - horizontal ladders, combination of different types of jumps; II - circuit training exercises with medicine ball 10to 30 reps; III - basketball.
Fifth week: I - ground speed based on skills through competition; II - Circuit Training: ladders, rope
and loom 8to 20 repetitions of exercises, III - ball games.
Sixth week: I - horizontal ladder, a change of direction, II - point games in sections 10, 20
and 30 meters; III - running in the hall.

After applying these tests on a sample, according to the obtained data, descriptive and comparative statistical analysis were performed. From the descriptive statistics for each group separately were determinated: mean, minimum score, maximum score, standard deviation, skewnis and curtosis. From the comparative statistics the following statistical methods were used: t-test for independent samples and t-test for dependent samples.

RESULTS

The obtained values of central and dispersion parameters (Table 1) suggest us to the following conclusion. On the interval between the maximum (MAX) and minimum (MIN) results, we can concluder that the consistency of the results for the strength test was better for untrained group of subjects. The speed tests showed greater homogenity for the trained group

Table 1. Descriptive statistics – initial testing

Grupa	Test	Mean	Max	Min	Std.dev	Skew	Kurt
Trained	SDM	178.16	220.00	142.00	18.12	0.23	0.63
	BML	361.84	510.00	250.00	71.49	0.46	-0.44
	DTK	17.16	35.00	3.00	8.31	0.28	-0.63
	TAP	24.34	31.00	21.00	2.57	0.72	-0.13
	TAN	22.56	28.00	18.00	2.38	-0.13	-0.28
	20M	3.96	4.34	3.41	0.20	-0.54	0.92
Untrained	SDM	154.55	199.00	124.00	19.12	0.58	-0.29
	BML	356.03	480.00	270.00	53.44	0.52	-0.01
	DTK	10.69	30.00	1.00	7.13	1.00	0.42
	TAP	25.03	32.00	21.00	2.64	0.47	0.23
	TAN	21.48	27.00	18.00	2.43	0.46	-0.57
	20M	4.34	4.98	3.92	0.26	0.60	0.14

Table 2. Descriptive statistics – final testing

Grupa	Test	Mean	Max.	Min.	Std.D.	Skew.	Kurt.
	SDM	179.00	221.00	140.00	18.18	0.16	0.81
	BML	365.31	510.00	250.00	71.75	0.41	-0.52
Trained	DTK	18.16	35.00	6.00	8.15	0.32	-0.76
	TAP	24.09	31.00	21.00	2.39	1.06	1.09
	TAN	22.97	29.00	19.00	2.36	0.48	0.01
	20M	3.98	4.34	3.42	0.20	-0.44	0.53
	SDM	155.36	196.00	130.00	18.32	0.48	-0.17
	BML	358.79	490.00	260.00	55.45	0.36	-0.17
Untrained	DTK	11.48	30.00	2.00	6.72	0.95	0.52
	TAP	24.55	31.00	20.00	2.44	0.23	0.43
	TAN	22.00	28.00	18.00	2.37	0.62	-0.06
	20M	4.32	5.01	3.90	0.27	0.68	0.33

of subjects. The values of standard deviation confermed that. The values of skewness (SKEW) were positive for both groups, and it means that the curve is positive asimetrical and epicurtic. However, the degree of skew values, in most cases do not exceed the value of 1, so we can confirm a good discrimination. The values of the kurtosis (KURT) degree for both groups were less than 3, so we can claim that the curve is flattened and platicurtic. That indicates the presence of a number of extreme values.

The obtained values of central and dispersion parameters in table 2, suggest the following conclusion. Results are based on the interval between the maximum (MAX) and the minimum (MIN) and it could be concluded that the initial measurement, as well as more uniform results, when performing strength tests, showed groups of untrained subjects, while the speed tests have more homogenity of the group of trained subjects, as it is sugegested by values of standard deviations. The values of skewness degree (SKEW) are mostly with positive signs and moving in the normal values, while the curve is epicurtic and we could not speak about very positive asymmetry, and we can confirm good discriminationof motor tests applied in both groups.

