

MORPHO-FUNCTIONAL AND PSYCHIATRIC ASPECTS OF CHILDREN AT THE AGE OF 10-14 YEARS

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Abstract: *This paper refers to the particularities of somatic, functional and psychiatric development of children aged 10-14 years. The morpho-functional changes that take place during the preadolescence period are essential, displaying themselves through the intensity of growth, especially physical growth, which is characterized by a superior rhythm in comparison with other periods of ontogenetic development. This period is characterized by intensified growth (especially in stature) with the obvious development of secondary sexual characteristics. This is the site of the mental age of the ontogenetic stage of shaping individuality and human conduct.*

Key words: *growth, development, stages, maturation, adaptation.*

Middle school age, between 10 and 14, is one of the most important steps of development in which start the transformations that will ultimately lead to the organism's maturation. During this period we may find a combination of certain characteristics that are part of the junior high process along with others that, in one way or another, prefigure those characteristics of teenagers. The morpho-functional changes that take place during the preadolescence period are essential, displaying themselves through the intensity of growth, especially physical growth, which is characterized by a superior rhythm in comparison with other periods of ontogenetic development. The entire process of development can take different shapes, but regardless of these, it does not take place proportionally and is not produced instantaneously at all the body's segmental levels. Growth can be defined as

the expression of the quantitative phenomena regarding the body's growth in size and its segments. Development gathers the qualitative processes of the evolution and consists of the functional differentiation of the tissues, the functional perfection of the apparatus and the systems within the organism [7].

Growth dominates – first of all the superior and inferior limbs grow and afterwards the thorax and the pelvis. All in all, the average growth in height is between 3-4 cm and 6-7 annually. At the age of 11-12 the girls overgrow the boys a bit, being taller, but between 13 and 14 years old this difference fades away. The growth in height is accompanied by a gain in weight, and the process of calcification is intense. Thus, the facial part of the brain is developed, the process of calcification in the bones of the hands is finalized and the growth of the permanent denture occurs.

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The adjustment of the growth process is being influenced by the extra hypothalamic existence of certain somatostatin secretions (STH) at the hypothalamic level, and the receptors of the adrenergic hormones stimulate the STH secretion, whereas the noradrenergic hormones inhibit this stimulation; the free fat acids, with the help of the ventral median nucleus, have a positive action on the STH; the proinogenic substances have a positive action with the help of the thermo-adjusting hypothalamic nucleus. The laws of normal growth and development, stated by [5, p. 300], are as follows: the unequal and asymmetrical growth law of tissues and organs; the different rhythm law of growth and development; the proportion law; the alternance law; the opposite sex law of growth and development. Growth is generally uniform [1, p. 536] becoming really accelerated at the end of the period; it mainly occurs in the elongation of the inferior limbs, which generates a severe fragility of the child's body. Up to the age of 10, the differences in growth of children of opposite sex are not big; starting with this age, the girls proceed to growth acceleration due to puberty. Between 9-11, for girls, and 11-12, for boys, this period represents an active proliferation, which leads to the incubation of the epiphysis, of the sesamoid bones as well as the finalization of the medullar cavity, a stage that continues along with puberty.

If at the age of 8 years old the muscular mass represents approximately 27.2% of the entire body mass, at the age of 15 it increases to 32.6%. Along with the development of the muscular mass the force increases also, having a boost between 13 and 14 years old. For children

at the age before puberty the muscular fibers are relatively larger than those of adults and the tendon portions are shorter. At the beginning of the period they are still thin, have a big nucleus and are relatively rich in karyoplasms and water. Among them one can find a great amount of conjunctive tissue. The muscular tonus is lower for children at the age before puberty in comparison with the adult's, which favors a better execution of the joint movements, but aggravates the execution of certain smooth movements segregated by precision [7].

The neuromuscular excitability is lower at junior high children in comparison with adults, the chronaximetric values being higher. The speed in reaction and execution is very good, but the strength is still weak, due to the reduced muscular mass. At the age of 10 the girls manage to achieve over 87% of the speed they will develop at the end of their physical and functional (17 years old) growth and development, whereas the boys 75% of the speed they will develop at the end of the growth period.

The heart reacts strongly to effort, but uneconomically; the coronary irrigation is rich, the control mechanisms are still weak till the age of 7, are poorly developed and more proper as far as easy solicitations are concerned. The heart has a globule shape, the transversal diameter is longer than the longitudinal diameter and the atriums are bigger than the ventricles. The heart's transversal diameter is proportionally longer than that of the adult's. The growth of the longitudinal diameter occurs at a slow pace, until puberty. At the age of 7 the circumference of the right ventricle is 2 cm bigger than that of the left ventricle.

