PHYSICAL EFFORT IN AEROBIC AND FITNESS CLASSES – MORFO-FUNCTIONAL AND MENTAL CHANGES

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Abstract
Effort is a stress factor which modifies the homeostatic parameters to higher values than the standard ones. Effort can be described quantitatively, but also quality wise, depending on the effects caused into the subject’s organism. Effort, tiredness, recovery represent a cycle of physiological phenomena organically associated with physical activity. The repetitiveness of this cycle leads to growth of effort capacity which means a growth of the ability to do a more elevated muscular work for a longer time.

As a form of teaching through exercising, aerobics and fitness aim to optimize a subject’s biometric potential, its cognitive, emotional and social-relating components. If other types of exercises mostly focus on the “biological machine”, both aerobics and fitness create the premises for a development of subject’s personality aspects and their aesthetic sense.

It is through this kind of activities that we obtain progressive changes both upon the cognitive processes (thinking, attention, memory, imagination) and emotional ones. It stimulates the intellectual activity which is responsible for obtaining information on skills, activities, exercises and fitness in general. Emotionally, aerobics and fitness’ influences can be noticed in attitude, interests, motivation and values.

1. Introduction.

The exercise engages body dynamic system, in all its stages of development, each ontogenetic periods corresponding a certain "profile" of it, leading to processes of growth, development, optimization potential, regeneration, restoration, etc..

We present below a summary of the defining aspects of the effort, drawn from the works of renowned authors: Astrand, O. (1971), Demeter, A., Dragnea, A. and Teodorescu, S., Bota, C...

Various authors define effort from a physiological perspective, psychological or theory training, or as a "process of mobilizing forces to overcome an obstacle" or as "factor found in antithesis to sleep" Demeter, A. (1982), either as "biological predominant stimulus requires the body to respond by electrical manifestations, biochemical, mechanical, thermal," Bota, C. (2002) or as "a conscious process of overcoming applications to achieve a good level of training" Dragnea, A. (2002). From all these points of view, emerges the idea that effort is a stress factor that alter the homeostatic to values much higher than in basal conditions.

In this way, the body responds to this stress, a more or less strong, more or less generalized, depending on its characteristics. The effort can be characterized quantitatively, but also qualitatively dependent subjects effects in the body. The effort, the fatigue, the recovery, represents a cycle of physiological phenomena associated with organic movement. Repetition of this cycle leads to increased...
exercise capacity, for example the ability to perform mechanical work as increased as long as possible. The concept of exercise capacity is associated to increased level motor skills (physical condition).

Regardless of the activity is performed (physical education, sports training, leisure activities or physical therapy), exercise require adaptation mechanisms and preadaptation mechanisms at levels increasingly higher, requiring the careful guidance from leading experts these activities. The exercise is contingent on one side of the skeletal muscles, and performing mechanical work on the other hand, the underlying organs and systems that amplify performance sustain work for the subject.

In summary, we can say that exercise is a state of tension in the muscles conditioned by morph-functional capabilities and energy, as well as mobilization of mental processes (affective-volitional), Bota, A. (2007).

If the subject is faced with a task that requires physical exertion, the body responds with a series of functional changes of physiological system that engages predominantly sphere and the mental. Any movement requires activation of the musculoskeletal system and cardio-vascular and respiratory systems provides the basis for this activity in the long term.

2. The physical exercise benefits.

When the body is subjected of a physical exercise program several times a week, each physiological system undergoes specific adaptations that improve operating efficiency and its strength. The magnitude of these changes is depending on the intensity and duration of lesson stimuli, the workload and the initial level of physical preparation. In the absence of stimuli continue to adapt, install phenomena inadequacy -untrained, occurring very quickly. This reversibility of the process is expressed as muscle atrophy, decreased contractile proteins, particularly slow muscle fibers, closing joint angles, unable to continue a long-term effort, etc..

Even though aerobics maintenance, adaptive processes are not as spectacular as in professional sports, they follow the same pattern (specific model), obviously at a different scale. Adaptive phenomena occur at the optimal level, if the effort parameters are rigorously programmed.

As a form of physical education, aerobics and fitness aim to optimize bio-motor potential of the subject, its components cognitive, affective and social-networking. If other types of movement, aimed predominantly "biological machine", both aerobics and fitness paves the different dimensions of personality development issue, modeling alongside aesthetics.

