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MOTOR EFFICACY OF PROGRAMMED-TEACHING OF PHYSICAL EDUCATION APPLIED TO SEVEN-YEAR OLD SCHOOLBOYS

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INTRODUCTION

Growth and maturation are maintained by the interaction of genes, hormones, nutrients and environment (Malina 1984). Increased physical activity is another factor that affects growth and maturation, and significant changes occur both in anaerobic power and aerobic capacity during growth under the influence of training (Bouchard 1981). Physical activity influences the values of VO_{2max} at VT (Bunc 1993) and aerobic power and muscle strength (Shephard 1994).

The aim of this study is to show which effects can be achieved in changes of basic motor abilities in pupils of the first class of elementary school through a programmed teaching of physical education with predominantly athletic and sport gymnastic contents but based on the existing three hours a week schedule.

METHODS

This study has been conducted on 325 seven year old schoolboys, divided to two groups: a control group, counting 140 boys, attending physical education classes according to the conventional programme and an experimental group of 185 boys, attending classes of advanced, intensified physical education.

Boys from both groups were subjected to a set of 12 motor tests twice, six months apart (description of the tests: Katić 1995). The differences between groups in the variables of differences (Measurement 2 - Measurement 1) were established by using a discriminant analysis.

RESULTS

The motor indices recorded in two groups of schoolboys presented in Table 1 show that boys from the control group had better results at the beginning of the school year than those from the experimental group regarding agility (sidesteps), static strength (bent arm hang), indices of movement frequency (hand tapping and foot tapping) and to a lesser extent aerobic endurance (3 min run). After six months, the experimental group achieved significantly better results regarding aerobic endurance, static strength, repetitive force of the body (sit-ups), flexibility (forward bow), explosive force (20 m run) and in the indices of movement frequency.

Structure of the discriminant function shows that the experimental group attained a significant improvement in all variables.

Table 1
Mean values (± SD) of motor indices measured twice in boys from the control and experimental groups and the structure of the discriminant function (F) of Δ; Measurement 2 - Measurement 1.

Variable	Control group n = 140		Experimental group n = 185		F
Measurement	1	2	1	2	
Sidesteps (s)	16.1 ± 2.1	14.2 ± 1.8	16.4 ±2.2[c]	14.1 ± 1.7	-0.46
Polygon backwards (s)	23.4 ± 7.5	17.4 ± 4.7	22.7 ± 5.7	16.3 ± 3.9[a]	-0.49
Bench standing (s)	1.8 ± 1.0	2.0 ± 1.0[d]	1.6 ± 0.9	2.3 ± 0.9[a]	0.18
Forward bow (cm)	36.4 ± 8.2	37.3 ± 7.1[d]	37.1 ± 8.9	42.4 ± 8.6[c]	0.30
Hand tapping (taps/min)	19.8 ± 3.2	20.8 ± 2.4[d]	18.6 ± 2.6[c]	21.7 ± 2.8[b]	0.35
Foot tapping (taps/min)	15.9 ± 2.0	17.2 ± 1.9[d]	15.5 ± 2.1[a]	17.6 ± 2.0[a]	0.39
Standing jump (cm)	111.1 ± 19.4	127.9 ± 19.6	114.1 ± 16.9	131.1 ± 16.2	0.47
Ball throw (m)	10.7 ± 3.4	12.0 ± 3.7[d]	10.4 ± 3.1	13.0 ± 3.3	0.35
20 m run (s)	5.0 ± 0.5	4.7 ± 0.4[d]	4.9 ± 0.5	4.5 ± 0.4[c]	-0.48
Sit-ups (per min)	22.0 ± 7.0	25.1 ± 6.6[d]	21.5 ± 5.8	28.2 ± 5.5[c]	0.39
Bent arm hang (s)	12.7 ± 11.7	14.0 ± 9.9[d]	9.6 ± 7.2[c]	22.4 ± 13.0[c]	0.29
3 min run (m)	449.3 ± 50.6	474.8 ± 61.4[d]	435.1 ± 65.3[a]	531.3 ± 61.9[c]	0.52

Significantly different from the respective value in the control group: [a]P<0.05; [b]P<0.01; [c]P<0.001; [d]Significant difference between within-group differences (Δ; P<0.001)

DISCUSSION

As expected most pronounced between-group differences were in aerobic endurance indices (Shephard 1994; Katić 1995), since the development of the oxygen transport system enhances development of the whole chain of abilities to be improved.

The discriminant function proves that extended physical education classes have exerted a significant and complex influence on the development of motor abilities in boys. This influence is especially pronounced in the indices of aerobic endurance, coordination, explosive strength, frequency of movements, repetitive force and to a slightly lesser extent flexibility and static force.

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