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THE DISTRIBUTION OF SUBCUTANEOUS FAT IN CHILDHOOD

ABSTRACT. — The paper is based on examining the thickness of 10 skinfolds in 10.661 Czech and Slovak children of both sexes, within the age bracket of $1^1/_2$—15 years. The authors, provided that the thickness of the skinfolds comprises the entire thickness of the corresponding fat layer, try to assess the relative distribution of the subcutaneous fat and its changes in the course of the child ontogenesis: a) on the trunk, b) on the limbs, c) on the head and neck, d) on the limbs, on the head and neck. The relative amount of subcutaneous fat is determined as a share of skinfolds of the given region from the sum total all 10 studied skinfolds.

KEY WORDS: Subcutaneous Fat-Thickness — Skinfolds — Czechoslovak Population.

In general, without a profound knowledge of the real situation, it is supposed that in the course of the human ontogenesis certain changes occur in the proportion of subcutaneous fatty tissue and visceral fat from the total body fat. So e.g. Bonatz (1970) mentions, on the basis of various data taken from the literature, that the proportion of subcutaneous fat in various periods of the life can amount to one-half-to-three fourths of the deposit body fat. Similar data are quoted for young adult males and females also by Badora (1975) and by Borkan and Norris (1977).

For the determination of the body fat usually the method of hydrostatic weighing is applied (in modern literature see e.g. Boileau et al. 1981, Corbin et al. 1982, Schutte 1980, Petrásek et al. 1979 and others), and also the dilution method (e.g. Burmaister and Fromberg 1970, Forbes 1980, Komiya 1981 and others); the amount of subcutaneous fat can be determined either by measuring it on X-ray pictures (e.g. Bugyi 1973), or with the use of ultrasound (Roche 1979), or by measuring the circumferences of the body or with the help of calliper (e.g. Alves et al. 1980, Ashwell et al. 1982, Hajniš et al. 1980, 1981, 1983, Satwanti et al. 1980, Siervogel 1980 and many others).

We are of course well aware of the fact that none of the methods of assessing the total or partial amount of fat are fully accurate, they are all indirect methods, but we have to use them, for the time being we do not know any more exact methods.

The views regarding the accuracy of the methods assessing the thickness of the subcutaneous fat vary. So e.g. Borkan et al. (1982) hold that the assessment of the subcutaneous fat from the measured thickness of the skinfolds is more accurate than the ultrasonic method, but Haymes (1976, quoted according to Roche et al. 1982) states that the thickness of the subcutaneous fat is highly dependent on both these factors. There is a high degree of dependence between calliper and X-ray measuring of the thickness of the subcutaneous fat (+0.8 to +0.9) according to Young et al. (1963); with these views agree also Roche and Himes (non-

published data, quoted according to Roche, 1979). Equally high correlation is — in the view of Fry (1962) also between calliper values and between direct measuring of the thickness of the subcutaneous fat tissue.

One of the most interesting problems that can be studied perhaps by simply measuring the thickness of the skinfolds, are the changes of the thickness of the subcutaneous fat in various places of the body in connection with the age of the individual. In this sense — with the above mentioned reservations — we shall deal in this paper with the relation of the thickness of the subcutaneous fat of the trunk on the one side, with that of the limbs, head and neck during childhood on the other side. There can be found very few data tackling this problem in the special literature. We can learn about them casually from the articles by Bogin and Macvean (1981), Eveleth and Tanner (1978), Feldmann et al. (1969), Jenicek and Demirjian (1972) and Strunge with Trostmann (1978). Due with this problem are dealing some earlier articles by Edwards (1951), Reynolds (1951) and Fry (1962), but also some more recent studies, e.g. by Mueller and Stallones (1981), Satwanti et al. (1980), Siervogel (1980), Tomov (1977), Zansky (1980), Cronk et al. (1983) and a compillation by Roche et al. (1982).

MATERIAL AND METHODS APPLIED

The data on which our study is based come from a research covering almost 11.000 Czech and Slovak children of both sexes in the age of $1^1/_2$—15 years. The children were examined in the years 1976—78 in 20 localities selected through statistical methods, covering the entire territory of Czechoslovakia.

