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# PHYSICAL DEVELOPMENT, QUALITATIVE ELEMENT OF THE BIOLOGICAL PROCESS IN 10-12 YEAR-OLD CHILDREN`S TRAINING

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***Abstract.*** *The aim of the study is to improve, both quantitatively and qualitatively performance in the stages of sports training and to highlight the principles of physical effort, based on quantifying the results obtained by correlating morphofunctional parameters in sports activities in children aged 10-12, fields in which selection, methodology, physical development, technical-tactical training and training strategy are involved. The scientific direction of the training can be done by obtaining as many objective data from the training process, by processing and statistical interpretation of them. The high level of performance can be achieved only through a thorough knowledge of the dynamics of training, determined by new coordinates of quality and efficiency in practicing sports activities, specific objectives for the pre-competitive, competitive, post-competitive period, substantiating the coordinates of sports effort, in order to improve performances with the elaboration of conclusions, which emerge from the implementation of the working hypotheses, the project ending with the process of disseminating the obtained results.*

***Keywords:*** *physical development, motor capacity, physical exercise, training, performance.*

**Introduction.** Physical development is the sum of morphofunctional changes, induced by growth-maturation processes, which occur in different stages of age, throughout the life of each organism, corresponding to the specifics and limits of variation of human evolution, under the action of hereditary , environmental, factors (water, air, soil, solar radiation, food, etc.) and socio-economic, cultural, sports ones. [2, 3, 4, 6, 8].

Physical development is a qualitative component of the biological process of development of the human body and is in balance with the process of growth of the body. The phenomenon of growth means the process of quantitative accumulation, at the level of tissues, organs and systems, of segmental and global values, which correspond to biological laws, with stages according to gender, age and some internal and external factors [5].

Balint, L. [1] considers that the qualitative element of physical development is the maturation process, which is achieved by reaching stages of relative somato-functional stability, at the level of different structures and systems of the body.

Physical development, through the two complementary processes - growth and maturation, has a specific dynamic and, while, at some point, the growth phenomenon ceases, biological maturation continues to manifest another significant period in the ontogenesis of the human being [7] .

In the field of directed motor skills, what is interesting about human physical development is the dynamics of this process in the age range between childhood and adolescence.

**Material and method**

The reality of becoming a human being shows that not all children follow the same pace of growth - maturation, some of them being more or less developed in relation to chronological age. On the other hand, the

organs within the human biological system do not develop at the same pace.

In ontogenesis, physical development meets an ascending period, which includes childhood, adolescence and youth, a period of slight stagnation, with elements of functional progress, in the beginning, which corresponds to maturity.

Physical development is a unique process, and its dynamics are staged. One way to highlight its restructuring can be achieved by capturing the characteristics of physical development - growth and, partially, maturation - in terms of waist evolution. Thus, for the interval 1–14 years, the following can be presented:

- from birth to 3-4 years, the increase in height is faster, accumulating, compared to the initial value, 20-25 cm in the first year of life and another 6-7 cm during the fourth year;

- from 4 to 10 years (in girls) and up to 11-12 years (in boys), the growth process has a relative stabilization, with an annual rate of 5 - 6 cm and 2.5 kg body weight. As localization, growth and maturation begin in the limbs and then extend to the trunk area.

Up to the age of 8, there are few essential somatic aspects that can differentiate girls from boys, but there is still a slight increase in muscle mass in boys (15% more than in girls) and an additional accumulation of fat tissue in girls (20% more than boys).

- at 9-10 years old, the child shows signs of early mental and physical fatigue, but has the ability to quickly rehabilitate his functional balance and, therefore, the period in question is favorable - the development of a training process specific to the school environment;

- from 10 to 12 years in girls and up to 11 ½ - 13 years in boys, the growth indicator becomes significant, reaching 8-10 cm in 6 months. This short phase of accelerated development precedes the appearance of secondary sexual characters. The growth is done mainly on the lower limbs, then on the upper limbs. At this stage, the development of long bones is noted in relation to the development of muscles and the installation of a certain temporary rigidity, located in the hamstring muscles (gracilis, semitendinosus, semimembranosus and biceps femoris). The production of growth hormone, accompanied by the action of the complex hipophysical hormone, gonadotropin (LH - lutein and FST - follicle-stimulating hormone), are responsible for the maturation of the sexual organs and the stimulation of growth cartilage. In this period of age, girls show a certain fragility and predisposition to fatigue;

- from 12 to 14 years for girls and from 14 to 16 years for boys, the growth process decreases, tending towards the value 0. On the given interval, cumulated for 4-5 years, an increase of 18 - 22 cm is obtained. This produces essential changes in the trunk, through thickening of the bones and the development of muscles.

