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THE ASSESSMENT OF WORK CAPACITY IN UNTRAINED ADULTS

M.A. CRISTUȚĂ[1] G.S. LUPU[1]

Abstract: *Currently, the concept of health involves not only a psychological and physical well being of the individual and community, but also a certain ability for physical effort, and regaining your strength after effort, of resistance against the unfavorable environmental factors, against diseases, and a certain longevity, in concordance with the socio-economic and geographical conditions in which a person performs his/her activity. Thus, a person cannot be considered healthy if they do not have a good work capacity and/or a certain nonspecific general resistance to the unfavorable environmental factors and to diseases. This study aimed to assess the work capacity in a group of untrained subjects.*

Keywords: *work capacity, assessment, adult*

1. Introduction

Currently, the concept of health involves not only a psychological and physical wellbeing of the individual and community, but also a certain ability for physical effort, and regaining your strength after effort, of resistance against the unfavorable environmental factors, against diseases, and a certain longevity, in concordance with the socio-economic and geographical conditions in which a person performs his/her activity. Thus, a person cannot be considered healthy if they do not have a good work capacity and/or a certain nonspecific general resistance to the unfavorable environmental factors and to diseases [5].

The use of physical exercises as accessible and effective means of maintaining one's health, of increasing one's ability to work, increasing the body's natural resistance to diseases and its ability to treat the human being in various unfavorable biological circumstances (sickness, convalescence, etc.), is noted in all the histories of the development of human society.

Over the course of the last two decades, researchers have reached the conclusion that the most effective method to build and maintain one's health is exercise.

Generally, the multitude of one's daily life occupations stops one to pay our body the needed attention in regard to

[1]"Vasile Alecsandri" University of Bacău, 157 Calea Mărăşeşti, 600115, Bacău, Romania

maintaining one's health, on which one's good mood and ability to work depend.

According to Băiașu, N., Bârlea, A., Magda, S., cited in Mârza, D. [7], "combining exercising with elementary hygiene, preventive and/or curative drug treatment, the use of physical agents (water, air, sun), contribute to the highest degree to a good health, increasing the work capacity, prolonging one's youth and life, increasing the biological potential."

2. Objectives

This study aimed to assess the work capacity in a group of untrained subjects.
In order to verify the hypotheses, stating that by applying specific assessment tests, one can identify the work capacity and by familiarizing oneself and implementing prophylactic measures, one can improve/maintain one's work capacity and health, a series of objectives and tasks, such as: consulting the recommended literature to see the current state of studies in the field; selecting representative case that would help meet the set objectives; organizing the research and intervention activity to optimize the prophylactic process; selecting a minimum of physical therapy means and methods that could be performed by the subjects in their homes, to ensure a continuity of the treatment; constantly recording the results and interpreting them to emphasize the subjects' progress; drawing conclusions in regard to the results recorded at the end of the proposed prophylactic measures.

3. Materials and Methods

The research was conducted at the TNT Club Sport Bacău, between October 2018 and March 2019. The location provided a gym, mattresses, treadmills, weights. The research comprised a number of 14 subjects, aged between 40 and 50. The aim of this research was to identify the work capacity of each subject and to highlight the role played by primary prophylaxis in maintaining and improving the subjects' health.

The *research methods* used were: the literature study method, , the observation method, the measurement and assessment method, the experimental method, the statistical-mathematical method and the graphical representation method [1], the inquiry method, by calculating the Physical Activity Index (PAI), which is a simple method of determining the characteristics of the training, as well as estimating one's fitness, using the questionnaire method; the PAI is calculated by multiplying the recorded points, the scale being the following:

Table 1

Physical Activity Index

Points	Characterization	Type of fitness
80 - 100	person with a very active lifestyle	superior
60 - 80	active and healthy person	very good
40 - 60	acceptable (improvement is needed)	reasonable
20 – 40	insufficiently active / relatively sedentary	poor
under 20	Sedentary	very poor

The measurement makes possible the characterization of values in quantifiable terms, allowing the assessment, summarization, and analysis of the recorded data sets, to interpret and compare them.

The Ruffier test was also used, referring to the body's capacity to adapt to a nonspecific effort, consisting in measuring the pulse during a standard effort of 30 genuflections performed in 45 seconds. The pulse is measured during rest, over 15 seconds (P1), in the first 15 seconds right after performing the work (P2), and in the first 15 seconds of the second minute after performing the work (P3). All values are multiplied by 4 to get the heart beat/minute, then the formula (P1 + P2 + P3) – 200/10 is applied. The recorded results relate to the following standards: under 0 (zero) = exceptional work capacity; 0-5 = very good work capacity; 5-10 = good work capacity; 10-15 = poor work capacity; over 15 = the person cannot perform any work [4], [7];

The RICHTER test battery - to assess the work capacity in untrained adults, composed of 5 tests whose normalcy is assessed according to age and gender [2];

The COOPER test - consisting of a 12-minute run. The distance covered is assessed; increasing this distance represents an increase in the work capacity of the subjects, an improvement of their cardiac muscle, lungs, and metabolism [2], [4].

