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BODY BUILD AND MOTOR PERFORMANCE OF MALE UNIVERSITY STUDENTS OF PHYSICAL EDUCATION

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Abstract: *Changes in somatotype, growth type, body fat content and motor performance in tests of physical endurance, speed strength and coordination were analyzed in 45 male students. The purpose was to clarify if the curricular changes of education could effectively modify the perviously observed unfavourable trend.*

A significant increase was observed in stature, body fat content and in the anthropometric variables related to depo fat. Mean performance in 60 m run become poorer, those of the 1000 m run and medicine ball throw improved in the two-years period of study. It was infered that the more reasonable distribution of the practical lessons of the curriculum while it solved the deterioration of performance, failed to stop the previously noted increase in body fat.

Key words. *PE students; Body dimensions; Motor test scores.*

Introduction

Though of the slight extent only, Mészáros (1979) and Mészáros et al. (1986) reported differences on body build and body dimensions between successful and rejected applicants for admission to the Testnevelési Főiskola (University of Physical Education) Budapest. Success in meeting the complex requirements of the entrance procedure, nevertheless, depends more on the motor abilities and on the equally level of knowledge in the science subjects than on the specifics of physical constitution (Farkas et al. 1986).

Another previous study has shown that both body composition and cardio-circulatory endurance undergo unfavourable changes during the four years of university studies, despite that the admitted students represent a group which had been subjected to a multi-aspect process of selection (Frenkl and Mészáros 1979). One of the factors held responsible for such changes was the ill-proportionate distribution of the practical lessons in the curriculum.

So when this latter also was changed by the new order of education, the question of whether the new distribution of the practical lessons would modify the mentioned unfavourable trend had arisen immediately.

Material and Methods

The anthropometric and motor properties of the subjects were first recorded concurrently with the aptitude test procedure in April 1985. The follow-up study took place in the spring of 1987 by which time the 45 studied male students had finished the fourth semester. All of them had a valid sports medical license to participate in competitions, although merely six of them were Class I or better qualified athletes.

The somatotype of the subjects was assessed by the Heath–Carter technique (1971) and their growth type by Conrad's method (1963). Body fat expressed as a percentage of

body mass was estimated as suggested by Parízková (1961). Motor profiency was approached by the following test items:

– 60 m run assess speed. Track rules were observed; running time was measured to the nearest tenth of a second.

– 1000 run to assess cardio-respiratory endurance. Execution started from upright position; time was measured to the nearest tenth of a second.

– Backward throw of a 5 kg medicine ball to assess power and coordination of arms, trunk and legs. Distance was measured to the nearest 5 cm.

The differences between the respective means of 1985 and 1987 were tested by Student's t for dependent samples.

Results and Discussion

The means, standard deviations and the respective t-values are tabulated (Table 1).

The most marked changes in the anthropometric variables were observed in body fat content. The very favourable percentage found in 1985 was by no means specific to this sample. Farmosi et al. (1987) reported on similar volumes of body fat in the first-term PE-students of the previous years. Although the increase in body fat amounted to 3%; a 13–14% content of fat is not uncommon even among national team members (soccer players; Mohácsi and Mészáros 1987).

Table 1. **Means and standard deviations of the studied variables in male PE-students (N = 45)**

Variables	1985			1987	
	x	s	t	x	s
Stature	177.58	6.59	+	178.51	6.87
Body weight	68.77	6.79	+	74.06	8.06
Metric index	-1.16	0.38	–	-1.10	0.36
Plastic index	88.40	3.18	+	89.39	3.33
Ist component	2.28	0.70	+	2.93	0.80
IInd component	4.63	0.80	–	4.91	1.06
IIIrd component	3.19	0.83	+	2.51	1.00
Body fat%	10.82	2.92	+	13.73	3.00
60 m run	7.18	0.30	+	7.52	0.25
1000 m run	193.09	9.62	+	178.55	14.46
Medicine ball throw	11.84	1.33	+	13.18	1.34

t = significance of t-test at 5% level for dependent samples

Thus, it is not the absolute fat mass that is worth considering, but the very fact of an increase: This fat deposition occured in subjects involved in intense physical activity of at least 4–5 hours daily. A two-factor explanation is suggested: increased appetite due to the high-intensity exercise and a dietary regimen of inappropriate composition namely, mensa meals of high fat and CHO and low fibre content.

Stature was found to have grown by nearly 1 cm. Ranging between 0.4 and 1.6 cm this increase was statistically significant. Beyond the age of 18, it was reasoned, this extent of increase in stature was most likely due to an exercise-inducted rise in the

growth hormone level (Shephard and Sidney 1975). This mechanism is assumed to be important even when one appreciates the fact that most of the exertion-inducted HGH is metabolized by the liver in 30 to 60 min after physical activity had ended (Sutton and Lazarus 1976). Elevated HGH levels occuring several times daily are very likely to exert effects that cannot be neglected. One has to assume that in order to lead to a measurable increase in stature, tissue hormones may also contribute to the effect of excess HGH (Winter 1978). It is noted that the mean stature of our subjects did not exceed appreciable even in 1987 height of the technology students reported by Gyenis and Till (1981).

The increase of more than 5 kg in body mass was significant, naturally. About 90% of it was attributable to the accumulation of depot fat and taller stature.

Neither the plastic index representing the robustness of the growth type nor the Ist component of the somatotype are independent of fat deposition; their change is consequential in our opinion. It is noted in this respect that at the time of the first study the body build of the observed students was comparable to that of the players of the first league of the national championship (Mészáros and Mohácsi 1982, Farmosi et al. 1984, Mohácsi and Mészáros 1987).

The times measured in the running speed test of 60 m became considerably longer after two years. One reason for that is obviously fat apposition. Yet, it would be wrong to leave out of account that the efforts necessary to achieve an acceptable level in the complex skills and aptitude required by the university surriculum scarcely favour even a maintenance of running speed acquired previously. Any further improvement in speed, moreover, even a stabilization of the previously attained speed, would need special training at this level of performance.

Cardio-respiratory endurance and coordinated power as reflected by the employed test items were found to improve in our subjects. The means are naturally better than in the students of other faculties (Reigl 1983). It is added, however, that while the 60 m times are comparable to the standards of the Hungarian system of qualification, the results of the 1000 m run do not meet competition requirements.

A joint interpretation of the observed data has led us to the inference that the previously common "derangement" in the students' physical performing capacity has been mitigated or stopped by the redistribution of the curricular lessons of practice and theory. Nevertheless, the previously observed tendency of unfavourable changes in body composition still persists.

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