

PHYSICAL DEVELOPMENT – INDICATOR OF SCHOOLCHILDREN’S STATE OF HEALTH

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Abstract: Body development consist in morphological and physiological quantitative and qualitative changes. There are enunciate the fundamental principles on which is based this development. There are studied the characteristic feature of the phenomenon of acceleration in our country, the components of growth and it insists about the consequences of the non-observance of daily alimentary ration, adequately to genus, age, activity, under quantitative and qualitative relation. It emphasis the characteristics of the development in schoolchild period and at puberty.

Cuvinte cheie: dezvoltarea organismului, creșterea, înălțimea, greutatea corporală

Rezumat: Dezvoltarea organismului constă în modificări morfologice și fiziologice cantitative și calitative. Sunt enunțate principiile fundamentale pe care se bazează această dezvoltare. Sunt studiate particularitățile fenomenului de accelerație în țara noastră, componentele creșterii și se insistă asupra consecințelor nerespectării rației alimentare zilnice, adecvate genului, vârstei, activității, sub raport cantitativ și calitativ. Se subliniază caracteristicile dezvoltării în perioada de copil școlar și la pubertate.

INTRODUCERE

The development of the body occurs during the period of time covered from conception to the adult stage over almost 20 years, this being a continuous and dynamic process with morphological and physiological changes both of quantitative (a growth in height and in weight) and qualitative (the differentiation of tissues and organs). Growth, with the meaning of physical development, represents the totality of phenomena concerning the increase in size and weight of the human body, resulting in the change of the ratio of different body parts and body shapes (1).

The fundamental principles of human development are: 1. *The pace of body’s development as a whole decreases as one grows old, following the profile of a parabolic curve.* The fastest growth pace occurs during the intrauterine period. After birth, the pace is maximum during the first year of life. Acceleration of growth occurs at preadolescence, followed by the reduction of the growth occurring after puberty and a halt in growth around the age of 25 (1). 2. *The law of alternation:* the long bones increase in length and alternatively thicken. The break between the growth in length processes is used for the growth in thickness and vice versa. 3. *The weighing machine law:* the periods of activity and rest which alternate during the development of a long bone are different for two long consecutive bones of the same limb. 4 *At the level of tissues, organs, systems and body parts growth has the following characteristics:* growth is allometric, the faster development of some organs is accompanied by the slower growth or even the regression of some organs: the growth direction is cephalic caudal; if a body part has proportional growth superior to the one in height the parts closely superior or inferior to the one taken into consideration will have proportionally inferior growth to the one in height. 5. *The laws of puberty:* During the prepubertal stage, the waist grows especially due to the lower

limbs, and after puberty, it is mainly focused on the trunk; before puberty the growth is centered around the bone system, while after puberty it is focused on muscular mass; before puberty the process of bone development prevails, during puberty and after it the process of bone mass accrual is essential. 6. *Physical development depending on gender:* has the following characteristics: girls have in all evolutionary stages a more precocious bone development; boys have in all stages of growth – except for the prepubescent period - a larger waist, weight and muscular force than girls (1, 2).

Many specialists have emphasized the progressive intensification of the child’s growth and physical and psychological development processes that they named: “the acceleration phenomenon”.

The studies in our country show that in urban areas, during 1950-1978, the growth phenomenon of the average values for the basic somatic parameters indicated high acceleration, especially for puberty age groups, whereas the period 1978-1985 indicated stagnation and even a deceleration phase. In 1992, a stabilization of the average values was noticed concerning small children and the return of the acceleration tendency during puberty. In rural areas, the results covering the period 1950-1993, indicate the constant increase of the height-weight level over the four researched periods.

The etiology of the acceleration phenomenon is explained by 3 categories of factors: economic, social (urbanization), genetic. The pace of growth may be parallel to the one of development, especially at an early age, lagging behind at old age, but never before development.

If the word “growth” would designate quantitative development – an increase in weight, in height, - that of *development* means much more than this, defining important qualitative assimilation of the human body or its functions especially in the sense of differentiation of organs and their

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functions, their maturation and after reaching adulthood and the process of biological regression, natural phenomena in the evolutionary cycle of life (3).

Growth has two components: quantitative growth and qualitative growth.

Quantitative growth is produced through the process of the replacement of the used organic mass, along the entire lifespan, by the increase in weight and in length of the body. Growth occurs through: hyperplasia (proliferation of cells) and hypertrophy (the increase in cellular volume). Qualitative growth entails cellular differentiation.

Growth and development represent two indicators of the child's health, but not the only ones to these the psychological and intellectual development, the ability of immune defense and reproduction is added.

The increase in weight and in height is conditioned by the intake of nutrients together with diet; from all these proteins have the main role and then in a small extent the fats. The qualitative and the quantitative lack of basic diet principles have its repercussions mainly on the in weight and only later on the growth in height.

Disrespecting the daily food diet, suitable for gender, age, activity, from a quantitative and qualitative point of view, may lead to severe nutritional disorders, sometimes quite difficult to correct. Nutritional deficiencies due to a deficient diet can occur when this is insufficient or exceeded.

The most obvious sign of nutritional deficiencies is weight loss or denutrition or excessive weight or obesity. The term obesity refers to people who overcome by 20 % theoretical weight (5), and denutrition defines weight loss by 10 % over the corresponding standards of gender, age, and respective height.

