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PHYSICAL FITNESS DIFFERENCES IN HUNGARIAN SCHOOL-AGE CHILDREN WITH SPECIAL REGARD TO EXPLOSIVE LEG STRENGTH

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Abstract: *The physical fitness status refers to and reflects the influence of environmental and ecological conditions. Futhermore, the attitudes and behaviour patterns of a given social setting determine to a large extent the life style and amount of physical activity. This paper refers to a large scale research project "National Growth Study", focused on biological development of the Hungarian youth at the end of the 20th century. Regional and environmental differences regarding children's physical performance were found in their dynamic strength, too.*

The results of our first National Growth Study made it possible for us to watch trends in growth and physical fitness of children and youth and to assess the influence exerted on these trends by different conditions. The foundings of complex investigation could give the answers to the important question to what extend violent changeds which took place in Hungary during the past years, have been reflected by the development of children and youth, and what has to be changed for the new generations' health-related physical fitness.

Key words: *Health-related fitness; Explosive leg strength; Hungarian youth; Social influences.*

Introduction

The physical fitness of school-age children has received considerable attention in recent years in Hungary, too. The special appreciation is due to the growing concern that habitual physical activity levels may be declining in the young. Beside this, there is a wellknown protest from armed services recruitement centres that young recruits are at a low standard of fitness. The Youth Sport Association has emphasized a sharp decline in organisewd competitive sport is Hungarian schools.

With regard to these facts the investigation of biological development and physicawl performance capacities of Hungarian youth was initiated at the end of the 20th century (Eiben – Pantó 1981, 1986, Barabás 1986). The studies were supported by the Institute of Social Sciences and the National Sport Office. The survey concerning anthropometrical measurements and physical performance should emphasize the relationship between the health and physical activity and monitoring the aspects of positive health, health-related fitness.

The most useful definitions of fitness draw a clear distinction between fitness, as related to "performance" that is specifically an athletic or industrial task and fitness that is related primarily to functional health. The term of "health-related fitness" has been used for a couple of years (Safrit 1986, Tuxworth 1988. Aahperd 1980, Eurofit 1988).

The general concept of physical fitness can be divided in three major divisions: the organic, the motor and the cultural component (Renson et al. 1979).

However, the basic factor of the health-related fitness is the cardiorespiratory fitness which is in relationship with the organic (i.e. physique) and motor (i.e. motor fitness) of physical fitness. There are other elements claimed to be linked to health, mainly the joint flexibility together with abdominal endurance, the strength and its associated capacities,

power as well as static and dynamic, agility and so on. The motor fitness that is a m ltidimensional component, can be measured only through a battery of test, each of them measuring different factors. Although a cross-sectional examination has by definition certain limits, one can still draw certain conclusions concerning the development of motor abilities, such as strength, speed and endurance.

In this study there are some organic and cultural comoponents discussed, based on the standing broad jumb test which is evaluating the explosive leg strength.

Material and Methods

The size of the examined sample contained approximately 28 000 schoolchildren, the 1.5 per cent of 6–18 year-old healthy children of both sexes in Hungary (*Table 1*). The sample represents all types of settlements and all types of schools (in Hungary there are three types of secondary schools: grammar, specialised and vocational-training schools).

Table 1. **Number of subject examined**

Age (years)	Boys	Girls
6	200	209
7	1066	950
8	1168	950
9	1261	1151
10	1160	1099
11	1176	1079
12	1107	1055
13	1165	1079
14	1164	1069
15	1551	1224
16	1577	1074
17	1328	936
18	737	537
over 18	97	59
Total	14758	12672

The investigation was connected functionally to Eiben's "The Hungarian National Growth Study" (Eiben – Pantó 1981). Different jump tests were used to evaluating the explosive leg strength. We chose the standing broad jump test (Barabás 1984). Data were elaborated with the multivariate discriminant analysis and variance analysis on IBM 3010 computer with SPSS–X program-package.

