

SOMATOTYPE OF ADULT DOWN'S PATIENTS

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Abstract: The authors analysed the variation in physique of 137 adult Down's patients (89 men and 48 women; aged between 17 and 55 years) living in social occupational institutions in Hungary. A detailed anthropometric programme was carried out. Heath—Carter's anthropometric somatotyping methods were used.

In somatotypes of the Down's patients values of endomorphy and mesomorphy are generally high. These values in men increase with age; in female patients this tendency is not so considerable. Values of ectomorphy are very low, and they decrease in older patients in both sexes. The means of somatotype components in male patients are 5.86—5.90—1.05, they are mostly mesomorph-endomorph and meso-endomorph. Those in female patients are 7.14—6.27—0.69, most of them are endomesomorphic. Distribution of male somatotypes is more dispersed (SDI = 3.98) than in female patients (SDI = 3.67).

The authors describe the typically corpulent, stocky, fatty *Down's physique*.

Key words: physique, somatotype, adult Down's patients, Down's physique.

Longitudinal studies carried out on children suffered from Down syndrome have pointed out that a surplus in chromosome 21 results in a deviated body development compared to that of normal children (e.g. WERNER et al. 1939, THELANDER and PRIOR 1966, RARICK and SEEFELDT 1974, IKEDA et al. 1977). It is to be regretted that growth studies like these usually deal only with a few body measurements. On the other hand, however, it is worth mentioning that certain characteristics of the physique of adult patients can be found also in Down's patients of any age.

This paper deals with the physical characteristics of adult Down's patients, and presents their somatotype.

Material and Methods

137 patients with Down syndrome were investigated: 89 men and 48 women, their age varied between 17 and 55 years. They live at different social occupational institutions in different parts of Hungary. The majority of them have studied at the type of schools suitable to their intelligence level, and at present they regularly work in their institutions. According to their age our patients were sorted into three groups: (I) adolescents (17—24 year), (II) young

adults (24.1 — 40 year), and (III) persons of mature years (40.1 — 55 year in men and 40.1 — 45 year in women).

A detailed anthropometric programme (MARTIN—SALLER 1957, TANNER et al. 1969) was carried out. Besides the usual parameters of 23 selected body measurements also some indices as well as proportionality characteristics (ROSS and WILSON 1974, EIBEN et al. 1976) were calculated (with a R-40 computer).

The *Heath*—Carter's anthropometric methods were used to determine somatotypes (CARTER 1975). Distribution of somatotypes of the patients was estimated by Somatotype Dispersion Index (SDI, ROSS and WILSON 1973).

Besides pictures necessary to standard somatotype photos were taken also of the more frequent developmental disorders. It should be mentioned that investigation of mental retarded, especially Down's patients is more difficult than that of normal subjects.

Results and Discussion

Growth studies of Down's children emphasize that several body measurements of them are considerably smaller compared not only to averages of normal children of the same age, but also of mentally retarded children without Down syndrome. Our investigations show similar experiences also in adults. Table 1 shows selected body measurements and indices of the examined patients. Comparing them to the 18 year-old young Budapest adults (EIBEN

Table 1

Selected body measurements and indices of adult Down's patients

Body measurements and indices	Male			Female		
	\bar{x}	SD	z	\bar{x}	SD	z
Stature (cm)	154.3	6.75	—	142.3	5.00	—
Sitting height (cm)	83.7	3.75	+0.23	76.6	3.90	+0.18
Chest circumference (cm)	89.7	7.79	+2.14	87.5	9.11	+3.23
Abdomen circumference (cm)	89.8	12.30	+2.86	95.3	16.36	+5.02
Biacromial width (cm)	36.3	2.20	+1.04	33.4	1.68	+1.00
Bi-iliocrystal width (cm)	27.6	2.05	+0.88	28.1	2.22	+2.74
Weight (kg)	60.6	11.05	+1.81	57.2	12.64	+3.73
Rel. sitting height (%)	53.98			53.88		
Density*	1.013			1.009		
Per cent fat**	38.55			40.39		
Body fat (kg)	23.17			22.97		
Lean body mass (kg)	37.40			34.18		

