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Exercise Sciences, Psychomotor Sciences, and Neuroscience in the Military Air Force

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Abstract

To challenge the great opportunities, to explore the fatigue, the limits, the stress of a human being. Develop new fitness, training, cognitive programs for particular environments or specialist roles such as air forces or astronauts. find out how to improve decision-making, deep skills and bring out the hidden potential within a military, special forces man or war veteran. The aim of this study was to extrapolate, through scientific evidence and previous work on the effects of microgravity, on the role of neuroscience, physical exercise and psychomotor skills. Through verbal and non-verbal language, tonic-emotional communication, one is able to help the person in his uniqueness, exploiting the communicative, emotional and motor potential of the latter which, remained latent, led him to isolation; therefore trying to develop a harmonious relationship with himself and with the world. I hope that this work can provide food for thought with respect to the essential need of each individual to be satisfied. They must take into account and take a "look" into the needs, desires and potential of the individual.

Within this thesis, the theory and practice of this science has been briefly described, its application, in the specific case, in the isolation of the special forces, in the cognitive and postural adaptation capacity of the military air force. described the techniques, such as Psychocontact and the motor-muscular relaxation methods that I have mostly used in this path, still in progress. I conclude my thesis with personal considerations on this experience that involved me personally, no longer looking only with the eyes of a rehabilitation therapist, but with those of a professional, of a health scientist whose training is based on a egodynamic conception, centered on the subject in its entirety and in its complexity.) Through this new science, I was able to appreciate my inner change, which opened up new perspectives to help the person; no longer patient, but as a person understood in his uniqueness and identity. Furthermore, I was able to find a notable change in the subject in its becoming and in the reality that surrounds it. There is, of course, still a lot of work to be done and this little dissertation only wants to enrich or eventually fill where classical medicine fails to reach; always to meet and help the person. I hope that this science and methodology can continue to expand more and more in the world and that it can continue to have a social and dignified role in society.

Keywords: Neuroscience; Deep skills; Recognition memory; Spatial memory; Physical activity

Introduction

The reduction in life span seems to always have to be traced back to a greater production of free radicals (defined as ROS = Reactive Oxygen Substances).

In reality, a certain amount of ROS is physiologically formed in the cells of the organism, hence the excessive production of these or their poor elimination, has been considered one of the most significant causes of aging due to the fact that these free radicals interact with nucleic acids, with proteins and lipids, altering them structurally and functionally. the only cells that can have a maximum life span equal to that of the organism to which they belong are perennial or post mitotic cells (neurons and muscle cells), i.e. those without replicative activity.

Certainly not all perennial cells live as long as the organism, as is well demonstrated by the fact that the weight of the human brain, which is 1500 g at the age of 30, reduces on average to 1390 g at the age of 90 due to programmed death affecting numerous neurons.

It is currently established that labile and stable cells after having undergone a certain number of mitoses in the culture medium, undergo aging phenomena, which are a prelude to death by apoptosis.

"In vivo" the most important cellular alterations that occur in senescence consist in hypotrophy, which is mainly reflected in the reduction of muscle mass, and in the accumulation inside the cells and also in the intercellular spaces of harmful materials: lipofucsins, substance amyeloid and metals. n contemporary society where the "Hypokinetic Syndrome" with bad eating habits, have led to a significant increase in the incidence of Cardio-Vascular diseases such as heart attacks, strokes, etc. both the medical profession and the Ministry of Health try to sensitize the population to a prevention for these pathologies by advising to improve nutrition and stimulate people to regular physical activity.

"Sport and Nutrition" are the basis of well-being. We often read this statement, never dwell on its meaning. Sports or physical activity are not synonymous [1].

Physical activity, which is often recommended by doctors, refers to regular "aerobic" motor activity which can vary for each person based on their characteristics and/or pathologies. In practice, this activity can vary from walking with a brisk pace to slow running or cycling both with city bikes for short routes repeated periodically during the week or swimming 2/3 times a week also following regular gymnastics courses

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or training programs in the gym are to be considered as a good physical activity.

Physical activity aims to improve cardio-circulatory and respiratory functions, tone muscles and improve joint movement skills.

Doing sport means dedicating yourself to a sporting discipline by constantly training to improve both physical performance and technique in athletic gestures and play patterns.Our body constantly needs energy to live. We consume energy to work, study, breathe, sleep, etc… because each organ or apparatus is made up of billions of cells in which many biochemical processes take place, catalyzed by enzymes, which allow us to live. All this has a significant energy expenditure.

Any mechanical means of travel needs energy that can be supplied, from gasoline, diesel, electricity, etc. our body also needs fuel supplied by food which, once digested, thanks to the biochemical processes mentioned above, are transformed into "ATP" (adenosine-tri-phosphate) and available as an energy source.