Results and Discussion

Standing broad jump results related to height and weight (i.e. organic components of physical fitness) at every age groups, more exactly characterize performances of subjects (for deteils see Eiben – Pantó 1987–88, and Barabás 1986). *Figures 1* and *2* show the age-group differencees of height, weight and jumping scores for boys and girls.

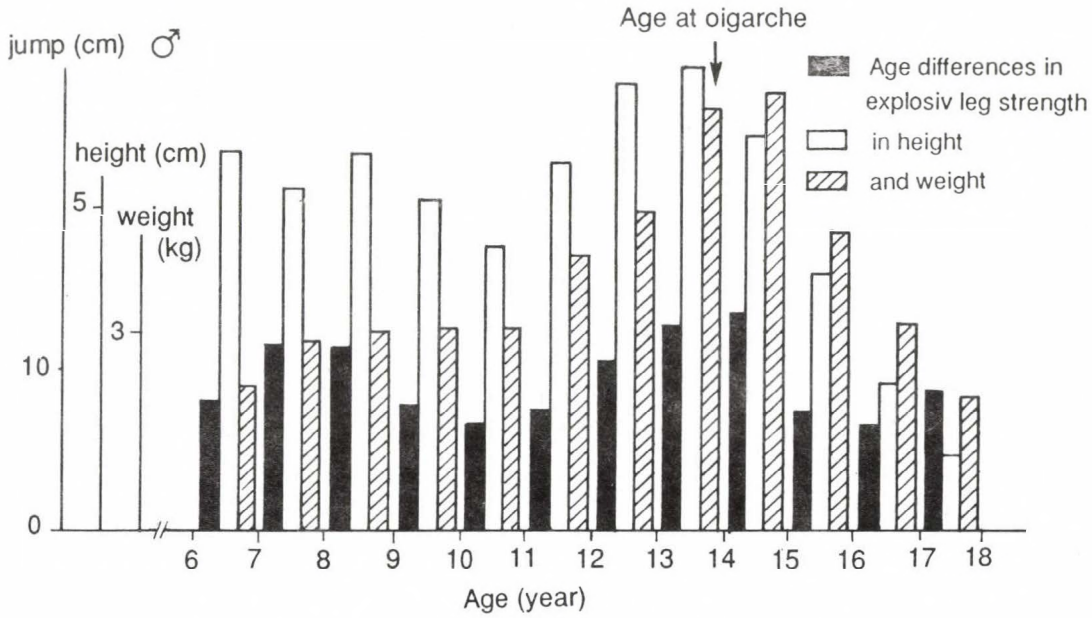

Fig. 1: Girls' performance differences between the consecutive age-groups

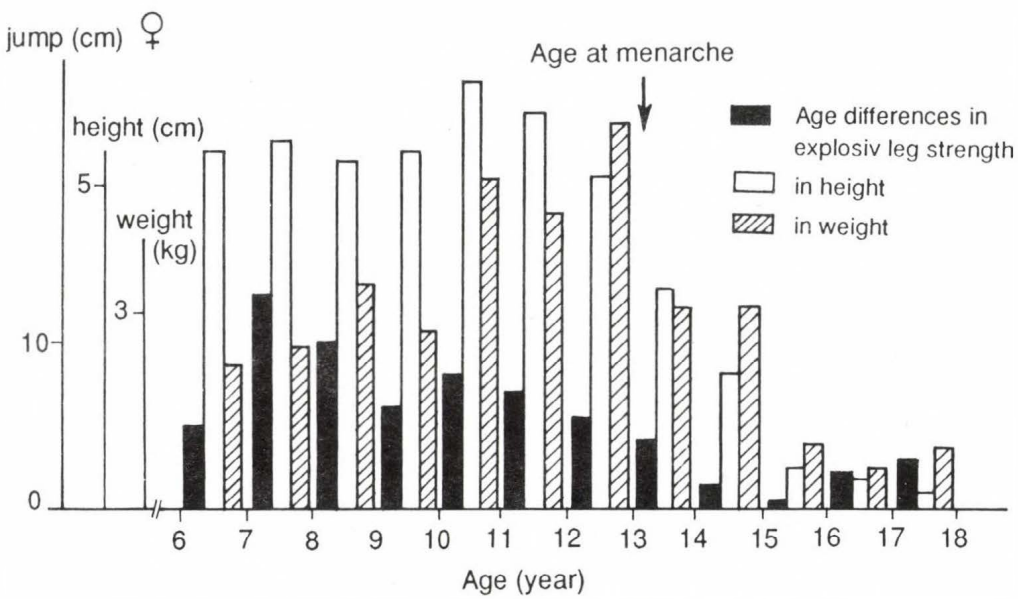

Fig. 2: Boys' performance differences between the consecutive age-groups

The optimal case would be that the body weight increase according to age, would mean a proportionally bigger mass of muscles, to which could result in better performances. However, this assumption is only partially justifiable in the case of girls. The increase of body weight is to a great extent caused in connection with sexual characteristics by the growth of fat tissues. On the other hand, the greater body weight bears greater inertia and therefore greater strength would be necessary to mobilize this body weight from its state of rest (Malina 1980).

