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CONSTITUTIONAL EVOLYUTIVNY CHARACTERISTIC OF SEXUAL IMORPHISM AND PHYSICAL DEVELOPMENT OF YOUNG MEN OF SIBERIA

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Abstract
Anthropometric survey of young men in Siberia has revealed uneven distribution of somatotype on sexual differentiation dominated mainly gynecomorphous somatotype and asthenia, with a gradual leveling age indicators. Found that, in adolescence the process of physical and sexual maturation is not completed. Young men of eunuchoid type treat generally pathological and disevolyutivny types.

Keywords: physical constitution; sexual dimorphism; male; Siberia; anthropometry; evolyutivny types

INTRODUCTION

It is well known that the formation of the same part of the Constitution shall take the external environment and heredity. Hereditarily is determined by the main features of the constitution - the longitudinal dimensions of the body and the dominant type of metabolism, the latter is inherited only if in the same locality lived continuously 2-3 generations of people. The combination of these attributes determines the degree of similarity of many people with each other, allowing them to allocate 3-4 basic constitutional type [1].

Anthropological data follow the physical development of certain groups and in some cases to diagnose the disease [8]. Epochal dynamics of body size over the past 40 years in boys and girls have the same direction for some signs - increase in body length and leg length, girth reduction, and the sagittal diameter of the chest. For other signs observed some sex differences - a slight increase in body weight and shoulder width in boys, in the absence of the dynamics of these dimensions in girls, a reduction in the width of the pelvis in girls, in the absence of dynamics in boys [2].

Determination of the degree of somatic sexual differentiation by an index of D. Tanner (1968) found that youths in the development of modern, elevated gynecomorphous [9], is quite closely associated with physical inactivity [13], and the level of the index in boys and Tanner's level of physical activity in an equal dependent of each other [7].

Compared with studies last century has increased the number of young men with signs of asthenia and, especially, gynecomorphia in highly urbanized regions [10, 11, 12].

THE PURPOSE OF THE WORK

Identification of features of sexual differentiation of males, depending on the physical constitution, weight and body density.

MATERIALS AND METHODS

A survey of 345 young people (from 17 to 21 years) according to the scheme of the age periods of human ontogenesis [14]. All the boys were Caucasians, living in the Krasnoyarsk region and the last 1-2 years have studied in universities of Krasnoyarsk. The measurements were performed on a voluntary basis in the first half of the day, in a light room standard set of anthropometric instruments and devices that have passed metric verification by well-known and accepted procedures [6, 3, 13, 15].

In addition to absolute and relative indicators are calculated coefficients and indices: the index of sexual dimorphism (SDI) for J. Tanner, body mass index (BMI-Ketle2), the index of proportionality of body (a type of physical constitution) by L. Rees – H. J. Eisenk, the index of body density (Rohrer), the index of proportionality of the chest (Erisman), the indices of the chest, " wall, shoulder width (SRI) and pelvic-brachial index (TPU) to E.N. Khrisanfova [5] and others.

The research results were introduced into the individual protocols and the electronic database. Statistical analysis was performed using a software package Statistics v.6.0 using the methods of parametric and nonparametric statistics.

RESULTS AND DISCUSSION

Results of gross studies have shown that sexual dimorphism index (SDI), which characterizes membership in

one of the sexes and the degree of severity, all young men are gynecomorphous type (78.07 ± 1.25), and the index shows a moderate specific dysplasia of the floor and has a large interquartile variability (49.0-108.5). A more detailed description of youths on S.D.I. allowed to establish a moderate degree of severity of symptoms of dysplasia sex (gynecomorphizm) at 65.42% of the total number of examinees, mild dysplasia of the sexes (mesomorphism) at 29.50% and no signs of dysplasia of the sexes (andromorphizm) at 5.08%.

Body length in boys varies from 163.0 cm to 199.5 cm, with an average body length of 180.24 ± 0.54 cm average body weight in this group of boys 70.35 ± 1.43 kg, maximum weight - 115.0 kg, minimum - 48.2 kg.

Index Reece - Eisenk, characterizing the proportionality of the constitution and physique, the youths belong to the asthenic type (109.83 ± 1.0), as evidenced by exaggerated pelvicbrachial index (TPU = 79.46 ± 1.07) and undervalued (SRI) index than shoulder width (19.58 ± 0.47), for which they are dolihomorphous (asthenic) type. At the same time the indices related to the chest: (IUC) Chest (51.45 ± 0.52), «Wall (IS) -0.78 ± 0.09 and Erisman (IE) -2.58 ± 4.16, can be attributed to the development of the boundary between the mesomorphic (normosthenic) and dolihomorphous types.

