

DEVELOPMENTAL ACCELERATION IN CHILDREN AND YOUTH ACCORDING TO ANTHROPOMETRICAL INVESTIGATIONS FROM THE YEARS 1951 AND 1961

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A state-wide anthropometrical survey of the children and youth from birth to the age of 18 years was carried out in 1961 on the entire territory of Czechoslovakia. The following institutions took part in the preparation of the survey: The Institute for the care for Mother and Child (the period from birth to 6 years), The Pedagogical Institute in Prague (the period from 6 to 14 years) and the Institute of Hygiene in Prague (teenagers from 15 to 18 years). The survey as a whole was sponsored by the Anthropological Institute of Charles University in Prague. Collaborating in this work in Slovakia was the Institute of Hygiene in Bratislava.

The survey was highly successful thanks to the cooperation of several thousand school teachers, physicians and medical personnel. It was not a questionnaire survey; all those who took the measurements were personally instructed by the specialists who were in charge of the survey. Moreover, each collaborator was supplied with detailed written instructions. To assure the use of a uniform method and to eliminate possible errors caused by using instruments of different marks, uniform, normalised scaled strips and tape measures were supplied to those carrying out the measurements in the terrain.

Selection of the areas where the measurements were to be carried out was made with the aid of the Statistical Department of the Economic Institute of the Czechoslovak Academy of Sciences, which also stipulated the representative sample for each sex and for each age group. In determining the sample, care was taken to have equal representation of town and rural children. Other factors were the size of the community and the social composition of the inhabitants. The comparability with the state-wide survey of 1951 was assured by the choice of areas as well as by the size of the sample.

This was the first time that combined cards were used serving to list the data and as punchcards for its mechanical processing. Thanks to the use of this method numerous errors which occur in transposing the information, were avoided. There was also continuous control during the entire processing period and finally, this method permitted considerable material savings. On the whole, more than a quarter of a million individuals were measured in the Czech lands (Moravia and Bohemia) and in Slovakia.

The data was processed by the Center for Mechanical Data Processing at the School of Economics in Prague. The entire survey was financed by the Ministry of Education, the Ministry of Health

and by the Regional National Committees. The entire survey is a part of a general scientific project entitled: For the Healthy Development of the New Generation. The section dealt with in this paper is coordinated by Prof. František Blažek.

At the present time we are already able to present the first results of the survey, which are very interesting.

When comparing the body heights of boys in 1951 with those of 1961, we see a significant difference in the entire course of both growth curves; in every instance the arithmetical means of 1961 are higher than those of 1951. In boys, the course of both the curves, in the age of 7 to 11 years, is more or less parallel. From 11 to 15 years the curves progressively separate. Then, with the reduction of the annual growth increments, we see the reconvergence of both curves. They do not come together until the age of 18. The difference, when expressed in the measure of dispersion (standard deviation) equals $\frac{1}{4}$ of the standard deviation in the ages of 7 to 11 and one-half from 12 to 15 years. In every year after that until 18 years, the difference decreases by $\frac{2}{10}$ th of the standard deviation of 1951. That means that in the last 10 years a further impressive increase has taken place in the mean body height of Czech boys and girls, especially in the period of prepuberty and puberty. The final height ascertained in boys of 18 is almost identical with the mean of an adult man of 20 to 30 years, measured during the I and IInd Czechoslovak Spartakiades. From this we conclude that the great acceleration in growth took place especially in the developmental period, smaller differences are to be expected in the final height in the adult age.

In the case of girls, both curves show similar differences, retaining their characteristic course, however. If we draw the curves of the boys and the girls on one diagram we see the first crossing of both the curves between 10 and 11 years and the second crossing between 13 and 14 years of age. In the case of girls where the decrease of growth comes earlier and also ceases earlier, we see that both the curves fuse at the age of 18. In that period the Czech girls attain the mean body height of 162.1 cm. This mean is identical with the mean of 18 year old women who took part in the second Czechoslovak Spartakiade (1959).