There are positive and negative correlations between the performance and body measurements (*Table 2*). In the case of boys the strenght development reaches the ighest peak only when peak of height and peak of weight have changed, that is the spurt-like development after puberty. While in the case of girls the performance results are levelling off after puberty (Barabás 1986).

Table 2. **Pearson correlations (r, p) between standing broad jump performances and body measurements (height, weight) in boys and girls**

Age (year)	– Height		– Weight	
	r	p	r	p
Boys				
6	.0418	.287	.0797	.141
7	.0150	.316	.1609	.000
8	– .0514	.043	.0863	.002
9	– .0746	.005	.0609	.017
10	– .0974	.001	.0947	.001
11	– .1446	.000	.0349	.120
12	– .1152	.000	.1144	.000
13	.0076	.000	.2264	.000
14	.1014	.000	.3165	.000
15	.0822	.001	.2278	.000
16	– .0289	.134	.1780	.000
17	.0124	.332	.1848	.000
18	– .0950	.006	.1386	.000
Girls				
6	.0699	.000	.4131	.000
7	– .0895	.004	.0808	.000
8	– .0093	.379	.1324	.000
9	– .0598	.024	.1298	.000
10	– .1305	.000	.0898	.002
11	– .0916	.002	.0659	.018
12	– .0462	.072	.1806	.000
13	– .1436	.000	.0670	.016
14	– .1084	.000	.0993	.001
15	– .1511	.000	.0662	.011
16	– .0847	.003	.1386	.000
17	– .0500	.067	.1889	.000
18	– .2042	.000	.1051	.008

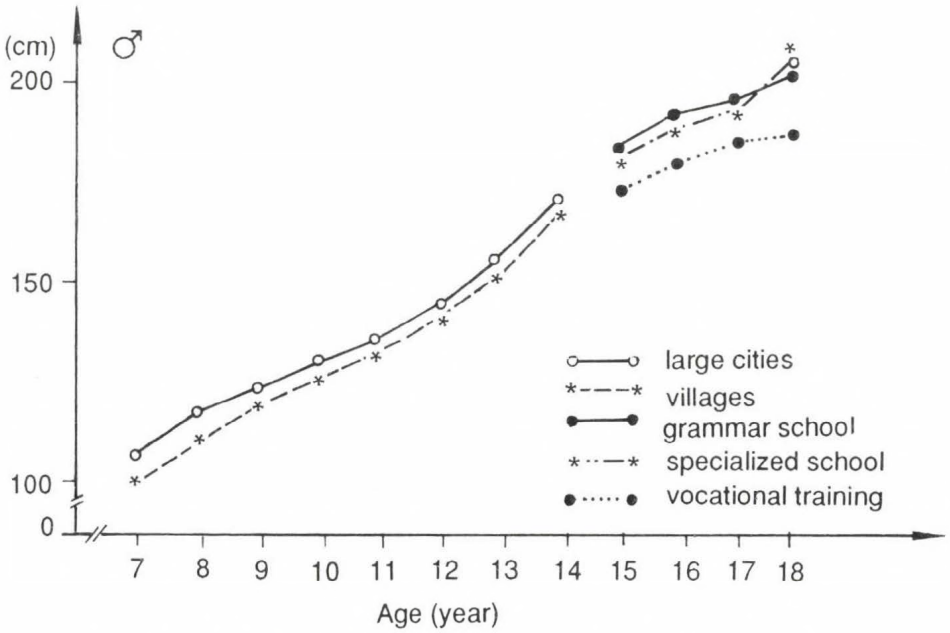

Fig. 3: Performances in standing broad jump of boys living in different circumstances