During the research the thickness of 10 skinfolds according to Allen et al. (1956) was measured with the help of Best's calliper (see also Hajniš et al. 1981, 1983). All skinfolds were measured by the same person, and always on the right side of the body.

After the revision of the record cards the data of 10.661 children were used for further processing. Their division into sex and age groups is indicated in *Table 1.* The probands form one-year age groups according to the so-called calendar-age. We hawe e.g. groups of 2—3, 3—4 ... and 14—15 year old. The only exception is the first age group, covering only half a year (between $1^1/_2$ and 2 years of age).

For the given objective, i.e. for assessing the changes with the age in the thickness in the subcutaneous fat during childhood the mean measured thicknesses of skinfolds had been calculated for the following groups:

a) all 10 skinfolds *(Table 2),*

b) 5 skinfolds of the trunk *(Table 3),*

c) 3 skinfolds on the limbs *(Table 4),*

d) 1 skinfold of the head and 1 skinfold of the neck *(Table (5),*

e) 5 skinfolds measured outside the trunk (skinfolds of the limbs, head and neck, *Table 6).*

TABLE 1. *Number of individuals at the age groups*

Age group Years	Boys	Girls
$1^1/_2$— 2	222	213
2—3	367	359
3—4	349	333
4—5	324	324
5—6	362	363
6—7	423	445
7—8	444	433
8—9	385	409
9—10	400	388
10—11	432	429
11—12	407	395
12—13	407	418
13—14	413	424
14—15	404	389
	5339	5322

TABLE 2. *The sum of the 10 body skinfolds (mm)*

Age group Years	Boys		Girls	
	$\bar{X}$	s	$\bar{X}$	s
$1^1/_2$—2	54.44	10.26	57.08	11.82
2—3	50.71	10.26	54.08	10.42
3—4	49.17	10.49	53.01	11.02
4—5	47.56	11.63	53.82	13.02
5—6	47.93	13.64	56.91	16.32
6—7	49.04	16.48	56.61	20.76
7—8	51.76	13.11	60.57	23.50
8—9	53.11	22.43	66.75	28.06
9—10	61.53	27.47	71.54	28.78
10—11	61.88	28.53	75.13	32.29
11—12	69.16	34.81	78.94	33.86
12—13	68.71	33.97	80.42	30.44
13—14	67.73	30.12	89.42	30.02
14—15	65.46	27.60	98.12	36.76

TABLE 3. *The sum of 5 skinfolds of the trunk*

Age group Years	mm		%	
	Boys	Girls	Boys	Girls
$1^1/_2$—2	20.58	22.78	37.80	39.92
2—3	18.96	21.33	37.39	39.48
3—4	18.19	20.81	36.99	39.25
4—5	17.37	21.09	36.52	39.18
5—6	18.75	22.77	39.11	40.01
6—7	18.62	22.86	37.96	40.37
7—8	19.62	25.32	37.90	41.81
8—9	21.11	28.87	39.74	43.26
9—10	24.81	32.03	40.32	44.77
10—11	26.29	34.79	42.49	46.31
11—12	30.63	37.17	44.29	47.08
12—13	30.14	38.33	43.87	47.66
13—14	31.04	43.38	45.82	48.51
14—15	30.48	47.69	46.56	48.60

TABLE 4. *The sum of 3 skinfolds of the extremities*

Age group Years	mm		%	
	Boys	Girls	Boys	Girls
1½—2	21.57	21.90	39.70	38.47
2—3	20.04	20.68	39.42	38.23
3—4	19.72	20.72	40.06	39.16
4—5	19.45	21.29	40.78	39.67
5—6	19.36	22.56	40.33	39.88
6—7	20.23	22.88	41.33	40.94
7—8	20.94	24.03	40.79	40.29
8—9	20.97	25.91	39.77	39.82
9—10	23.28	27.31	39.78	39.19
10—11	23.94	27.92	39.56	38.23
11—12	26.03	28.86	38.77	37.59
12—13	25.55	29.24	38.34	36.80
13—14	24.86	32.46	37.11	36.54
14—15	24.01	35.34	36.64	36.65