Based on the analysis of kurtosis degree (KURT), we can conclude that the curve is platicurtic for both groups, and there is a number of results which are scattered to extreme values.

Table 3. T-test between groups on initial testing

Tests	T	Sig
SDM	4.95	0.00
BML	0.37	0.72
DTK	3.24	0.00
TAP	-1.03	0.30
TAN	1.75	0.08
20M	-5.87	0.06

In Table 3, are showen the results for testing the significance of differences between the used motor tests between groups in the initial measureement. The T-test for indipendent sample is used. The analysis of the results tell us that statistical significance level of 0.05 significantly mean test: jump from place (SDM), and lifting the hull on the bench (DTK). The trained group showed a higher level of explosive strength development and trunk flexor repetitive strength during applied motor tests.

Table 4. T-test between groups on final testing

Tests	T	Sig
SDM	5.06	0.00
BML	0.39	0.69
DTK	3.47	0.00
TAP	-0.74	0.46
TAN	1.59	0.11
20M	-5.52	0.00

Table 4 shows the results of testing the significance of differences between the used motor tests between groups of sample to the final measurement. T-test is used for independent sample. The analysis of the results give us statistical significance level of 0.05 significantly different mean test: jump from place (SDM), lifting the hull on the bench (DTI), and sprint 20 meters (20m). The trained group showed a higher level of explosive strength development and trunk flexor repetitive strength on the final measurement, in a relation to the untrained group. In the final measurement, there was no statistically significant difference in test results to access the sprint speed, on what we can conclude that the six-week training conducted in that segment more influence on trained group.

Table 5 shows the results of testing the significance of differences between motor tests used on the initial and final testing for trained group. T-test was used for dependent sample. Analysis of the results show that the statistical significance level of 0.05 signiificantly different mean for tests: jump from place (SDM), throwing medicine ball from lying position(BML),

Table 5. T-test between results for trained group on initial and final testing

Test	Mean	Std.D.	Std.error	T	Df.	Sig.
SDM	-0.84	1.48	0.26	-3.22	31	0.00
BML	-3.47	5.99	1.06	-3.28	31	0.00
DTK	-1.00	0.84	0.15	-6.71	31	0.00
TAP	0.25	0.76	0.13	1.87	31	0.07
TAN	0.41	0.94	0.17	-2.43	31	0.02
20M	0.01	0.02	0.00	2.16	31	0.04

Table 6. T-test between results for untrained group on initial and final testing

Test	Mean	Std.D.	Std.error	T	Df.	Sig.
SDM	-0.52	1.92	0.36	-1.45	28	0.16
BML	-2.76	9.21	1.71	-1.61	28	0.12
DTK	-0.79	0.94	0.17	-4.54	28	0.00
TAP	0.41	1.27	0.23	1.76	28	0.09
TAN	-0.52	1.21	0.22	-2.29	28	0.03
20M	0.01	0.04	0.01	1.79	28	0.08

lifting the hull on the bench (DTK), taping foot (TAN) and sprint 20 meters (20m).

Table 6 shows the results of testing the significance of differences between motor tests used on the initial and final measureement for untrained group. T-test was used for dependent sample. Statistically significant difference of mean can determine the lifting strength on the bench (DTK) and taping foot (TAN). The implemented training program has proved effects in improving the trunk flexor repetitive strength and speed of repetitive leg moments.

CONCLUSION

This implemented training program is primarily oriented to strength and speed development, and was carried out in order to examine the impact on the development of these motor skills for trained and untrained boys. The differences between the results of motor tests were analyzed using the initial and final measurement between groups and within each group of examinees separetly. As expected, the trained group showed better results on initial measurement, while the final measurement set up even bigger differences between the groups. It is obvious that the training program proved effects in improving some of the tested motor abilities in both groups. Greater impact has been established in the trained group. It means that trained group, during two years of work, have not reach yet a satisfactory level of strength and speed development. There is a lot of space for motot dimensions improvement and development. That is why this type of research is very important to form an optimal programmed sport training.

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