Height and body weight are important indicative of children health. Children coming from poor families have lower height and weight as compared to children of the same age from families that have no social risk. These aspect have been investigated in a retrospective survey applied to a group of 509 children who came from poor families in Novi Sad hospitalized in the Institute of Child and Teenage health over a 5 year period and in a prospective survey which included 90 children from poor families (experimental group) and 132 children from families that did not present any social risk (the social group) hospitalized in the institute over a 6 month period. In the retrospective survey, that included only children from poor families, 136 (26.7%) of them had their height ranging below the 10th percentage, 173 (34%) had their weight and 86 (16.9%) of them the head circumference situated below the 10th percentage. Delay in psychomotor, intellectual development was set at 177 (34.8%) of them. Children belonging to families with social risk had significantly had a deficit in height, in weight, of head circumference and development as compared to those theoretically expected. In the prospective study, 40 (44.4%) of the children from the experimental group had their height, 29 (32.2%) their weight (22.2%) the head circumference below the 10th percentage; 17 (26.2%) of them showed a delay in psychomotorial / intellectual development. Children coming from poor families have significantly presented more frequent delays in growth and development, as compared to the children from the families without social risk.

That is why pediatricians must take into consideration social risk factors when treating children with delay in growth and development (6).

In Western Europe, an increasing number of children and young people are nowadays becoming adepts of a vegetarian diet either because they are brought up in vegetarian families, or because they decided to become vegetarians on their own. It was expressed the concern regarding the risks of nutrient

deficiency that might affect the growth and development of children and adolescents especially those who rely on vegetarian macrobiotic diets. The nutritional adequacy of lacto-ovo-vegetarian diet largely discussed by Jacobs and Dwyer (1988), and more recently by Sanders and Reddy (1994). The majority of studies that we have used have emphasized the health issues of preschool children, but very few investigated the growth, the body's composition, maturation and the state of physical fulfillment of vegetarian school age children. For instance, in the so-called Farm study (a vegetarian village in Tennessee), O'Connel and co. have shown that the body height of children under 10, brought up in a vegetarian community fell seriously below the reference values in USA. But the study made by Hebbelinck M, Clarys P and De Malsche Ann in Belgium has reached the conclusion that a lacto-ovo-vegetarian diet sustains the appropriate growth and physical development. In comparison with the reference values, young vegetarians are thinner; they score less in force testing, in cardio respiratory endurance (7).

If after the possible prenatal malnutrition, postnatal nutritional difficulties follow, the negative consequences sum up. The malnourished child undergoes several aggressions. He is more sensitive to all kinds of microbial and parasitic infections.

The schoolchild period (7-16 years olds) represents the children's superior stage of growth and development that in which the intellectual preoccupation – schooling – represents the main dominant. As opposed to the subsequent periods, especially after the age between 10 and 12, major changes occur in the child's development both quantitative and qualitative. The schoolchildren's state of health is good in most cases. But at this age, acute illnesses or with a tendency to become chronic may show up such as gastritis, ulcer, asthma bronchitis, celiac disease (10) or some illnesses with severe evolution, like rheumatic or TB infection (11), with possible undesirable consequences (chronic nephritis, chronic hepatitis, cardiac localization of the rheumatic infection etc). During the same periods, the first forms of neurological– psychological disorders occur, especially under the form of exhaustion neurosis or some types of neurovegetative dystonia, easily treatable if diagnosed in time and if in order to cure them, medical factors, the family and even the child himself are involved. But it is incomparably simpler to prevent all these illnesses than treat them. The growth is slow, but it becomes more accentuated during the prepubertal stage, when a growth leap is recorded. The growth in weight occurs by 3.5kg/year on average, and with 6 cm in height.

The growth of the skull perimeter is very slow. Between 6-12 years old the perimeter increases from 41 to 53-54 cm. At the end of this period the brain reaches the sizes of an adult.

The growth and child development during puberty At this stage, physical, cognitive, psychological, social transformations occur.

The prepubescent stage starts around age 10 for girls and 12 for boys, being dominated by the secretion of the somatotropin hormone (STH) that stimulates general growth and determines the pubertal height leap. STH modulates the release of cytokines, as the tumoral necrosis factor-alpha (TNF-alpha) and interleukin-1 but recent made studies didn't find any correlation between the values of TNF-alpha and the serum concentration of STH, of insulin-like growth factor-1 or the insulin-like growth factor binding protein-23 (13). Also, during the prepubescent phase the secretion of ovarian and testicular hormones starts.

The pubertal stage (puberty as such) is dominated by the sexual maturation processes, due to the secretion of gonadotrope and sexual hormones. The onset of puberty is

produced depending on the general level of body maturation. The most accurate reference point of this growth is bone maturation. The bone age in which puberty starts is in general 11 for girls and 13 for boys.

The postpubertal stage (adolescence) lasts from the onset of puberty as such, up to the halt of the growth cartilages, which coincide with the eruption of the third molar. At this stage, sexual maturation is resumed, especially neurological psychological maturation. The postpubertal stage is dominated by the secretion of the thyroid hormones which operate in the growth processes and tissular differentiation of the body.

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