TABLE 5. *The sum of 2 skinfolds of the head and neck*

Age group Years	mm		%	
	Boys	Girls	Boys	Girls
1½—2	12.28	12.49	22.56	21.89
2—3	11.74	12.38	23.15	22.89
3—4	11.25	11.80	22.89	22.26
4—5	10.74	11.73	22.58	21.80
5—6	10.80	12.13	22.54	21.32
6—7	10.98	11.69	22.39	20.66
7—8	11.10	12.07	21.45	19.93
8—9	11.16	12.43	21.01	18.62
9—10	11.49	12.73	18.68	17.80
10—11	11.73	12.86	18.96	17.11
11—12	12.70	13.05	18.37	16.53
12—13	12.43	13.03	18.09	16.21
13—14	12.11	13.31	17.88	14.89
14—15	11.28	13.64	17.24	13.90

TABLE 6. *The sum of 5 skinfolds of the extremities, head and neck*

Age group Years	mm		%	
	Boys	Girls	Boys	Girls
1½—2	33.85	34.40	62.17	60.27
2—3	31.78	33.06	62.67	61.13
3—4	30.98	32.52	63.00	61.35
4—5	30.18	33.03	63.47	61.37
5—6	30.17	34.69	62.94	60.97
6—7	31.22	34.58	63.65	61.08
7—8	32.04	36.10	61.90	59.59
8—9	32.13	38.34	60.49	57.44
9—10	36.77	40.05	59.76	55.98
10—11	35.67	40.77	57.65	54.27
11—12	38.74	41.91	56.01	53.08
12—13	37.98	42.28	55.27	52.57
13—14	36.97	45.77	54.59	51.19
14—15	35.29	48.98	53.92	49.92

Tables 3—6 contain besides the thickness of the respective number of the given skinfolds in millimetres also their percentual share in the sum total of all 10 skinfolds *(Table 2),* equalling 100 %. On the presumption that the layer of the fat is perfectly evently distributed in the subcutaneous area, each group should have the tenfold percentage of number of skinfolds it comprised (e.g. in limbs 3 skinfolds = 30 %, etc.).

However, we must emphasize that the data thus indicated reflect the differences in the thickness of the fat layer at the measured places, but do not indicate the global volume of fat in the individual parts of the body. It means that a certain value of skinfold thickness found e.g. on the arm or on the thigh here indicates the corresponding thickness of the fat layer, without indicating the volume (amount) of the subcutaneous fat. Nevertheless these rates and relations are still not completely clear, since, as documented, there are considerable differences in the compressibility of the skinfold and subcutaneous fat in various places of the body during the ontogenetic development (e.g. Roche 1979, Roche et al. 1982, Brožek and Young 1963, and others).

The determined sums of skinfold thicknesses are indicated boht in the tables, and also in curve plots.

AGE-RELATED CHANGES IN THE THICKNESS OF SUBCUTANEOUS FAT

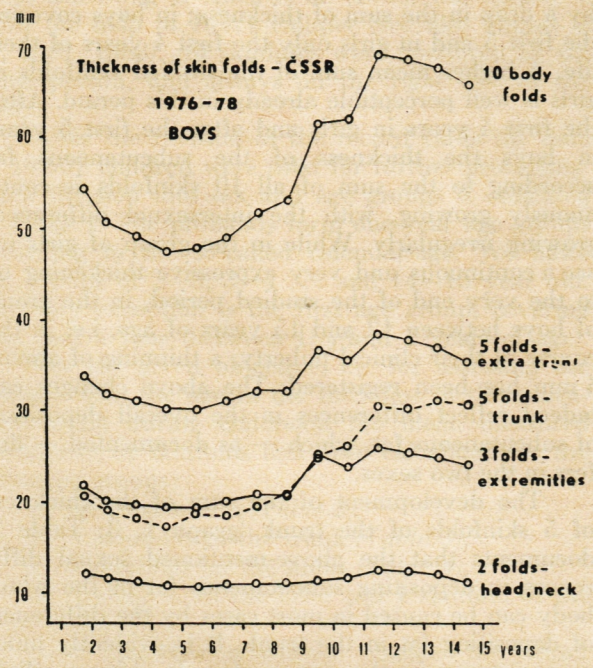
By comparing the development changes in the sum of the thicknesses of all 10 measured skinfolds between the two sexes in *Table 2,* in *graphs 1 and 3* are well perceptible some of the differences. The initial development phase in both sexes is marked by a drop in the sum of thickness; in boys covering the first 5 and in girls only the first 4 years of their life. A higher mean sum of the studied skinfolds in girls is well perceptible already in this period. After the first 4 years in girls and after the first 5 years in boys the thickness of the subcutaneous fat according to the sum of all 10 skinfolds is continuously growing, with the intersexual differences growing irregularly. While in the group of girls we see a continuous and very expressive thickening up to the very end of the studied period, in the group of boys between 12 and 15 years of age, i.e. in the course of their clinical puberty, a thinning of almost 4 mm has been registered. The above changes can indeed reflect differences in the overall deposition of subcutaneous fat, which — as documented — differs in the two sexes.