Body mass index (Quetelet 2) indicate that the energy stability (21.62 ± 0.66 kg / m I) and a sufficient density of the body, determined by the index Rohrer (12.0 ± 0.50 kg / m i). However, BMI has for different individuals is very wide scope, from 16.29 kg / m I to 32.57 kg / m I at 50% quartile values within the normal range (19.6 -23.33 kg / m I) (Table 1). Rohrer index figures are similar in orientation to the BMI, being within 50% quartile values from 10.91 to 12.77 lb / ft i and with a breadth of scope from 8.90 to 17.99 kg / m i.

Clearly reveals the uneven distribution of somatotype on sexual differentiation and size parameters, the index Ketle ^{2} (Table 1).

TABLE I

Anthropometrical showing depending on the sexual dimorphism in the youths (J.Tanner, 1968)

№	Showing	Gynecomophous type *(N=218)*	Mesomorphous type *(N=107)*	Andromorphous type *(N=20)*
		(M±m)	(M±m)	(M±m)
1	Body legnth, cm	180,0±0,58	180,12±0,46	184,13±0,47
2	Body mass, kg	69,12±1,39	71,41±1,29	80,03±2,00
3	Ketle ^{2} (ИМТ), kg/m^2	21,28±0,63	22,04±0,63	23,53±0,97
	overweight, %	9,34	17,24	20,0
	fatness, %	1,55	-	13,33
	Chronicle energy.shortness ., %	12,95	6,89	13,33
	Standard (norm), %	76,16	75,87	53,34

The young men andromophous somatotype showing the highest overall parameters of overweight, obesity and even chronic energy deficiency. Boys and mesomorphic somatotype gynecomophous same height and weight, are also quite a few young men with excessive body weight and chronic energy deficiency (Khan).

Constitutional typing in selected groups of boys on gender L. Rees – H.J. Eisenk revealed a predominance of asthenic body type in gynekomorphous and mesomorphic somatotype and the lowest percentage of andromorphous. Normostenics have roughly equal gender distribution. At pycniks severity of symptoms of the opposite sex occurs in the smallest number of boys. In general, the number of young men with signs of sexual dimorphism is reduced from asthenics to normostenics and picnics, and the expression of gender traits is growing at asthenics from andromorphous type to gynecomorphous type have normostenics remains at one level and have picnics down from andromorphous to gynecomorpham (Table 2).

TABLE II

Classification of the youths according to the sexual dimorphism and physical constitution

Showing	Gynecomophous *(M±m)*	Mesomophous *(M±m)*	Andromophous *(M±m)*
Phisical Constitution (L.Rees – H.J. Eisenk), y.e.	110,66±0,96	108,81±1,00	105,05±1,33
asthenic, %	69,43	66,67	40,0
normsthenics, %	26,94	24,14	26,67
pyknics, %	3,63	9,19	33,33

Subsequent evaluation of the morpho-functional status of young men revealed that an integral feature content of tissues in the body (body density) indicates the presence of the organism boys all gender groups, the normal content of muscle and bone mass with their increase of gynecomorfii to meso-and andromorphia. In gynecomorphous and mesomorphic somatotype index Erisman - proportionally developed chest, the andromorphous - wide. But it's also seen a clear trend towards an increase in the width and circumference of chest (IUC) from gynecomorphous to andromorphous types (Table 3). The parameters characterizing the growth of body width (SRI, IC, TPU) and boys gynecomorphous mesomorphic types of gender-based anthropometric marked decrease in shoulder width, flattening of the chest and an increase in the width of the pelvis.

Determination of the degree of somatic sexual differentiation by an index of D. Tanner boys Barnaul [7] showed that in the juvenile period to andromorphous somatotype are 10.2% of the subjects, the mesomorphic – 13.1%, to gynecomorphous - 76.7%. In our study, the distribution of signs of sexual dimorphism remained the same, but the predominance of ginekomorphous somatotype below 11%, andromorphous below 2 times (5.08%), and mesomorphic higher in the more than 2 times (29.50%) of total surveyed, which may be associated with different numbers of youths, their different age requirement and varying degrees of physical activity, and, possibly, with different environmental conditions.

