

THE REGULATORY SYSTEM OF THE HUMAN BODY IN THE NORTH

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THE TEENAGER: GROWTH AND DEVELOPMENT IN THE NORTH

ABSTRACT

The article reviews physical development of teenagers living in extreme climate conditions. The influence of various factors on physical development leads to phenotypical changes. The environment influences much on the children's organism as due to genetic plasticity and lability it is more acquisitive to unfavorable factors. Researches in the North where residing conditions are severe enough, considering extreme factors, such as long period of low temperatures, sharp day differences of atmospheric pressure, polar night, deficiency of solar radiation, etc., have revealed delay of terms of the beginning of growth activity, a great speed of transit of separate stages of the organism development, the accelerated maturing and early biological maturity which is explained as a phenotype approaching to the special ecological conditions.

Keywords: teenager, physical development, pubertal period, extreme North.

Healthy rising generation is an important condition of prosperity and development of any society. In this aspect children and teenagers of the North are in the most complex ecologic-hygienic and social-economic conditions.

The pubertal period is one of the most complex periods in the development of the child when reproductive performance is reached, osmotic growth comes to the end, perfection of all organs and systems occurs. During this process organism Healthy rising generation is an important condition of prosperity and development of any society. In this aspect children and teenagers of the North are in the most complex ecologic-hygienic and social-economic conditions.

The pubertal period is one of the most complex periods in the development of the child when reproductive performance is reached, osmotic growth comes to the end, perfection of all organs and systems occurs. During this process organism quantity indicators (the dimensions of separate organs and all body) increase, and also there is a perfection of organs' work and the physiological systems providing normal livingability of the mature person which high lights is labour activity and a birth of healthy children [4, 11].

According to the state statistics of the Republic of Sakha (Yakutia) since 2000 to 2010 the common sickness rate among teenagers has increased in 2.5 times. The primary diseases are: the first place is occupied with respiratory organs which have increased in 1.8 times for a decade, on the second place – traumas and poisoning and some other consequences, have increased in 2 times, on the third place – illnesses of digestive organs, have increased in 2.6 times [8,9]. As a whole, these data testifies to presence of a negative tendency – reduction of healthy teenagers in Yakutia.

Physical development (PD) is consid-

ered to be one of direct indexes of health of rising generation. In each region it is characterized by certain ethnic composition, climate-geographical and social-economic conditions and has its peculiarities [4, 6, 7, 9, 13, 17]. That's why it is recommended to use local standards as the growth and development of children in different climate-geographical regions and ethnic groups are various.

Physical development is a complex of morphofunctional properties of organism defining a store of physical strengths, capacity measure, level of biological state of organism, process of the development of, first of all, somatic indexes which can be supervised for the purpose of optimization of physical development [10,11].

One of the factors, influencing on a physical development, especially growth of the child after 2 years of life is heredity. There are 2 periods when correlation between growth of parents and children is most significant. It is age from 2 till 9 years when one bunch of genes (the first family factor) affects, and age from 14 till 18 years when growth regulation depends on other genes (the second family factor).

Social-economic conditions (education of parents, living conditions, number of children, age of the father and mother, hygienic skills, education and etc.) make essential impact on the growth processes in all ontogenesis periods. So, practically all worldwide there is a tendency: children from wellprovided families are taller and heavier, than children from poor families [9, 11].

Important value in the development of the child plays also climate-geographical factors (duration of light day, temperature, humidity). It is considered, what exactly climate-geographical factors renders maximum influence on child's organism as due to genetic plasticity and lability it is more acquisitive to unfav-

orable factors. It is scientifically proved that a hot climate and high mountains conditions possess inhibiting influence on the growth processes, but simultaneously can accelerate essentially maturing of children. Growth rate fluctuations in connection with seasons of the year (acceleration in spring and inhibition in fall-winter months) [2, 11] are widely known.

Researches in the North where residing conditions are severe enough, considering extreme factors, such as long period of low temperature, sharp day differences of atmospheric pressure, polar night, deficiency of solar radiation, etc., have revealed delay of terms of the beginning of growth activity, a great speed of transit of separate stages of the organism development, the accelerated maturing and early biological ripeness which is explained as a phenotype approaching to these ecological conditions [1,14].

Studying of the basic indexes of physical development, the analysis of their changes among teenagers has revealed a series of peculiarities for last decade. At the beginning of the XXI century stabilization of longitudinal growth and puberty processes with simultaneous sharp augmentation of indexes of body mass and fat layer was marked in the majority of the European countries,

Another tendency which is found among youth of the Russian Federation and some other CIS countries is connected with inversely directed processes when stabilization of longitudinal growth decreases indexes of body weight, body form changes to astenization and leptosomization. The examinations of children and teenagers of Moscow, Saratov and some other big cities of Russia in different time have testified about it [5].

In Yakutia the first time regional standards have been compounded and

published by the professor M.V. Handy in 1988. A series of researches for the relative analysis have been made since 1995 to 1998 and since 2000 to 2004 [9, 18].