The development of the sum of the thickness of 5 skinfolds of the trunk (graph 1, 3; Table 3) documents that the above-mentioned sexual differences in depositing subcutaneous fat in the whole body can be caused in most cases by the differences of depositing fat in the trunk. It is evidently much more intense in the group of girls. After a slight reduction of the fat layer by the fourth year of the

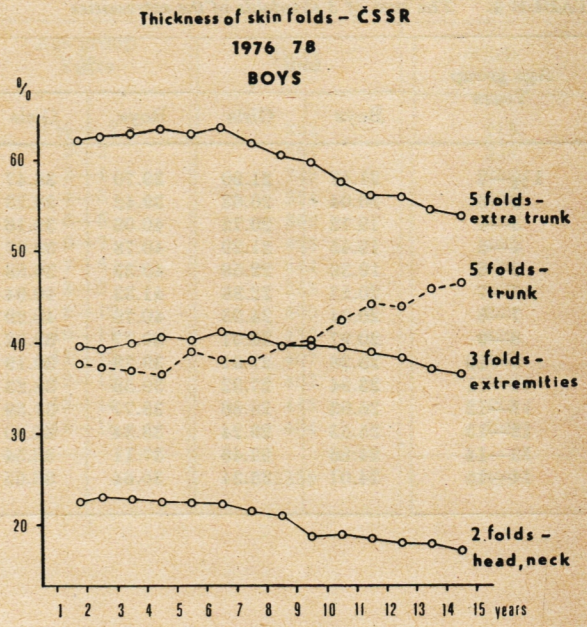
life the layer of the fat in girls is continuously growing, while in the group of boys it is reducing up to the 5th year of the age. Beginning with the 12th year the sum of the thickness of the 5 skinfolds, and thus also the amount of subcutaneous fat on the trunk of boys remains virtually unchanged. Intersexual differences begin in the first age class, and are especially rapidly growing after the 12th year; the maximum value amounting to an average of 17 mm of the summed up thickness of skinfolds — is reached during the 15th year.

Table 3 and *graphs 2 and 4* comprising the percentual development of the sum of the thickness of 5 skinfolds with regards to the sum of all 10 measured skinfolds, however, show an identical development trend in both sexes. Percentually — with regards to the total subcutaneous fat — the layer of fat deposited on the trunk is equally growing beginning with the 5th year, both in boys and in girls, up to the end of the studied period. As documented by the calculated data, by the 2nd year of age (provided that there are theoretically equal fat layers in all ten measured places) there is on the trunk roughly 40 per cent of subcutaneous fat in girls and 37.5 per cent in boys. This difference of 2—3 % is preserved up to the age of 15 years, when girls reach 48.60 % and boys 46.56 % of subcutaneous fat (see *Table 3).*

The development of the thickness of the subcutaneous fat layer on the limbs can be assessed according to the corresponding development of the sum of the thicknesses of their skinfolds in millimetres *(Table 4, graphs 1 and 3)* and again in percentage *(Table 4, graph 2 and 4).* From practically equal initial mean values of the sum of thickness of 3 skinfolds in $1^1/_2$—2 year old boys (21.56 mm) and girls (21.90 mm) in the following period there is a slight thickening in most boys. While in girls