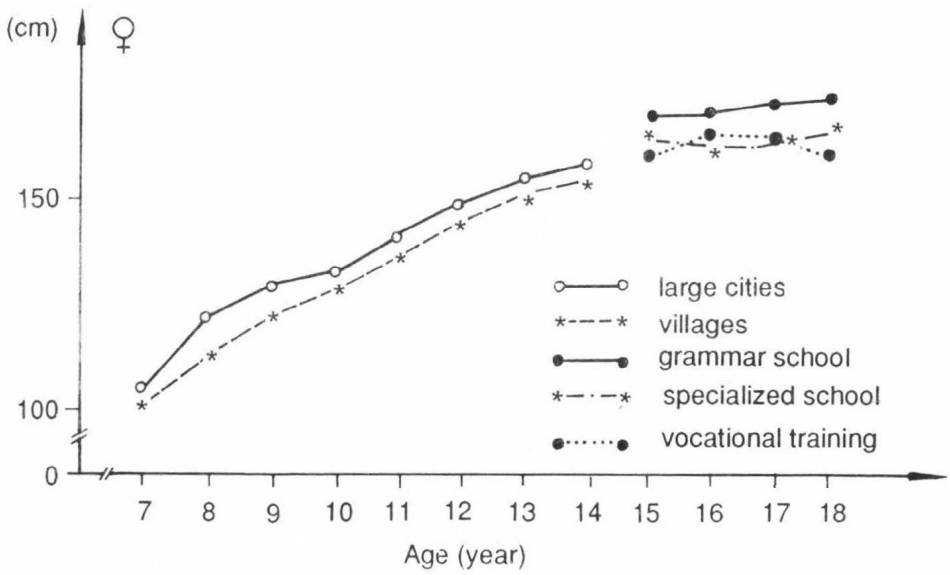

Fig. 4: Performances in standing broad jump of girls living in different circumstances

Beside the organic component the physical fitness is also influenced by the cultural component of physical fitness. This refers to the social influences such as for instance the situation of physical education in the school-system or furthermore the change of evaluate system (Laki – Makszin 1986). The attitudes and behaviour of a given cultural setting determine to a large extent the life style and movement activities of an individual. These are mainly determined by the type of settlements (which is a consequence of the number of inhabitants) and the type of schools (which is reflecting the differences among the settlements!) and that is the consequence of the social structure.

Figures 3 and *4* show the *performance differences* of boys and girls being in different circumstances. The *standing broad jump* results of 6–14 year-old children living in cities or villages are different. Our preliminary results let us know that the largest separations are between the cities and villages, referring to the physical performance of youth (Barabás – Fábián 1988). Another emphasized separation is in the case of secondary school-type. The performances of 14–18 year-old boys and girls are different in the jump test according to their secondaary school-type (*Fig. 3* and *4*). The largest differences can be seen between the performances of grammar schoolchildren and the vocational-training schoolchildren (Barabás 1989). That is the evidence of recruiting possibilities of secondary school-system, determined by the forced urbanisation, development of the industrialized cities as against the rural areas, like small villages. There is some social selection, too.

Conclusion

Humanized life, the equal possibilities are human rights. The development and prospering of a settlement must depend only on the intellectual power and venture of their inhabitants. It is important for the whole community to accept responsibility for ensuring that school-age children (youth) achieve and maintain physically active life. Liasons among the schools, parents, sport associations and health professionals is the only way to make effective programs based mutual understanding of the nature and seriousness of the problem, in order to preserve the health of the next generations and young adults of the society.

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