Some features in physical development of teenagers have been determined, such as: body decrease at augmentation of body length which have led to decrease in index of proportionality and formation of gracial figure among teenagers of 10-14 years; low indexes of body length in 4,6 cm and body mass in 5,3 kg, and delay of appearance of the secondary sexual signs among girls in comparison with indexes of teenagers of the Russian Federation; teenagers prevalence with decrease in muscle strength of hands, as result of decrease of body mass for muscular component; delay of actual sizes of vital capacity and compressive force of hands from standard that defines low functionality among teenagers of Yakutia. Also in comparison with 1998 in 2003 relative density of schoolchildren with deficiency of body mass has grown in 1% on the average, and almost twice body mass has grown (from 4,5 % to 8,4 % among boys, from 3,8 % to 7,7 % among girls) [17,18].

Nowadays problems of physical development of children and teenagers continue to be investigated.

For medical practice the indexes of rather easy measurement which are called somametric more often are used: body length, body mass, chest circumference. Body external examination reveals somatoscopic indexes: form of thorax, back, foot, bearing, muscular state, adipopexis, skin elasticity, puberty signs. For the assessment of organism functionality are used physiometric indexes - vital capacity of lungs, compressive force of hands (dynamometry) [4, 11,12].

Maximum pubertal acceleration in a linear growth among girls is marked at the age of 10-13 years, among boys the high-speed peak is registered on the average in 13-15 years. Just to these periods there is a maximum intensive influence of environment on the development of child's organism [4, 11].

The body mass is considered to be rather labile index which is changing under the influence of exogenous and endocrine factors and is in direct, nonlinear dependence on length of the body; its increase descends irregularly and is conserved after the linear growth termination.

The thorax circumference has great value for the assessment of level and harmony of physical development, defi-

nition of the constitution type and sexual development [11].

One of the approaches to health forecasting is the assessment of the psychosomatic constitution of the person as adaptable possibilities and predisposition to various mental and somatic diseases correlate with accessory to defined constitutional types [3]. Constitutional type is the integrated index characterizing physical and functionality of the human body. Its morphological expression is somatotype [19]. Somatotype is defined only with the harmonious development of the child. According to R.N.Dorokhov and M.I. Bahrah's scheme, there are microsomatic, macrosomatic and mesosomatic somatotypes [12]. Research of somatotype among children, in particular among teenagers is important compounding assessment of physical development as it defines level of somatic health and functional state, is the constant characteristic and genetically determined [16].

Thus, dynamic examination of physical development of a growing organism of the child made in time is necessary for revealing individual features of growth and maturing, rate and development harmony and serves as important diagnostic criteria [19]. The objective assessment of physical development level of children is possible only with the local standards presence in each region taking into account social-economic and climate-geographical features of the region.

Nowadays, working out of standards of physical development is one of priority directions for hygiene of children and teenagers and also pediatrics.

Assessment criteria of physical development (estimated tables) are compounded for separate regions and are not static in time, therefore it is recommended to make constant update and correction of territorial standards of physical development of the children's population each 5-10 years [12,15].

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THE ASSOCIATION OF INSULIN RESISTANCE AND VISCERAL ADIPOSE TISSUE DYSFUNCTION WITH COMPONENTS OF METABOLIC SYNDROME IN MEN OF WESTERN-YAKUT INDUSTRIAL REGION

ABSTRACT

We have compared the association of parameters of insulin resistance and visceral fat dysfunction with the main and additional components of metabolic syndrome in men who permanently reside in West Yakutia industrial region and work in mining company. There was a close connection between insulin resistance and analyzed main and additional components of metabolic syndrome. However, we have found no association between the dysfunction of visceral fat tissue and disorders of carbohydrate metabolism, which is the principal component of metabolic syndrome. Cardiometabolic risk assessment using the criteria of visceral fat dysfunction can therefore result in underestimated contribution of carbohydrate metabolism disorder to cardiometabolic risk. Thus, insulin resistance criteria are more informative in population studies of metabolic syndrome epidemiology and pathogenesis than the criterion of visceral fat tissue dysfunction.

Keywords: West Yakutia industrial region, men, metabolic syndrome, insulin resistance index, visceral adiposity index.

In spite of the consensus on metabolic syndrome (MS) definition achieved by professionals from different fields of medicine and international organizations, there are still many controversial issues of metabolic syndrome pathogenesis. MS is currently considered a cluster

of factors of increased cardiovascular risk including the following five pathological conditions, which are the main components of MS: abdominal obesity (AO), arterial hypertension (AH), carbohydrate metabolism disorders (CMDs), hypertriglyceridemia (HTG),

and decreased level of high density lipoprotein cholesterol also known as hypoalphacholesterolemia (HACL) [7].

The majority of researchers believe that insulin resistance (IR) is a key element of MS pathogenesis. HOMA-IR index of insulin resistance is used to