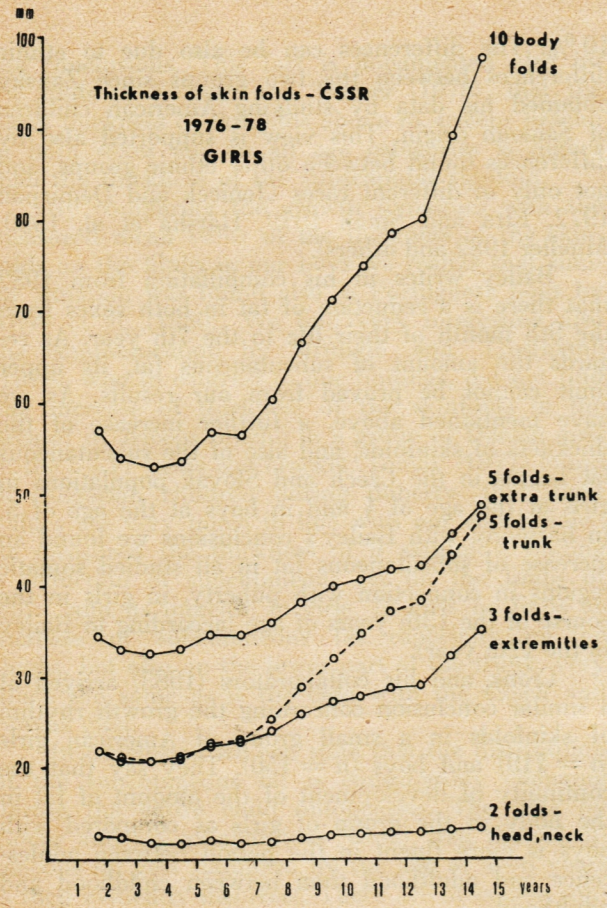
GRAPH 1.



GRAPH 2.

there is a slight increase already beginning with the age of 3 years and after the 13 years a great increase of subcutaneous fat, the boys up to the age of 6 show certain stagnation. Then follows a slight thickening, which at the age of 9 years becomes more conspicuous. Similarly as in the sum of all 10 skinfolds, beginning with the 12th year there is a well perceptible regression of the thickness of the subcutaneous fat, which is perhaps connected with a more intense metabolism and increased activities of the boys during puberty. Beginning with the third year of life there are well perceptible differences in the amount of limb fat between the two sexes, these differences rapidly increase from the 13th year onwards, reaching the maximum value in 14—15 years old probands (an average of 11.34 mm of skinfold thickness and it is greater in the group of girls).

By assessing the percentual changes of the thickness of subcutaneous fat in the limbs according to the sum of 3 skinfolds with regards to the sum of all 10 skinfolds there are no great changes in either of the sexes during the child ontogenesis. Although the amount of the subcutaneous fat on the limbs is slightly increasing up to the 7th year of the age, both in boys and in girls, afterwards it is slightly dropping, under the hypothetical presumption that the subcutaneous fat is evenly distributed up to 36.5 %. The determined mean thicknesses of the limb-skinfolds — similarly as was the case with the skinfolds of the trunk — document the unevennes of the distribution of the subcutaneous fat in childhood. It can be concluded that by girls up to the age of 7 years and in boys up to 9 years there is relatively more fat on the limbs than on the trunk. After the indicated period the difference becomes partly balanced, nevertheless, a higher percentual share of the fat on the limbs remains up to the last studied age category.



GRAPH 3.