Through this activity we intend to obtain progressive changes both cognitive (thinking, attention, memory, imagination) and affective processes, too. It stimulates intellectual activity which is responsible for acquiring critical thinking about skills, activities, exercise and fitness in general. In the affective influences of aerobic gymnastics maintenance are felt on the attitudes, interests, motivation and values.

Beyond these influences, exercise is stimulating the secretion of endorphins, whose effect is the resentment of a state of inner joy, even elation. So many subjects, although clinically healthy, do not know what you really feel better, physically and mentally, until you begin to adopt active lifestyles through the body optimizes its internal parameters. Author Glasser, W. (2000) states that exercise induces a form of positive dependence, followed by symptoms of depression in subjects suddenly stopped practicing. Euphoric, "abandoned" oneself, feeling good
is explained by increasing endorphins, opiate similar effect. These are nerve cells located in the hypothalamus and in endocrine cells of the anterior pituitary.

In parallel, the practice is associated to discharge emotional, catharsis effect (therapeutic effect by downloading a repressed emotions) and the possibility of relaxing. Away the idea that systematic practice affects the balance of personality, feeling the joy of living and the qualities that make the professional performance. “Satisfaction of exercising can become, in time, a motivation by itself” (Pop, 2012).

3. **Adaptive effects on the main body functions.**

Exercise produces a multitude of effects on the high adaptive functions responsible for the efficiency of body functioning, maintaining or improving health, up to achieve high performance in sports.

Characteristics of adaptive processes important for maintaining health and good physical condition to unsportsmanlike have the following configuration:

- **Osteoarticular system adjustments** The bone, although considered a rigid support structure is active and sensitive to the forces pressuring the form of compression, torsion or those created by muscle contraction of the muscle tendon inserts on the bone.

  The bone cells (osteoblasts) respond to mechanical stress, migrating to the surface of exposed bone in the request, at which point the process starts modeling, additional deposition of collagen fibers, their migration and mineralization of osteoblasts dormant, causing an increase in final sensitive bone diameters.

  These adaptive effects are lost fairly quickly after a period of low demand or bed rest. Lack of physical activity leads to rapid removal of calcium from the bones, often leading to the onset of osteoporosis, specific women exposed four times more than men.

  Activities that stimulate muscle hypertrophy and increased force appear to stimulate bone and associated connective tissues.

- **Muscle adaptation.** Aerobic regime limited influence maximum force or muscle strength, but has positive effects on local muscular endurance. The aim is that by introducing the work load at the fundamental lessons of aerobics and fitness, to achieve increased muscle tone and shape different muscle groups by removing excess fat hypertrophy.

  Aerobic gymnastics and fitness benefits are to produce positive effects on muscle endurance, ability to contract the muscle repeatedly by a large number of static contractions or maintain a certain period of time.

  Billat V. (2003) presents his research results in increasing muscular adaptations:

  - Increase the size of muscle fibers (hypertrophy), the length of the fibers and the vascular capillaries, connective tissue development, therefore tendon-tractions of muscle;

  - Growth potential due to increased oxidative enzyme levels aerobe specific metabolism and the number and size of mitochondria;

  - Increased muscle glycogen (energetic substrate readily operable), meeting the conditions has been improved from 13 to 15 g / kg muscle to 25-30 g / kg muscle after a specific period of work;

  - Increased mobilization of fatty acids and their oxidation, which results in the case of prolonged efforts to save glycogen, to prevent hypoglycemia and perhaps
muscle fatigue, effect of sugars to be metabolized, the amount of lactic acid is smaller, fatigue is installed later.

These structural and biochemical changes entail the specific functional changes, resulted the improvement of skeletal muscle physiological properties (excitability, contractility, tonicity and elasticity), found in increasing strength, speed, flexibility and strength.

- Cardio-vascular system adjustments. Specific aerobic gymnastics, aerobic efforts, immediate and delayed effects on the major functions of the body and increase energy consumption in aerobic effort depends on the possibilities of adaptation of the cardiovascular and respiratory system.

The transport of oxygen to the active muscles, as a result of carbon dioxide is subject to changes in cardiac output and oxygen concentration difference and carbon dioxide from the venous and arterial blood, also depending on the peripheral vascular mechanisms which redistribute blood flow between active and inactive territories with decreased vascular resistance.