For somatometric measurements, the following can be taken into account:

- longitudinal dimensions - height, bust, length of the upper and lower limbs;

- transversal dimensions - biacromial diameter, transverse diameter of the thorax, bitrohanterian diameter and magnitude;

- circular dimensions - the perimeter of the chest, abdomen, arms, forearms, thighs and legs;

-sagittal dimensions - antero-posterior thoracic diameter; dimensions of somatic mass - body weight, etc.

For physiometric measurements, the most common are:

- vital capacity,

- resting blood pressure immediately after effort and 3-5 minutes after effort,

- resting heart rate immediately after effort and 1-3 minutes after effort;

- the dynamometric force of the hand flexors and the back muscles, etc.

Taking into account all these theoretical-practical considerations, we proposed and performed an experiment, during the macro cycle 20.03.2017 - 01.04.2018, whose results

highlight the process of obtaining notable performance, by stimulating physical development and motor skills, in relation to the peculiarities of age.

We had in mind that the level of efficiency of sports activities, which registers quantitative and qualitative increases, to be determined by the means involved in performance sports. In any activity, characterized by a rival or competition in two, each of the fighters seeks to overcome the other through better physical, technical, tactical and psychological training. For this reason, we considered it necessary that, before moving on to the planning and execution of the preparation process, we develop a model of scientific thinking of the actions to be performed, as well as the important moments that we need to address in planning and performing the training process.

**The method of the experiment**

The organization of the experimental research:

a) the period of the experiment: 20.03.2017 - 01.04.2018.

b) place of the experimental research: SEISHINDOKAN Martial Arts Sports Club, Alexandria, Teleorman.

c) establishing the experimental sample: 24 children, divided into two groups: control and experimental, according to Tables 1 and 2.

**Table 1. Control group**

| No. crit. | Year of birth | Gender | Seniority in sports | Steps and skillful classes in Karate |
|---|---|---|---|---|
| 1 | 2006 | M | 4 years | 6 Kyu |
| 2 | 2006 | M | 4 years | 3 Kyu |
| 3 | 2007 | M | 2 years | 2 Kyu |
| 4 | 2008 | M | 2 years | 4 Kyu |
| 5 | 2006 | M | 3 years | 4 Kyu |
| 6 | 2006 | M | 4 years | 5 Kyu |
| 7 | 2006 | M | 4 years | 6 Kyu |
| 8 | 2007 | M | 2 years | 1 Kyu |
| 9 | 2006 | M | 2 years | 3 Kyu |
| 10 | 2007 | M | 2 years | 5 Kyu |
| 11 | 2006 | M | 4 years | 2 Kyu |
| 12 | 2008 | M | 2 years | 1 Kyu |

**Table 2. Experimental group**

| No. crit. | Year of birth | Gender | Seniority in sports | Steps and skillful classes in Karate |
|---|---|---|---|---|
| 1 | 2007 | M | 3 years | 6 Kyu |
| 2 | 2006 | M | 2 years | 4 Kyu |
| 3 | 2006 | M | 4 years | 2 Kyu |
| 4 | 2006 | M | 4 years | 5 Kyu |
| 5 | 2007 | M | 2 years | 1 Kyu |
| 6 | 2007 | M | 3 years | 3 Kyu |
| 7 | 2006 | M | 4 years | 4 Kyu |
| 8 | 2007 | M | 4 years | 2 Kyu |
| 9 | 2006 | M | 3 years | 5 Kyu |
| 10 | 2006 | M | 4 years | 6 Kyu |
| 11 | 2006 | M | 2 years | 3 Kyu |
| 12 | 2006 | M | 2 years | 1 Kyu |

In the center of attention was extracurricular curriculum, which should include the principles of tactics in defense and counterattack. We wanted the means of defense to be seen as a starting point, both for the attack and for the counterattack. The objectives, norms and requirements constitute the regulatory elements in the organization and direction of the training activity, achievement of the performance objectives and improvement of the motor qualities. Its notification depends on the pedagogical conception and the practical and creative spirit, as well as on the pedagogical insight of the coach. Increasing efficiency in performance sports is mainly aimed at optimizing content, methods, means and procedures to return to normal after effort. Performance means giving as much as necessary, to achieve the objectives, on the line of training and coaching. We consider that efficiency represents: the selection, organization and creative use of material and human resources, not used in the field until that time. In this case, it was necessary to develop a methodology, after which the motor activities were carried out.