Developmental acceleration found out in body heights was stated also in body weights. The weight curves of school children constructed according to

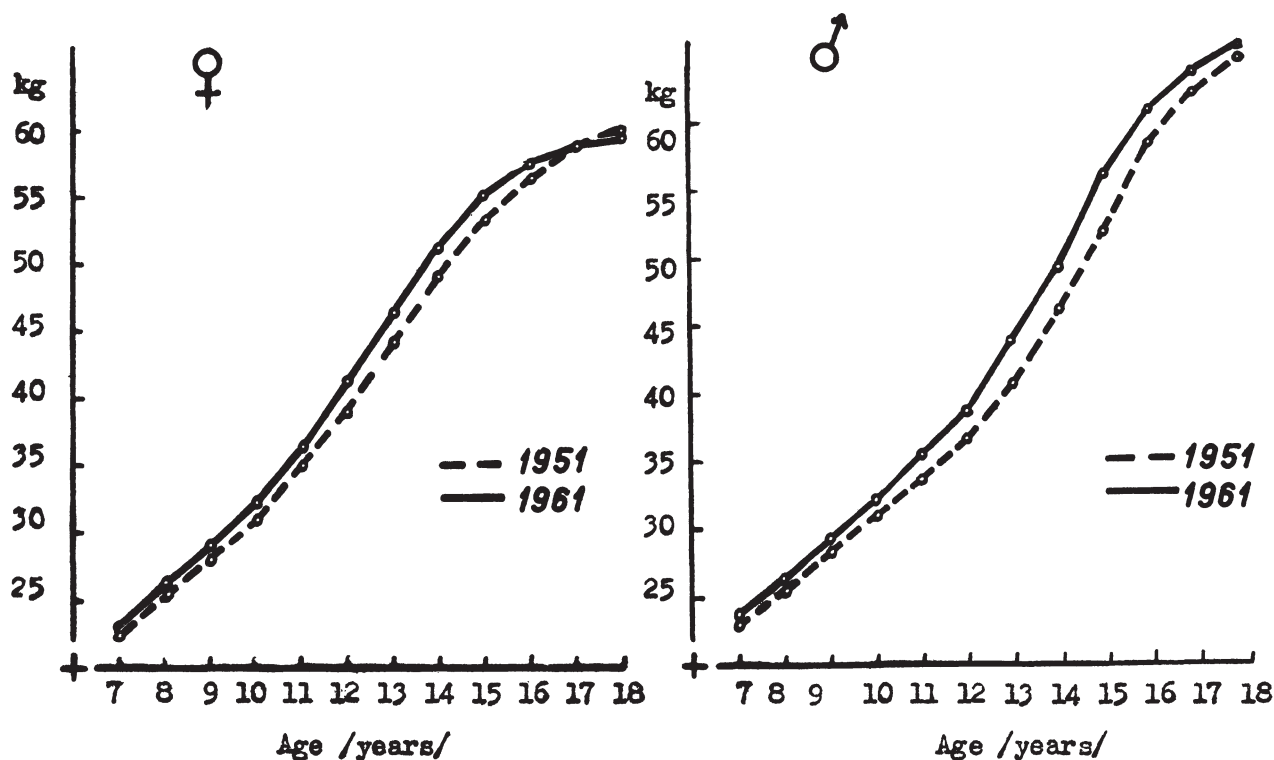


FIG. 1
State-wide Anthropometrical Survey — Bohemia and Moravia. (Age and weight.)