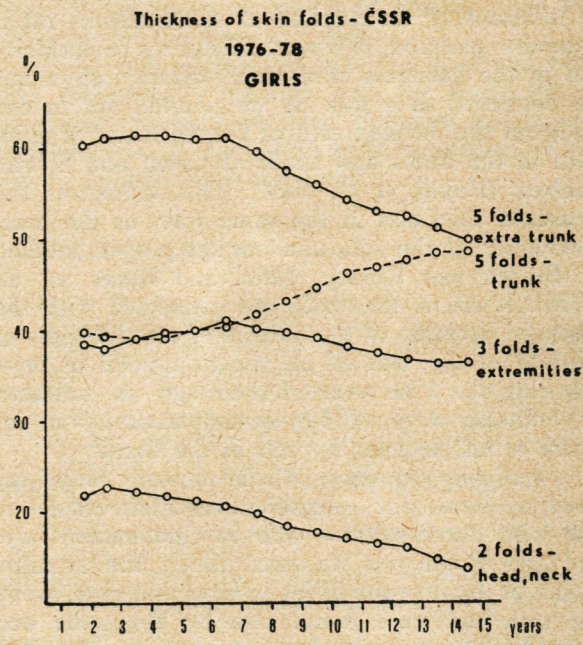
Although the measured skinfolds on the head and neck belong to the body trunk they have not been summed up with the trunk skinfolds. This is so, because one of the questions we would like to resolve is the assessment of the thickness of their subcutaneous fat.

It follows from *Table 5* and from *Graphs 1 and 3* that in contrast to the trunks and limbs here the thickness of the fat layer in girls only slightly exceeds the amount of fat in boys. While in girls during childhood we can see also here (on the head and neck) slight but continuous growth of the subcutaneous fat, in boys, in line with other parts of the body the amount of fat is slightly dropping beginning with the 12th year.

It is very interesting that percentually in the region of the head and neck (similarly to the conditions in the limbs) there are somewhat thicker layers of subcutaneous fat in boys than in girls. Its thickness is relatively decreasing during the child ontogenesis in both sexes, more perceptibly in girls than in boys (7.99 % x 5.32 %). The hitherto studied cases show uneven distribution of the subcutaneous fat in the individual parts of the body.

By summing up the thicknesses of 3 measured limb skinfolds and of 2 skinfolds measured on the head and neck we have obtained the sum of 5 subcutaneous skinfolds located outside the trunk. The mean values of this sum in millimetres and in per cents, with regards to the total sum of 10 skinfolds, are indicated in *table 6* and in *graphs 1—4.*

The study of the development of the absolute thickness in this group of skinfolds, and at the same time of the thickness of the subcutaneous fat, demonstrates sexual differences. From a practically equal initial value in children of $1^1/_2$—2 years it is getting considerably reduced (up to the age of 5—6 years) in boys, but is slightly decreasing in girls (up to 4 years of age). Afterwards the thickness of the subcutaneous fat is growing again. In girls up to the end of the studied period, i.e. up to 15 years of age, and in boys in line with both groups of summed up skinfolds, only up to 12 years of age, after this time is here the subcutaneous fat decreasing again. In girls — on the contrary — beginning with the 13th year of age the fat layer is depositing more conspicuously, on the head and neck, in line with the thickness of the limbs. The maximum intersexual difference in the mean thickness of the sum of all skinfolds outside the trunk, and thus the maximum layers of the subcutaneous fat, are reached in our last age group (14—15 years), reaching an average of over 13 mm of thickness in 5 skinfolds, while the development trend of the curve shows further growth in girls and thinning in boys.



GRAPH 4.

Percentually the share of extra-trunk subcutaneous fat determined from the mean thickness of skinfolds, does not change in the two sexes up to the age of 7 years. In boys and in girls it slightly exceeds 60 % of the total thickness in all 10 measured skinfolds. Its further share is equally dropping in both sexes, in girls somewhat more conspicuously. It can be said that the relative share of the subcutaneous fat during the entire childhood is somewhat higher in boys than in girls. In the 15th year it drops to 49.92 % in girls and to 53.92 % in boys — in the above-mentioned hypothetical condition, i. e. when the subcutaneous fat is evenly distributed in all 10 places of the studied skinfolds.