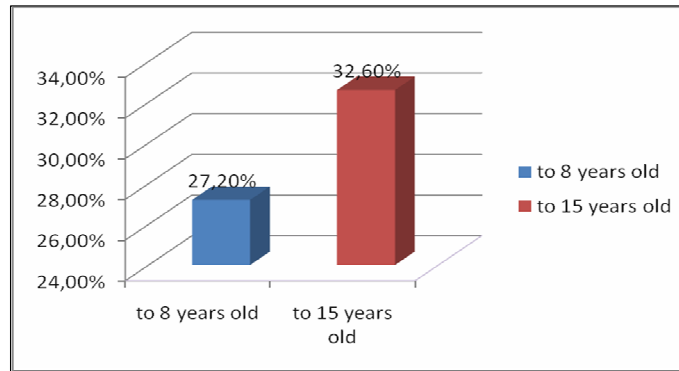


Fig. 1. Growth dynamics of the muscle mass from 8 to 15 years

At the age of 8 the weight of the heart is of 96.0 g. For children before the age of puberty the vascular net is relatively well developed. The fast development of the elastic type arteries simplifies the myocardium's task. At the age of 9 the cardiac frequency at rest is an average 90-96/minute and 88-91/minute at the age of 10; 87-88/minute at the age of 11 and 80/minute at the age of 13. This tachycardia present in the first years of school represents a significant burden for the myocardium, given the energetic and relatively important consumption of maintaining a high cardiac rhythm of rest and the weak economical (metabolic) efficiency of sustaining this. When it comes to effort the situation is far more precarious since the volume of the heart is smaller, any excess of blood irrigation to the respective muscles claiming a considerable boost of the cardiac frequency, which has a negative impact on the functional efficiency of the myocardium, which poorly handles intense solicitations for a long period of time.

The respiratory apparatus undergoes a very important development as well, acquiring new functional capacities, being capable of ensuring a better oxygen supply

of the organism, both in rest and in relative intense efforts.

Thus, the amplitude of the respiratory movements increases on average from 230 ml of air current volume at the age of 11, up to 300 ml air at the age of 13, and up to 350 ml air at the age of 15. Nevertheless, a decrease in the respiratory frequency is recorded from 22 breathings/minute at the age of 11, to 20 breathings/minute at the age of 13, and to 18 breathings/minute at the age of 15. The vital capacity (VC) marks a great leap in the puberty period. At the age of 11, the child's VC is somewhere between 2000-2200 ml air. In the first stage of puberty (10-13 years old) the annual increase of the vital capacity is up to 250 ml air for girls and up to 300 ml air for boys. In the second stage of puberty, the vital capacity develops quickly, the annual increase of this parameter reaching values of 400-500 ml air at the age of 14-15, thus, at the end of the stage reaching an average of 3500 ml air [4, p. 43-54].

In accordance with the characteristics of the morphological development, a decreased capacity of functional resistance and a decreased adaptation to the cardiovascular and respiratory apparatus is observed as far as intense physical effort is concerned.

The great organic and somatic transformations, common at this age, are accompanied by proper transformations in the mental life as well.

At the age of 10, the age that marks the end of junior high and the beginning of the middle stage, the relief of the brain cortex is being finalized, the intellectual capacities are approaching a very high level and the entire superior nervous activity is developing quickly. Psychologically speaking, the child shows a good mental balance, dealing successfully with school tasks and extracurricular activities. Intellectually speaking, he is still shaped by the concrete, assimilating knowledge without manifesting a critical spirit.

At this age, all mental processes undergo an ascendant development, notable modifications being achieved. Thus, the voluntary attention is being developed, and the involuntary attention is being modified, becoming more efficient. The preadolescent can concentrate and can be attentive longer (approximately 2 hours), often making efforts of correction and self education as far as attention is concerned. Moreover, the memory has an important growth rhythm after the age of 10.

During this period, there are obvious changes not only in the way the child memorizes, but also in what he memorizes. He often tries to put his memory to work calling upon different cultural fields (music, film, sport), the memory capacity to this extent being really high. Storing the logic is gradually achieved after 12 years. This form of storage schemes operate with logic. Evocation of memory, which is still required, develops at ages 12-14. Motor-verbal memory develops in puberty, in addition to visual memory (situation) and verbal memory, continuing to be particularly active.

The sensory-perceptual evolution browses a significant route for mental development and adaptation activities.