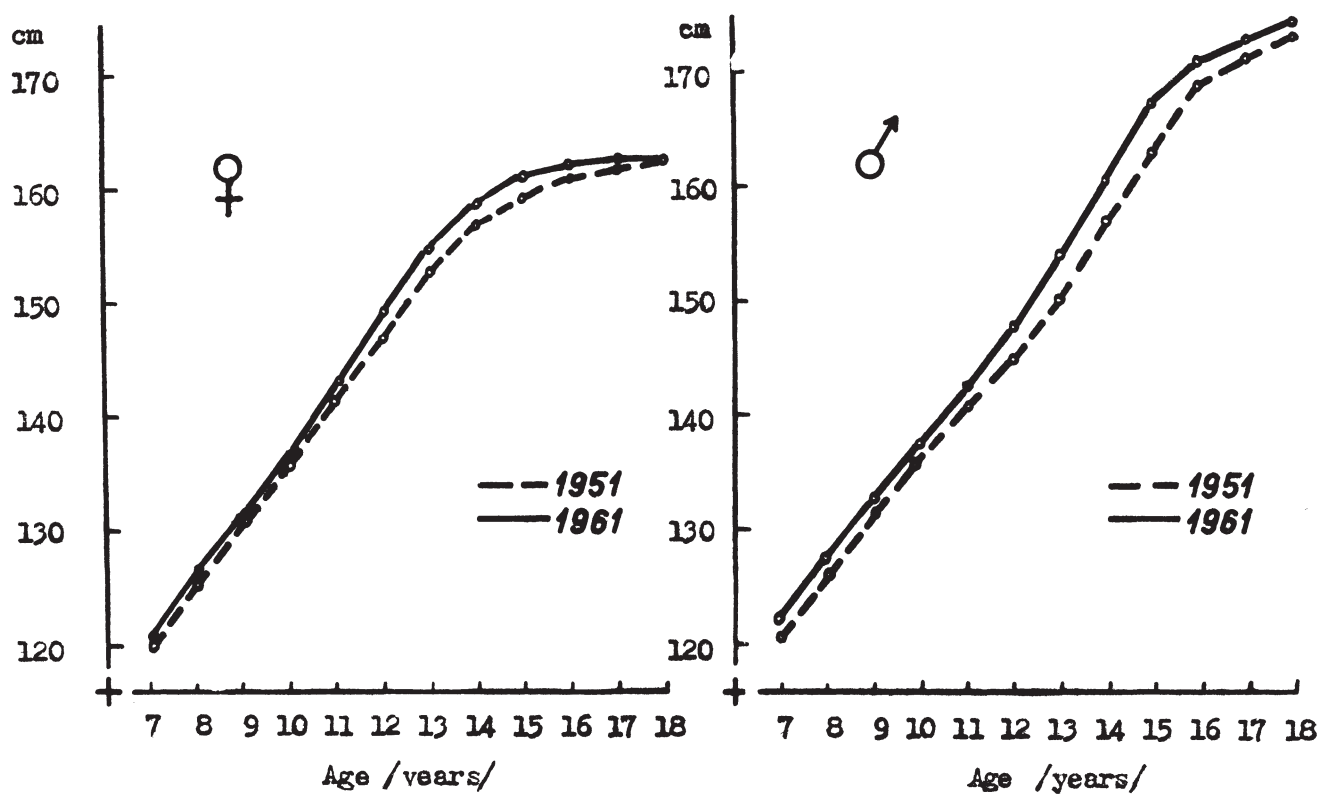


FIG. 2
State-wide Anthropometrical Survey — Bohemia and Moravia. (Age and height.)