As for a racing car, in order to run the engine at its best and to achieve high performance, a lot of fuel and excellent quality are required, in the athlete "the basis of good athletic performance is always excellent nutrition".

To improve every physical performance it is first of all necessary to intelligently follow the training programs and the technical schemes that are given by the coaches, try to correct your mistakes and improve the execution of athletic gestures and keep the "Engine" your body at its best. of the conditions supplying "petrol"

"Each engine is designed to work up to certain levels, if they are exceeded the engine breaks"

Each athlete has athletic characteristics Genetically determined to overcome them means having often irreparable damage,

"Doping substances exceed these limits, improving performance for a short period of time, with serious damage to the health of the person

Particular environments; from flight to space

The human organism has a great ability to adapt, even in the case of significant changes in environmental conditions; such as prolonged microgravity [2-5].

The force of gravity on earth produces an acceleration of 1 g (g is the symbol that indicates the acceleration due to gravity). The term microgravity indicates a reduced force of gravity and is, therefore, used to describe conditions in which the force of gravity is less than that on the earth's surface (less than one g). For example, the moon's gravity is only 17% of that of the earth, or 0.17g. The term microgravity is often used to describe conditions in space, because the body may not always be in weightless conditions, i.e. at 0 g.

It is interesting to note that most of the physiological changes due to exposure to microgravity are very similar to those seen in athletes after a period of inactivity or immobilization, or to changes associated with aging that probably result from a reduction in physical activity. This similarity is corroborated by the data that indicate the physical exercise performed during exposure to microgravity as an effective means of counteracting the physiological deterioration that occurs in space. For this reason, but also because exploration in space continues, the influence of microgravity on physical activity is a growing area of interest for specialists in the physiology of sport and exercise. Gymnastics is an essential factor and each astronaut and air force pilot is required to do specific exercises up to four hours a day, depending on the types of mission. The long stay in space causes a loss of muscle mass and especially of bone mass, especially in the female body. The legs atrophy and the upper body swells, while the bones lose calcium and lose weight at the rate of about 1 percent per month without the reason or the way to block this has yet been discovered. Today the technologies of survival in space have improved so that even the female organism can today resist for long periods in orbiting capsules. The first female astronauts had serious problems so much that sex was thought of as an insurmountable impediment. Physical preparation, in-flight countermeasures and post-flight rehabilitation are gradually becoming basic aspects of space medicine. In fact, due to the progressive increase in duration and complexity of missions, space medicine found itself in the need to incorporate elements from different medical disciplines, moving away from the confined spaces of aeronautical medicine.

Low body negative pressure (LBNP)

This countermeasure turns out to be really effective in balancing the effects of weightlessness on the cardiovascular system.

Low Body Negative Pressure can be used to reduce orthostatic intolerance by stimulating a physiological response to a new redistribution of body fluids and also to test and find the limit beyond which vascular conditioning occurs. Periodic use of LBNP helps blood flow from the upper body to the legs. This recreates a situation similar to that which normally occurs on earth when one is in the standing position. The heart is then forced to deal with a lower venous return and consequently there is a greater cardiac response and a regulation of vascular resistance to cope with this new condition.

Taking saline solutions and hydration

Studies carried out in the late 1970s show that drinking a liter of balanced saline solution can lead to an increase in plasma volume of up to 400 ml for a period of at least 4 hours.

The extracellular fluid is mainly made up of 0.9% NaCl (sodium chloride) dissolved in water or a normal saline solution. If an individual is given a normal saline solution intramuscularly or by ingestion (as in the case of astronauts) the volume is distributed mainly through the extracellular compartments. Since the volume of the plasma constitutes a small part of the extracellular fluid, it retains a small part of the saline solution. The rest goes to fill the interstitial spaces of the tissues. Possibly

a part of the fluid can enter the cells and a part can escape. Studies conducted in the mid-1980s found that this time-increasing plasma volume technique could be used by Shuttle astronauts to reduce orthostatic intolerance before landing [6-9].

Conclusions

Physical activity is rarely carried out in ideal environmental conditions. The exploration of space revealed that the microgravitational environment represents a unique challenge for the organism.

But why is it necessary to study microgravity?

1. To study the mechanisms of skin and body hydration;

2. To study the phenomena of aging;

3. To study new therapeutic and preventive strategies

These countermeasures essentially consist in guaranteeing the astronauts/pilots, by means of suitable tools, with and without weights,

intense physical activity for a few hours a day. Preliminary studies would seem to indicate this is the right way, just as continuous and adequate physical exercise for the individual subject is the right way to combat osteoporosis, loss of strength and orthostatic hypertension, all typical realities of the sedentary elderly and of the disabled.

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Conflict of Interest

None

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