

## SECULAR CHANGE OF HEIGHT, WEIGHT AND AGE AT MENARCHE IN KAPOSVÁR CHILDREN AND YOUTHS DURING THE PAST 50 YEARS

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*Abstract: Based on the observations of Véli in 1928-31 and in 1947-49, Bodzsár in 1975, Környei and co-workers in 1981 and in 1985, the authors established that body size and maturation of school children at Kaposvár changed in the last half-a-century.*

*Height: Each successive survey gives means higher than the previous one. The mean heights of 7 year-old boys in 1981 by 7.8 cm, the girls by 7.5 cm, of 12 year-old boys by 11.4 cm, and the girls by 12.2 cm and of 18 year-old boys by 10.5 cm were higher than 50 years earlier. The height of girls aged between 16-18 increased only by 2.0-2.6 cm. Between 1975 and 1981 the means of height were unchanged in the age group of 7-9 years, but the others increased by 0.3-3.3 cm. The increase in stature per decade did not decrease in the last decade in the 15-18 year-old groups.*

*Weight: In 1981 the mean weight of 7 year-old boys by 2.6 kg, the girls by 2.2 kg, 12 year-old boys by 8.5 kg and the girls by 11.9 kg were greater than 50 years earlier. During the past 40 years the mean body weights of 18 year-old boys increased by 4.4 kg but the girls' increased only by 0.6 kg.*

*Maximum increments between annual means for stature comes earlier. During the past 44 years it comes by one year earlier at the 13-14 year-old boys and by 2 years earlier at the 11-12 year-old girls.*

*The median ages at menarche estimated by probit analysis in 1947 was 13.9 year, in 1962 it was 12.98 year and in 1981 it was 12.69 year.*

*Therefore the socioeconomic factors which caused the gradual amelioration but not total subsidence of the earlier „retardation” need further investigation.*

*Key words: Secular trend, Height, Weight, Age at menarche, Kaposvár children.*

### Introduction

Changes such as an increase in height, weight and an earlier physical and sexual maturation have been observed during the past 50-100 years in most industrialized countries (Cameron 1979, Marshall 1981, Roche 1979, Vercauteren-Susanne 1985).

In this paper we consider the secular trend in height, weight and puberty (especially menarche) over the last years in Kaposvár. We wanted to find out whether any kinds of positive secular changes (acceleration) can still be revealed or as in certain developed countries (England, Norway, Japan, United States) have already ceased (Roche 1979).

Kaposvár is the country-town of Somogy (South-west Hungary), it is an agricultural-industrial town. In 1930 the number of residents was about 36900, in 1948 about 33500, in 1975 about 69400 and in 1985 about 74800. Over the last 50 years the increase in population was caused by settling from the surrounding agricultural villages. Migration wasn't from afar, there is little reason to believe that genetic changes - particularly heterosis or hybridization - took place.

György Véli, pediatrician and medical officer of schools lived and worked in this town and he was one of the eminent scientists of the Hungarian growth studies.

In our paper we made a comparison between the results of examinations by Véli from 1928-1931 (Véli 1936), and from 1947-1948 (Véli 1956), by Bodzsár in 1975 (Bodzsár-Véli 1980) and by our group of research workers in 1981 and in 1985 (Table 1). We examined 7-14 year-old children in 1981, and 15-18 year-old ones in 1985.

Table 1. Examinations of body-height and body-weight in Kaposvár

	Year	Authors	n	Boys	Girls
I.	1928–31	Véli	1819	986	833
II.	1947–48	Véli	3569	1958	1611
III.	1975 1981 (7–14 year-old)	Bodzsár	6386	3099	3287
IV.	1985 (15–18 year-old)	Környei Gyódi Gelencsér	4550	2524	2026

### Secular Trend in Growth of Height

Each successive survey gives means higher than the previous one (Fig. 1). As it appears from the mean values by age groups included in this illustration an unambiguously demonstrable change in the height of the children took place during the past 50 years. The differences in mean stature between 1928 and 1981 of the 7–12 year old boys and girls vary between 7.5–12.2 cm. This secular increase is about 1.5–2.5 cm/decade. The upward tendency of the mean stature continued during the last 6–10 years. It is larger in the older age groups than in the group of young school-children. Our observations will show that the maximum increments between annual means for stature come earlier: during the past 44 years it come by one year earlier in boys and two years earlier in girls.

### Secular Trend in Increase of Weight

As for height, a similar increase in weight has been observed (Fig. 2). In 1981 the mean weights of 7–12 year old boys and girls by an increase of 2.2–11.9 kg were greater than 50 years earlier. During the past 40 years the mean weights of 18 year old boys increased by 4.4 kg but the girls increased only by 0.6 kg. The results of our examinations show that the maximum increments between annual means of weights come earlier, similar to the growth of height: during the past 44 years it comes one year earlier in boys and two years earlier in girls.

### Menarche

An acceleration of maturation has accompanied the secular increase in body size. The physiological sign of maturation is the menarche which follows the adolescent growth spurt. Age at menarche has been studied extensively for more than a century. Means and medians from various studies show that the age at menarche decrease of about 4 months/decade occurred in many developed countries (Roche 1979). The recent reduction in age at menarche has not been uniform, there has been some change (for example in Eskimos).

In our examination we obtained the dates of menarche from the girls with status quo method and the results were analysed by the probit method (Table 2).

The median age at menarche in 1947 was  $m = 13.9$  years, in 1962:  $m = 12.98$  years and in 1981:  $m = 12.69$  years. It is interesting to mention that in 1982 at Nagyatád – a town about 70 km from Kaposvár – the median age at menarche was  $m = 12.63$  years (Várhegyi 1985). We have found that – compared to the earlier medians at Kaposvár reported by Véli – the so-called „acceleration” of growth has become slower, however, it has not stopped. Therefore, the environmental factors which caused the gradual amelioration but not total subsidence of the earlier „retardation” (Eiben 1967, Véli 1972) need further investigation.