* DURNIN—RAHAMAN (1967)

** SIRI (1956)

et al. 1971), the under-development in height and sitting height was found to be —5 SD and —3 SD, respectively. Stature (and sitting height) of Down's patients is also significantly smaller than the mean in Hungary. This type of differences in Down's patients is well-known also in childhood (ØSTER 1953,

DUTTON 1959), and it is specially expressed in the first decade of life (RARICK and SEEFELDT 1974).

Growth in height in Down's patients is less quick than that of normal youth (ROCHE 1965). This kind of an underdeveloped stature explains why the majority of the body measurements are proportionally great (Figures 1 and 2). The only exception is the length measurements. Thus, the z-values of the upper extremities are negative, and those of the lower extremities practically equal to 0, i.e. the extremities of our Down's patients are proportionally small. This finding meets with statement of IKEDA et al. (1977), who also pointed out that length of the extremities are smaller than that of normal subjects, and this difference increases with age. In GRIGORJEVA's (1973) opinion an expressed decrease with age only in length measurements can be seen; the other body dimensions stay closer to the normal subjects — she said. The short lower extremities also explain the relatively short stature (cf. THELANDER and PRIOR 1966).

Although no significant differences were found in breadth, girth dimensions and in body weight, these measurements, as well as the bicondylar widths and skinfolds in Down's patients are proportionally great (Figures 1 and 2).

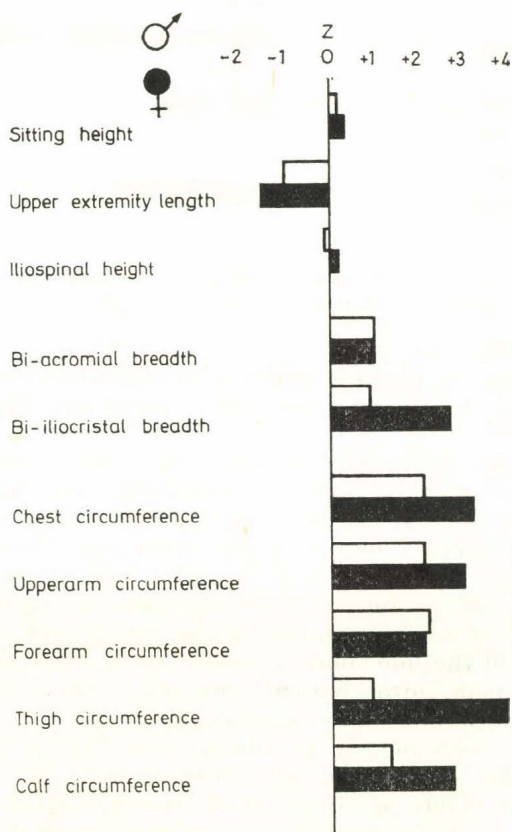


Fig. 1. Proportionality expressed by z-values of selected length, breadth and girth measurements