In the selection and distribution on the control and experimental groups of 10-12 year old children, Karate practitioners, from the Martial Arts Sports Club **SEISHINDOKAN**, Alexandria, Teleorman, we aimed to meet, approximately, the biological, anthropometric, physiological and motor criteria, before the experiment (Tables 3, 4 and 5).

**Table 3. Anthropometric criteria**

| | *Age* | *Waist* | *Weight* |
|---|---|---|---|
| *Anthropometric criteria* | 11 years | 148 cm | 40 kg |
| | 12 years | 153 cm | 44 kg |

**Table 4. Physiological criteria**

| *Physiological criteria* | *11 years* | *12 years* |
|---|---|---|
| - rest | 69 cm | 81 cm |
| - inspiration | 73 cm | 69 cm |
| - expiration | 66 cm | 74 cm |
| - bitronhanteric diameter | 23.8 cm | 25.9 cm |
| - vital capacity | 2000-2300 ml | 2300-2500 ml |

**Table 5. Motor criteria**

| *Motor criteria* | *11 years* | *10 years* |
|---|---|---|
| - speed 50 m | 8.5 sec | 8.4 sec |
| - length from place | 168 cm | 173 cm |
| - resistance per 1000 m | 3.30 min | 2.50 min |
| - abdomen | 23-24 x | 24-25 x |
| - tractions | 4-6 x | 6-7 x |
| - coxofemurale mobility | 55 cm | 56 |

During the macro-cycle 20.03.2017 - 01.04.2018, we proposed, with the two groups, both the experimental one and the control group, made up only of boys, to reach the level of performance, considering the training scheme, in which the period preparation for the championship was divided into three stages: preparation; pre-competitive; competitive.

The training duration for this stage was 90 minutes, dosed as follows:

- 40% of the time, allocated to physical training;
- 40%, allocated to technical skills;
- 10%, allocated for tactical skills;
- 10%, for theoretical skills.

During the training, the functional features of small karatekas were taken into account:

- low capacity of physical effort,
- low resistance to long-term efforts of the cardiovascular and respiratory systems,
- narrow lumen of the vessels,
- hormonal disorders, the heart makes a great effort for irrigating internal organs.

From the psychic point of view, the formation of the personality begins, noticing a good psychic balance, while the intellect is under the influence of the character.

**Results**

The evaluation of the experiment was performed by highlighting, calculating and comparing the proportionality indices, obtained from specific measurement actions, with proportionality indices, presented in the reference tables. We registered differentiations, as an expression of the physical development of the co-opted subjects in achieving the sports performances, in the different stages of the physical development, serving as orienting elements, in the selection process.

In the experiment performed on the 24 subjects, we found that, from a motor point of view, increases the mobility of the spine and the efficiency of the development of motor qualities, especially speed and skill.

Taking into account somatic indices, height increases rapidly, weight slows slightly, the bone system is strengthening, the thorax is narrow, the internal organs are less developed in relation to weight, the joints and ligaments are insufficiently developed.

During this period, physical maturity begins. Results of physical development and motor skills recorded after the experiment are further mentioned:

**Table 6. Anthropometric criteria**

| | *Age* | *Waist* | *Weight* |
|---|---|---|---|
| *Anthropometric criteria* | 11 years | 161 cm | 51 kg |
| | 12 years | 164.7 cm | 51.6 kg |

**Table 7. Physiological criteria**

| *Physiological criteria* | *11 years* | *12 years* |
|---|---|---|
| - rest | 75 cm | 76 cm |
| -inspiration | 74 cm | 75 cm |
| - expiration | 66 cm | 74 cm |
| - the vital capacity | 2500-2800 ml | 2800-3200ml |

**Table 8. Motor criteria**

| *Motor criteria* | *11 years* | *12 years* |
|---|---|---|
| - speed 50cm | sec8.3 | 8.1 sec |
| - length from place | 178 cm | 200 cm |
| - resistance per 1000 m | 2.20 min | 2.00 min |
| - tractions | 7-8 x | 8-1 x |
| - abdomen | 23-24 x | 24-25 x |

**Conclusions**

In sports activity, in the subsystems oriented towards achievement sports performance, the various features of physical development serve as indicative elements in the selection process for a particular branch or sporting event. In this context, according to the criterion of the participation of physical development in the achievement of sports performance, there are sports, which require a special physical conformation, such as martial arts.

As a sphere and, at the same time, direction, in which one acts, through the training process in extracurricular martial arts training, physical development represents the result, as well as the action, directed towards influencing the correct and harmonious growth of the organism, materialized in proportional morphological and functional indices, as close as possible to the assigned values, in this sense, to the healthy organism.

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