DISCUSSION

Although the views concerning the importance of measuring the thickness of the skinfolds for assessing the amount of subcutaneous fat differ, almost all authors admit that there is close connection between them (see e.g. Fry 1961 and 1962, Lee and Ng 1965, etc). Only Chumly et al. (non-published paper, quoted according to Roche et al. 1982) states that the measuring of the thickness of the subcutaneous fat is roughly 2—5 times more reliable from X-ray pictures than measuring the thickness of skinfolds. Borkan et al. (1982) says that measuring the thickness of skinfolds is much more effective by measuring the layers of the subcutaneous fat than by ultrasonic measuring, while Roche and Himes (non-published paper quoted according to Roche 1979), found out that the results of measurings with calliper well comply with the radiographically measured thickness at various places of the body. Orpin and Scott (1964) also recommend the measuring of the skinfold thickness as a realiable means for assessing the amount of subcutaneous and deposited fat.

The measuring of the thickness of skinfolds as an indicator of the amount of subcutaneous fat is generally accepted, however differences in elasticity and in the hardness of skin in various individuals are neglected as a rule as we pointed out in our study on the development of the thickness of skinfolds in the limbs and heads of Czech and Slovak children (Hajniš et al. 1981). This influences the measured thickness in the same way, as the compressibility of the subcutaneous fat proper, studied by Brožek and Kinzey (1960) and Brans et al. (1974). It seems that both are connected with the observed decrease of the median of the thickness of skinfold in the area of m. triceps brachii in boys following the 12th year of their age, as indicated by Johnston et al. (1974), accompanied by an increase of fat, detected by cuts in the tissue.

A higher reduction of subcutaneous fat of the trunk in lower age categories was observed — in line with our results — also in Guatemalan boys and girls (Bogin and Macvean, 1981). Similar differences in the deposits of fat in boys and girls, growing with age were found also by Frisancho and Fiegel (1982), so that the centripetal trend to the benefit of girls has been proved. This is perhaps connected with the earlier conclusions of Pařízková (1961) that the body fat in girls is distributed especially under the skin; this conclusion, however, diametrally contradicts the views of Forbes and Amirhakimi (1970), stating that girls in their early childhood deposit more visceral fat.

The relative increase of the share of subcutaneous fat on the trunk as compared with the limbs in the course of child ontogenesis as stated by our paper, is documented also by Zansky (1980). He, however, found in 3-years old children much higher shares of the sum of skinfolds in the limbs (58 % in boys and 55 % in girls), as compared, with our results (40.06 % and 39.16 % respectively). In 7-years old too, the presented data differ by almost 10 %. The differences can be also due to ethnic differences between the two groups since Zansky obtained his data by studying American children of Samoan origin. This view is supported also by differences found between other ethnic groups, and not only in different races (Jenicek and Demirjian 1972, Etta and Singh 1979, Harsha et al. 1980, Mueller 1982 and others).

Bailey writes in his compillation from 1982 that there is a reduction of fat in both sexes from the 9th month of their life to the 7th year. As regards the amount of subcutaneous fat, its upper limit cannot be proved from our results. As we have mentioned above, a further increase of the thickness of skinfolds, and also of the subcutaneous fat begins in the Czech and Slovak populations in girls at the age of 4 and in boys at the age of 5. In harmony with Bailey's conclusions we found an increase of subcutaneous fat in all studied somatic regions in connection with puberty, in girls in the course of the 13th years of age (according to Bailey in the 12th year).

Cronk and his collaborators (1983) arrived at a similar conclusion concerning the growth rhythm of skinfolds in a small group of American girls ($n = 119$) and boys ($n = 150$). They say that the continuity of development of the amount of fat in the body in the group of girls as compared with boys is more fluent in the period between adolescence and adulthood than between childhood and adulthood.

The thickness of skinfolds as an aid for orientation for determining the amount of subcutaneous fat, and perhaps also of the body fat, forms af present integral part of a number of anthropological researches. They are, however, often limited to two skinfolds, one in the regio brachii posterior (above m. triceps brachii) and the other in regio subscapularis. Especially the American authors hold that exactly these two skinfolds are closely related both to the amount of subcutaneous fat, and also to various body skinfolds. This view is defended also by Müller and Stallones (1981); the say that the above skinfolds fully suffice for the prediction of the anatomical distribution of the subcutaneous fat between trunk and limbs in most series, but not individually. In view of our still insufficient knowledge of the distribution of subcutaneous fat and its changes in the course of the ontogenesis it is quite daring to judge the development of the subcutaneous fat from the thickness of a single skinfold, as done by Frisancho (1974), although his researches are based on measurements of 12.396 probands, ranging from their birth to the 44th year of their age.