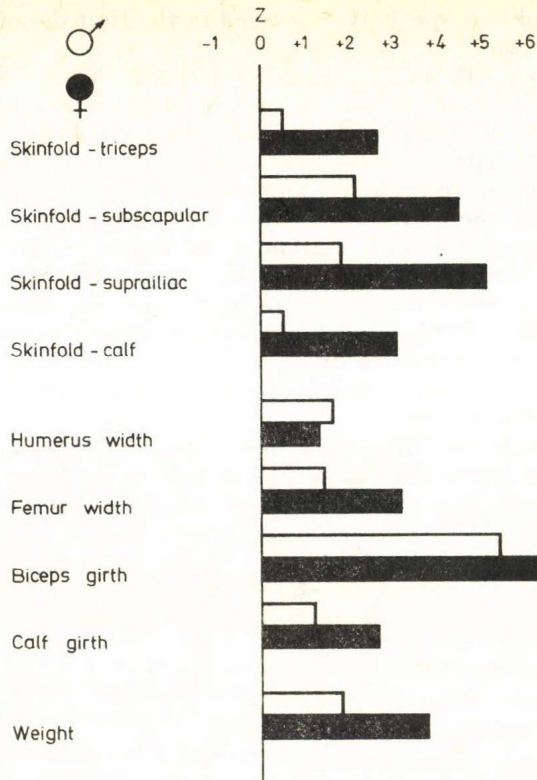


Fig. 2. Proportionality expressed by z-values of body measurements connected with Heath-Carter anthropometric somatotype method

Body density of the Down's patients is apparently low. Based on this total body fat and lean body mass were calculated. High means of body fat are considerable.

Figure 3 shows the distribution of men with Down syndrome in the somatochart. The exceedingly low values of ectomorphy are characteristic. Mesomorphy and endomorphy are balanced compared to each other while the former often has slightly higher values than the latter one. These components frequently have extreme values over 7. About a half of the adolescent male patients are out of the somatochart, i.e. their values in endomorphy and mesomorphy are over 5 or 6. The majority of the young adults is also out of the somatochart, and all the four older patients are also out of it. The means of the somatotype of male Down's patients are 5.86-5.90-1.05. They are mostly mesomorph-endomorph and meso-endomorphic.

Also in women ectomorphy is exceedingly low (Fig. 4). Endomorphy often shows slightly higher values than mesomorphy does. These two components show more extreme values in women than in men. This is also expressed by the means of these two components which are higher in all the three age groups. The means of somatotype of female Down's patients are 7.14-6.27-6.69. They are mostly meso-endomorphic.

Down's patients, males

△	I.	38	5.13-5.57-1.43
○	II.	47	5.95-6.00-0.96
□	III.	4	6.50-6.13-0.75
x	N =	89	5.86-5.90-1.05
			SDI = 3.98

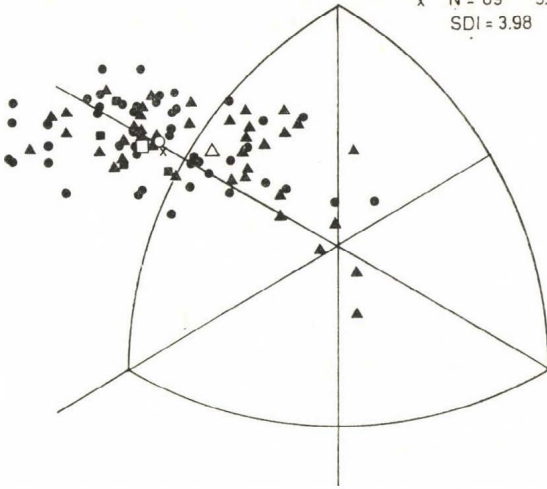


Fig. 3. Somatotype of male Down's patients. I: Adolescent age group, II: Young adults, III: Mature persons

Down's patients, females

△	I.	20	6.70-6.13-1.03
○	II.	24	7.48-6.81-0.50
□	III.	4	7.25-5.58-0.50
x	N =	48	7.14-6.27-0.69
			SDI = 3.67

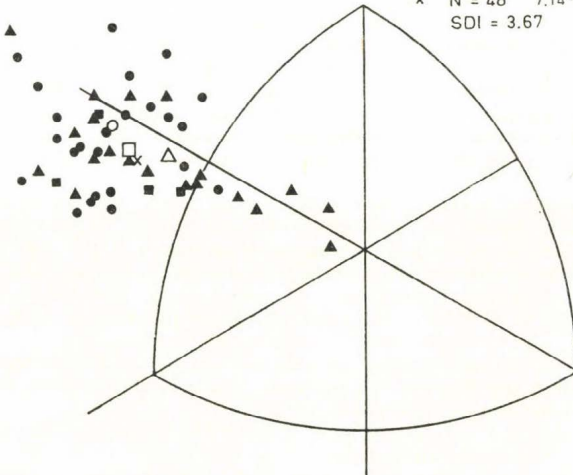


Fig. 4. Somatotype of female Down's patients. (I, II and III: as in Fig. 3)