Immediate adaptation of the heart to exercise is primarily in heart rate from resting values of 60-80 pulse / minute at 150-180 pulse / min depending on the intensity of effort and individual possibilities practitioner.

Nielsen & Vogt, quoted by Monod, H., & Flandrois, R. (2000) concludes that "there are two components in adaptive processes short on heart rate: one related to power and another determined effort needs thermoregulation".

Resting heart rate and decreases exercise-induced bradycardia by installing an economical way in which the heart works, with important consequences for cardiovascular disease prevention. At rest, the values can reach 60 pulse / min for men and 70 pulse / min for women.

Aerobic exercise lowers heart vulnerability to stress and responsiveness to the stimulating effects of adrenaline, causing significant changes in cardiac output which increases oxygen consumption and intensity of application, reaching values of 0.3 l / min, the values of 5 l / min. Clearing the blood flow in the liver, renal, splanchnic nerve or skin, is reduced by 10% - 20% through vasoconstriction, except cerebral blood flow, which remains unchanged.

Decrease in resting blood pressure by about 10 mmHg for systolic and 8 mmHg diastolic, is one of the most important late effects of aerobic gymnastics and fitness, explaining thus improving vascular wall elasticity that can easily relax under pressure blood flow. For those involved, the recovery phase after exercise blood pressure is much lower compared to sedentary individuals. We recommend aerobics and fitness, as the most effective means to prevent heart disease and stroke.

- Respiratory adaptations. On long term, adaptation is reflected in the phase components pulmonary parameters (ventilation, ventilation-perfusion ratio capillary and alveolar-capillary diffusion, and in terms of physiological processes in the lungs inhale and exhale, the main changes expressly stated by specific effort are as follows:

- Respiratory rate that decreases, because each act efficient breathing through inspiratory muscle development, size elasticity elements and fine tune thoracic-pulmonary ventilation. A low respiratory rate which reaches below 14 resp. / min, proving that medical untrained intensity of effort that the respiratory rate increases to 60 resp. / min, did not produce an increase in the trained than 30 resp. / min;
- The respiratory movement’s amplitude is existing pulmonary lung volumes during certain phases of the respiratory cycle. The amplitude of respiration increases inversely with respiratory and under basal ventilator processes does not change significantly, showing only during maximal effort, the values increase from 120 l/min to 150 l/min, due tidal volume and respiratory rate;

- Broadcasting (pulmonary gas exchange), in the alveolar-capillary barrier at rest does not record the changes, while in the case of maximum effort, increased pulmonary blood flow increasing a quantity of air passing through the lungs, as well as a higher blood involved in gas exchange;

- Arterial-venous oxygen difference indicates a parameter that increases during maximal exercise because blood oxygen concentration in venous return to the heart circuit is lower than the one trained to untrained practitioner, showing greater oxygen extraction tissue level and a better distribution of blood flow to the muscles especially active.

- Oxygen consumption, the quantity of oxygen that gives an arterial tissue for one minute. For adaptation to exercise, this parameter is reduced in trained subjects submaximal effort, meaning an improvement in metabolic efficiency and the biomechanical (practitioner, performs the same result by making movements less rigid or parasitic).

  On one hand, this decrease is due to learning and movement efficiency resulting in reduced energy cost. On the other hand, this decrease can be explained by loss of body weight, with implications for the actions in the body is raised or projects into the air. Decreased oxygen consumption may not always have different causes are due to cardio-respiratory or metabolic adaptations.

- Maximum oxygen consumption, after the author Pollok, M. (1973), is generally perceived as the most telling indicator of cardio-respiratory fitness of the subject. His studies have shown increased from 4% to 93% of VO2 max gain medium is 15 to 20% for a sedentary that employs specific exercises 3 times per week, 30 minutes a day for 6 months with an intensity of 75% of VO2max.


Energy consumed by practicing aerobic gymnastics and fitness resort to fat deposits in the body which causes both a rebalancing of metabolism and body fat reduction.

Practicing these types of physical activity has a beneficial effect on the whole body. Activating the entire muscular system or separately, the large muscle groups and regions has a direct influence on the vital functions of the body, especially the circulation, respiration, metabolism, nervous system, bones, joints and muscular system.

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