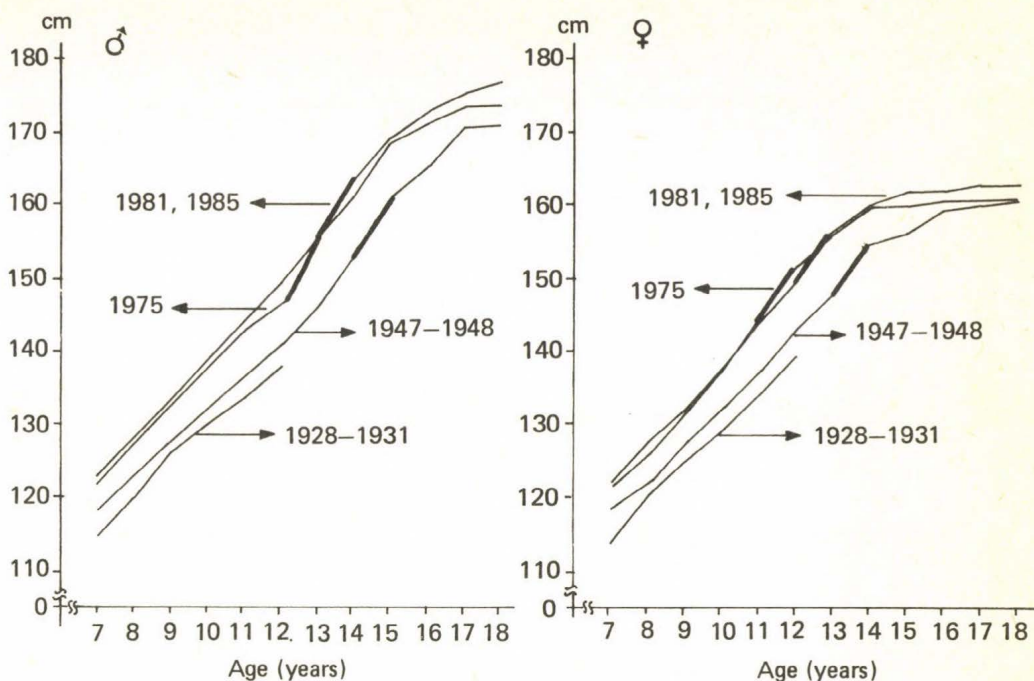


Fig. 1: Secular changes of height in Kaposvár boys and girls

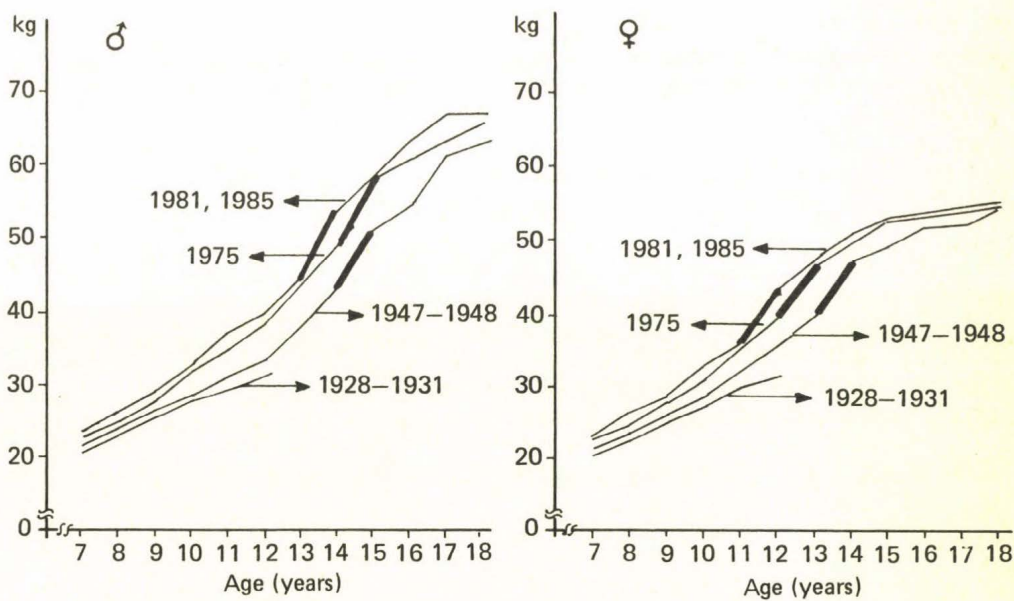


Fig. 2: Secular changes of weight in Kaposvár boys and girls

Table 2. Distribution of the menarcheal girls in Kaposvár

Age (year)	1947	1962	1981			
	(Véli 1971) n = 946	(Véli 1971) n = 1342	Age (year)	n	Menarcheal	
	Menarcheal %	Menarcheal %			n <sub>1</sub>	%
10	0.00	0.00	10	74	—	0.00
11	0.00	0.00	10.5	53	2	3.70
12	3.10	23.20	11	66	4	6.70
13	20.57	54.10	11.5	59	10	17.00
14	61.90	83.00	12	51	9	17.60
15	84.68	91.30	12.5	56	22	40.00
16	94.60	98.66	13	55	37	66.40
			13.5	52	41	78.90
			14	55	48	87.30
			14.5	29	29	100.00
	Median of the age at menarche with probit analysis:					
	m = 13.9 year	m = 12.98 year			m = 12.69 ± 0.32 year	

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