STATE-WIDE ANTHROPOLOGICAL INVESTIGATION, RESULTS FROM BOHEMIA AND MORAVIA

Age	Height				Weight			
	Boys		Girls		Boys		Girls	
	M	S	M	S	M	S	M	S
7	121,5	5,6	120,7	5,5	23,5	3,4	23,1	3,6
8	127,5	5,8	126,8	5,8	26,2	4,2	26,1	4,4
9	132,6	6,0	131,6	5,9	29,1	4,7	28,8	5,1
10	137,7	6,4	136,3	6,6	32,2	5,5	32,5	6,0
11	142,5	6,8	143,1	7,2	35,3	6,3	36,3	7,2
12	147,7	7,2	149,0	7,2	38,8	7,0	41,3	8,1
13	154,0	7,9	154,6	7,0	43,8	8,1	46,1	8,5
14	160,4	8,7	158,4	6,1	49,2	8,9	51,1	8,4
15	167,2	8,4	160,9	5,9	56,1	9,4	55,0	7,8
16	171,0	7,4	162,0	5,8	60,8	8,8	57,3	7,9
17	172,9	6,7	162,2	5,5	63,5	8,4	58,3	7,4
18	174,3	6,5	162,1	5,1	65,5	8,0	59,0	7,8

Age	Circumfer. of chest				Circumfer. of head			
	Boys		Girls		Boys		Girls	
	M	S	M	S	M	S	M	S
7	60,0	3,4	59,1	3,9	51,7	1,5	50,8	1,5
8	62,1	3,7	61,6	4,4	52,0	1,5	51,2	1,5
9	64,4	4,5	63,9	4,7	52,3	1,4	51,6	1,5
10	66,8	4,8	66,8	5,6	52,8	1,5	52,1	1,6
11	69,0	5,1	70,0	6,0	53,5	1,5	52,5	1,6
12	71,2	5,5	74,1	6,7	53,6	1,5	52,9	1,6
13	74,1	5,8	77,7	7,0	53,8	1,6	53,4	1,6
14	77,1	6,2	81,6	6,6	54,4	1,7	53,8	1,6
15	81,6	6,2	84,4	6,1	55,1	1,7	54,2	1,5
16	84,8	6,0	86,4	5,7	55,7	1,7	54,5	1,5
17	87,0	5,6	87,4	5,7	56,0	1,6	54,7	1,5
18	88,6	5,6	88,0	5,8	56,3	1,5	54,8	1,5

M = mean.

S = Standard deviation.

the arithmetical means of weights from 1961 goes above the curve of 1951. The greatest differences between both the curves are in the age groups of 12, 13 and 14 years. From 15 years upwards the curves converge. Boys of 18 are in the mean about 1 kg heavier than were the boys of the same age 10 years ago. The boys' curves of weights do not fuse. In girls on the contrary the curves from the years 1951 and 1961 meet already in 17 years. Girls of 18 are in the mean $\frac{1}{2}$ kg lighter than were the girls 10 years ago! This may be explained by rational nutrition and physical exercise.

The data cited concern the children and youth of the Czech lands (Bohemia and Moravia).

At the present time work is being done to compute further somatometrical characteristics — weight, circumference of the thorax and of the head. The data from Bohemia and Moravia are processed separately from that of Slovakia in view of the fact

that the survey of 1951 and those conducted during the two Spartakiades revealed significant differences in somatometrical characteristics in the inhabitants of both groups. Besides the metrical characteristics, information about the social and family conditions, was ascertained. This still remains to be processed.

LITERATURE

- PAVLÍK Z., SUCHÝ J., 1961: Antropometrický výzkum mládeže 1961 — jeho význam a způsob provedení. *Demografie* 3: 361—364.
- FETTER V., PROKOPEC M., SUCHÝ J., ŠOBOVÁ A., 1963: Vývojová akcelerace u mládeže podle antropometrických výzkumů z let 1951 a 1961. *Čs. pediatrie* 18: 673—677.
- SUCHÝ J., NOVÁKOVÁ M., 1962: Vyspělost tělesná (růst a vývoj a jeho hodnocení). *Encyklopedie prakt. lékaře, seš. 569—572, str. 819—822, Stát. zdrav. naklad. Praha.*
- SUCHÝ J., 1961: Význam celostátního výzkumu mládeže v r. 1961. Studijní materiály pro lektory Čs. spol. pro šíření věd. a polit. znalosti, *Přírod. vědy, únor 1—14.*