Given the process of biological maturation, sensitivity is also restructured by erotic functions. The phenomenon is most obvious in visual, auditory and tactile sensitivity. Perceptual experience is under the influence of development orders, and observations constitute associations leading him to express what he feels. He learns to observe, be attentive to everything that surrounds him, to show interest in knowledge and thereby stimulate complex functions intellect.

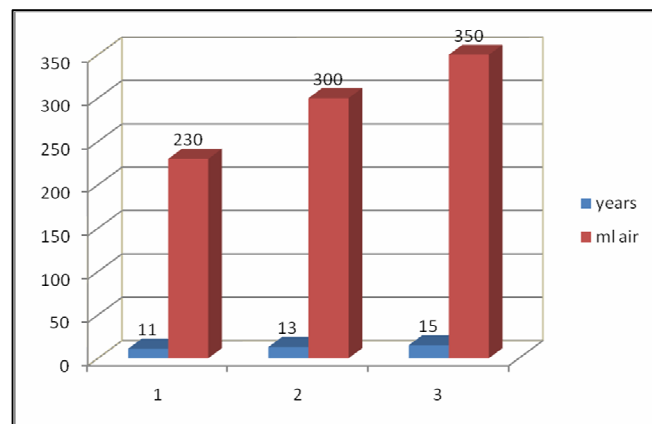


Fig. 2. *Dynamic growth in the amplitude of respiratory movements at ages 11, 13 and 15 [4]*

The development of perception allows a wider spatial and temporal orientation. In general, perceptual experience is enriched gradually.

In terms of thinking, it is still concrete (12 years). The student specifically enriches his comments, and not his knowledge. After 12 years of age significant changes occur in the structure of thinking. The learning process as a way to solve problematic situations is complicated. The critical spirit develops causing the young to validate values in comparison with no value and show explicit attitudes towards ignorance and incompetence. Although more mature and industrious girls do not exceed the intellectual development of boys, they are more compared to some comprehension of the failure of peers or adults. They often excel in matters involving complex verbal expression, while boys are better at science and technology. Operations and thinking skills are in the process of strengthening the power of the intellect as rich, complex and abstract information. Knowledge of this becomes more diverse and complex. It creates a habit of frequently used schemes, images, symbols and concepts of transparency understanding complex situations and strategies of expression.

As I said previously, the child has a good balance mentally, but he may feel moments of fatigue, headaches, irritability, or restlessness. There is an alternation between moments of voice, exuberant conduct, and times of fatigue, apathy, laziness. The child may become conflicting or less active, may take breaks to relax that extend too much even if he has not made too great an effort.

“Although eleven and twelve year olds may start wanting to do things more independently, and they do need to stretch their wings a little bit, they are certainly not as capable of dealing with the world as some of them would have you believe or as they

sometimes think themselves, so it is good for them to check out situations to make sure they are safe before they go off on their own.

Because eleven or twelve year olds may be making first efforts at independence this can change their relationship with parents. Boys may move away from a close relationship with their mothers and girls who have had a good relationship with their fathers may become a little emotionally distant with them” [9].

Some researchers believe that children of 10-12 years can manifest defensive behaviors especially in overpopulated environments. Yet, young people at this age tend to develop independent attitudes in relation to their family, but it is important for members to offer significant affective support in a discreet manner [3].

School and learning requirements lead to changes in personality. There is a structure of needs, interests, preferences and skills as a result of the discovery by the child of the importance to obtain the best results in his activity. A particularly important role in child development has, on the one hand, the social development of relationship characteristics, and on the other hand, receiving influences in the personality structure of the new experiences and knowledge. A social relationship bears the hallmark of social life as a whole, as well as school and family life. Social life is lived with a greater intensity than in any other stage of life. Groups for the game, for learning activities or any other form of action, have a high stability and become more uniform, relatively constant criteria, but especially based on age and sex [8, p. 163-183].

In another vein, and to conclude, one can say that the process of development and human growth occurs in steps, stages and periods that characterize the entire course of life. By growth and development we understand a dynamic complex of biological processes undergone by the

human organism in its evolution to maturation. Growth is a quantitative process of cellular reproduction concerning the body's gaining in weight, volume and size, whereas development represents a qualitative process of cellular differentiation; in other words we are talking about functional modifications and qualitative improvements that mark a perfection and adaptation of the apparatuses and the systems within the organism, a complex evolution and a coordinate integration of them in a whole.

Given the above, I think that it is very important for coaches to take into account the physical and psychological changes that children pass through, and adapt their methods of sports training to age peculiarities.

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