Age-specific rankings for all major indicators revealed that the growth of young men 17-18 years of age in the years to almost no change, and body weight by 19 years of age decreased by 8.5 - 9% and 21 year of age up to 12,0%. Increase muscle and bone mass occurs most rapidly in the 17-18 years, as evidenced by high rates of Rohrer index and Ketle2, sequential decrease overweight with 30.0% in 17 years to 9.1% in 20 years and the incidence of obesity but increases with the chronic energy deficiency (Khan) of the total youth with 12.5% in 19 years to 23.0% in 1921 to life (Table 3).

TABLE III

Classification anthropometrical showing and indexes according to the sexual dimorphism in the youths

№	Showing	Gynecomorphous *(M±m)*	Mesomorphous *(M±m)*	Andromorphous *(M±m)*
1	Bodythickness (Rorera's index), kg/м^3	11,84±0,48	12,22±0,49	12,78±0,71
2	Chest index (CHI)	51,03±0,49	52,11±0,55	52,99±0,62
3	Erisman index (EI)	1,82±4,64	3,76±3,64	5,47±3,53
4	Index of the width of the shoulders (IWCH)	18,48±0,37	21,43±0,17	22,99±0,26
5	Stenia index (SI)	0,79±0,02	0,77±0,03	0,73±0,1
6	Hip shoulder showing (HSS)	83,83±0,94	71,93±0,39	66,87±0,71

In adolescence with a change in physical development varies and constitutional identity. Number asthenics with 80% decreased by 34.5% due to their transition to normosteniki (16.5%) and picnicking (by 18.0%). Accordingly, the physical constitution is a young progressive change in their somato-sexual constitution. In 17 years gynecomorphous somatotype was 70.0%, mesomorphic – 20.0% and andromorphous – 10.0%. By 1921 the number of youths ginekomorfnogo somatotype decreased by 18.5% due to their transition into the mesomorphic somatotype. Age-specific rates andromorphous somatotype had no statistically significant differences in value. Given that the androgen levels of blood plasma is positively correlated with the width of the shoulders relative to the width of the pelvis [2], parameters of physical development is closely correlated with indices of sexual dimorphism, and the latter with physical activity [5], the boys in Central Siberia during the period 17 - 21 years more largely preserved signs ginekomorfnosti and, therefore, at a moderate physical activity does not terminate the processes of physical and sexual maturation.

For detection of distinctions of a body build of young men counted a trokhanterny index (Table IV), according to which all surveyed distributed on the constitution – evolyutivny types according to V.G. Shtefko and A.D. Ostrovsky (1929): pathological (index ≤ 1,85); disevolyutivny (index 1,86-1,91); gipoevolyutivny (index 1,92-1,94); normoevolyutivny (index 1,95-2,0); giperevolyutivny (index 2,01 and more).

TABLE IV

Distribution of young men on evolyutivny types in (%)

Pathological	Disevolyutivny	Gipoevolyutivny	Normoevolyutivny	Giperevolyutivny
7,8	19,7	20	35,2	17,3

According to a trokhanterny index of 27,5 % of young men of pathological and disevolyutivny types of Krasnoyarsk had DT ratio: DN less than 1,92 also fell into to eunuchoid type. From them among young men of Krasnoyarsk from 81 % to 100 % there were astenik and from 70,7 % to 73,9 % had moderate signs of sexual dimorphism (ginekomorfizm), and about 25 % had mesomorphism signs.

CONCLUSION THUS

The results convince us that the boys from the age of adolescence is to improve the physical performance, reduced asthenia and gynecomorphism, the growth of bone and muscle mass and stability indices of density and body mass, but not completing the process of somato-sexual, and not just , maturing. Remains a high percentage of youths with chronic energy deficiency, obesity and overweight, which is known to depend on features of the autonomic nervous system [4].
Considering that Krasnoyarsk falls into to highly urbanized cities, with a large number of antropourgentny emissions was established that, according to values of a trokhanterny index and evolyutivny types of a body build, on physical development of the young man Krasnoyarsk citizens fell into to asthenic type of a body build and had moderate or little signs of a structure of persons of an opposite sex. From them 27,5 % of young men fell into to eunuchoid type and had a lack of an androgenic saturation with morphological signs of a ginekomorfizm and settled down on classification among pathological and disevolyutivny types.

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