There is a significant difference in dispersion of somatotypes in both sexes. Somatotype Dispersion Index (SDI) in males has higher value than in females: 3.98 and 3.67, respectively. The phenomenon that the physique of Down's patients becomes more fatty with age, appears in both sexes, and has a consequence that endomorphy in general increases, ectomorphy decreases in older ages.

Summary

To summarize this brief characterization of our adult Down's patients, it has been found that their stature and their extremities are short, their breadth and girth measurements, weight, bicondylar widths, subcutan fat are proportionally great. A considerable dysproportionality of Down's patients is observed also in childhood, and it persists during their growth process, and results the *typically corpulent, stocky, and fatty Down's physique* described in this paper (see also Plate I and II). Its characteristics become more expressed with age, and it is more remarkable in female patients than in male ones.

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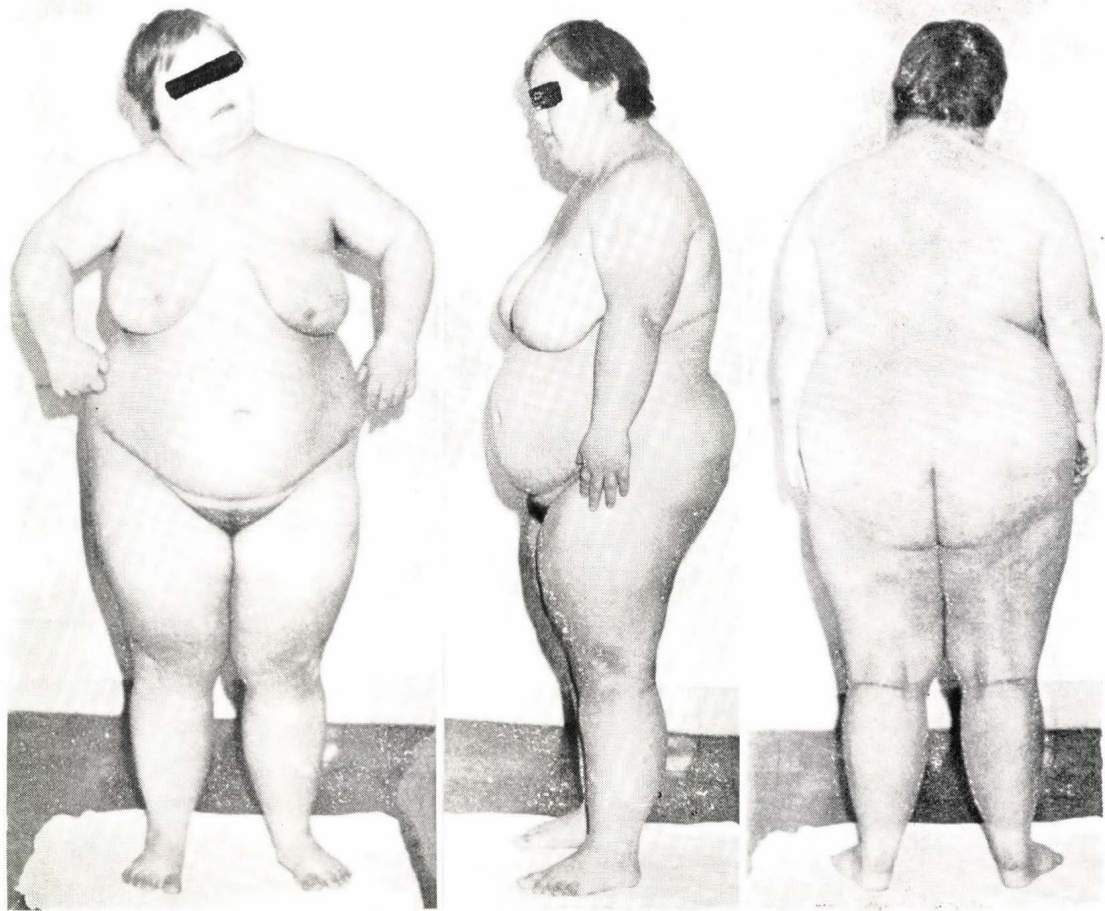