Satwanti et al. (1980) documents by measuring various body circumferences, and also by studying the thickness of skinfolds that the distribution of subcutaneous fat in young Indian women is roughly the same between trunk and limbs. This statement, however, cannot be accepted for the period of childhood, where, as documented by our results, there is relatively more fat on the limbs than on the trunk also in girls, in spite of all kinds of oppo-

site conclusions. This fact is documented also by the finds of Eveleth and Tanner (1978), that the mean thickness of skinfolds above m. triceps brachii in both sexes and in all age categories is higher than the thickness of the subscapular skinfold.

By comparing the growth dynamics with the measured mean value of the thickness of the skinfolds on the limbs in our boys we realize that similar situation was found also in Portuguese boys by Alves et al. (1980). We find very interesting also the communication by Strungle and Trostmann (1978), who in contrast to our findings, did not find any increase of thickness of the skinfolds in the area of m. triceps brachii in a group of Danish girls in the 8—17 years age bracket. Tomov (1977) found in Bulgarian children during puberty that their values are very much in line with our conclusions; he measured the thickness of 9 skinfolds, finding a reduction of subcutaneous fat on the limbs of boys, and its increase in girls. In girls he finds an increase of subcutaneous fat especially on the thighs, but also on the lower part of the trunk, very much the same as is the case with the Czech and Slovak girls.

In conclusion we can state that the distribution of the subcutaneous fat is considerably changing during the entire child ontogenesis. The data by Roche and his collaborators (1982), that the subcutaneous fat gets stabilized by the age of 4—6 years is then evidently incorrect. There are of course considerable individual differences in the distribution of subcutaneous fat during childhood, due to changes in the thickness of the fat layer in various regions of the body, but the development curves obtained during our research can be regarded as generally valid. We do not exclude possible time shifts of the individual phases, i.e. the time of thinning, of subsequent thickening and the reaction of the thickness of the subcutaneous fat layer and of the measured skinfolds on the beginning of prepuberty and puberty in other ethnic groups and nations. The use of callipers of different types can also play some minor role.

CONCLUSION

The research into the changes of the thickness of 10 skinfolds in connection with the age in 10.661 Czech and Slovak children of both sexes at the age of $1^1/_2$—15 years concentrates on the changes of the thickness and distribution of subcutaneous fat on the trunk, limbs, head and neck. It has been realized that:

1. Up to the age of 4 years in girls and 5 years in boys the layer of subcutaneous fat in all regions of the body is in different rate getting reduced. The degree of reduction is perceptibly higher in boys than in girls.

2. After the above period follows a phase of increase of the layer of subcutaneous fat. In girls this increase is fluent, and only during puberty, it is in the 13th year it is increasing practically everywhere and more intensely than earlier. The region of the head and neck shows slight increase only. In boys there is a more intense prepubertal wave, but beginning with the 12th year the thickness of the subcutaneous fat layer on the trunk is not changing; outside the trunk, i.e. on the limbs, head and neck, on the very contrary, the fat layer is decreasing up to the end of the studied period.

3. The subcutaneous fat layer is thicker in girls, during the whole period and in all regions of the body than in boys.

4. During the whole period of child ontogenesis the major part of the subcutaneous fat (percentually) is deposited outside the trunk. Beginning with the 7th year of age the amount of subcutaneous fat on the trunk is relatively growing, and outside it (on the limbs, head and neck) it is decreasing. The trend of levelling is more conspicuous in the group of girls than in boys. In the 15th year of life the difference in girls is less than 1.5 %, in boys, however, it is still almost 7.5 %.

5. Percentually the largest part of subcutaneous fat in girls is on the trunk, while in boys it is outside the trunk, i.e. on the limbs, head and neck. The intersexual difference of the percentual share of the limbs is, however, smaller than the difference on the head and neck.

6. In spite of the fact that the head and neck form anatomically together with the trunk the so called body trunk, their mean thickness and age-related changes of the thickness of subcutaneous fat behave similarly as in the limbs.

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