Plate II. Picture of a 32 year-old female Down's patient. Her somatotype is 10.5—11.0—0.5, extremely meso-endomorphic

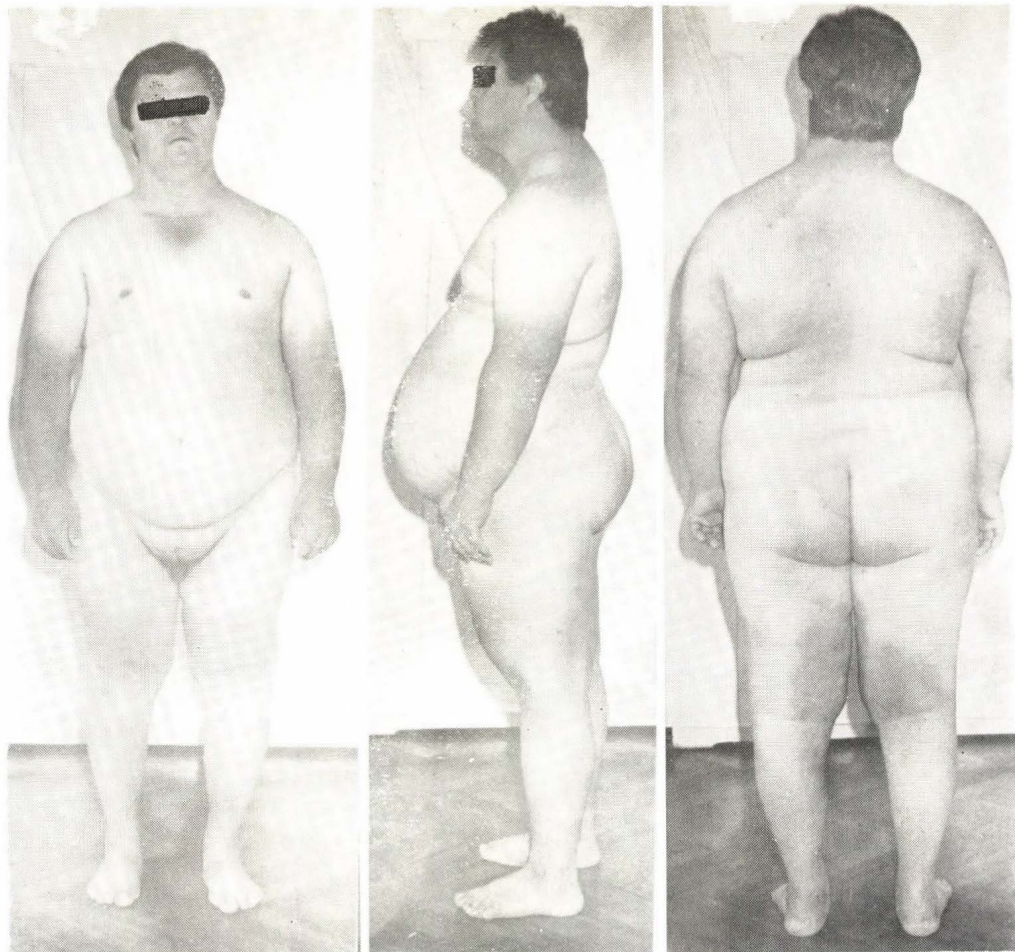


Plate I. Picture of a 28 year-old male Down's patient. His somatotype is 9.5—7.5—0.5, extremely meso-endomorphic

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