4. Contents of the Intervention

The sessions were conducted 3-4 times per week, each lasting 45 minutes.

The objectives of the primary prophylaxis programs envisaged maintaining an optimal body composition; preventing diseases and/or injuries; maintaining a correct body posture; maintaining/improving the work capacity at an optimal level; maintaining a good muscle coordination and ability; maintaining the joint mobility; maintaining the muscle strength and endurance, general and segmental; keeping and/or improving the morphological-functional integrity of the body.

The physical activity plan comprised analytical gymnastics exercises (free, with opposition, using devices or objects), aiming to maintain the optimal functionality of the muscle groups with a static and dynamic action that ensure a correct posture of the body; specific exercises for the improvement of the effort capacity; exercises to maintain the coordination at an optimal level; elements from sports; respiratory gymnastics exercises [3], [6], [8].

The *methodical indications* regarding the application of the primary prophylaxis programs took into account the need to use exercise to maintain and optimize one's health. The psychosomatic integrity and good functioning need a rational and continuous physical demand that needs to go beyond the average individual possibilities; prophylaxis at an adult age does not have contraindications for any of the subjects, regardless of their age and gender. The exercise programs must be strictly compatible with the individual particularities linked to the subjects' health, age, gender, aim and goals; the prophylactic physical therapy programs can be created and applied only by knowing the subjects' morpho-functional particularities, based on which the goals are set [6], [9].

5. Results and Discussions

The research comprised a number of 14 subjects, aged between 40 and 50. Each subject was tested individually, initially in November 2018 and finally in April 2019. The purpose of the research was to assess the work capacity in untrained adults and to implement specific prophylactic measures.

The Ruffier test, referring to the body's ability to adapt to a nonspecific effort, recorded positive results in relation to the standards: during the initial testing, the subjects recorded values between 5 and 10, which represents a good work capacity, with a minimum value of 5 and a maximum of 6.4. During the final testing, the subjects recorded values between 0 and 5, which represents a very good work capacity, with a minimum value of 2 and a maximum of 4.5.

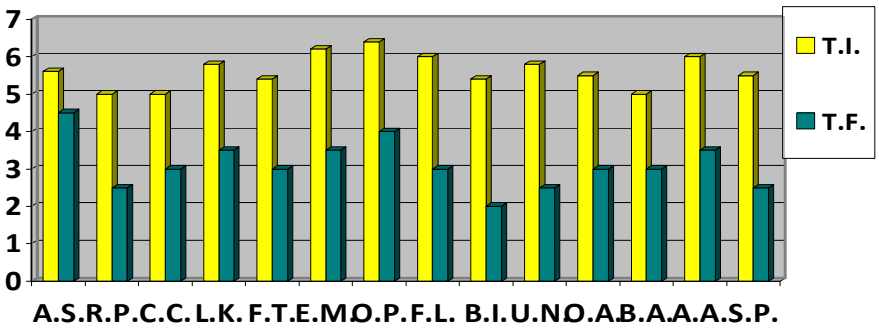

Fig. 1. *Graphical representation of the initial and final values for the Ruffier Test*

During the Ruffier test, the subjects recorded remarkable progress. The initial test values were 6, 6.4 while the final values reached 2, which shows that the subjects came to have at a very good fitness.

In regard to the **RICHTER test battery**, formed of 5 tests, initially, for Test 1 (number of lifts/20 sec.), the subjects recorded values between a minimum of 6 and a maximum of 9, in relation to the standard of 10-14, while finally, they recorded values between a minimum of 10 and maximum of 14. For Test 2 (no. of push-ups/30 sec.), the subjects recorded values between 5 and 8, in relation to the standard values of 14-18, during the initial assessment, and values between 12 and 16, during the final assessment, being within the norms. For Test 3 (mobility in cm), the standard values being 3-9 cm, the initial values were 2-4 cm, and the final ones, 4-7 cm. For Test 4 (number of bends, lifts, core rotations/20 sec.), the subjects recorded initially values between a minimum of 7 and a maximum of 9, in relation to the standards of 11-13, and finally, they recorded values between 11 and 13. For Test 5 (jumping), the standard values being 24-28, the initial values were 15-18, and the final ones, 24-28.

Regarding **the Cooper Test**, the subjects recorded initial values between a minimum of 2300 m and a maximum of 2496 m, values that are within a satisfactory work capacity, and final values between 2600 m and 2800 m, which represent a good work capacity. The

increase in the distances expresses an increase in the work capacity, an improvement in the training of the cardiac muscle, lungs and metabolism.

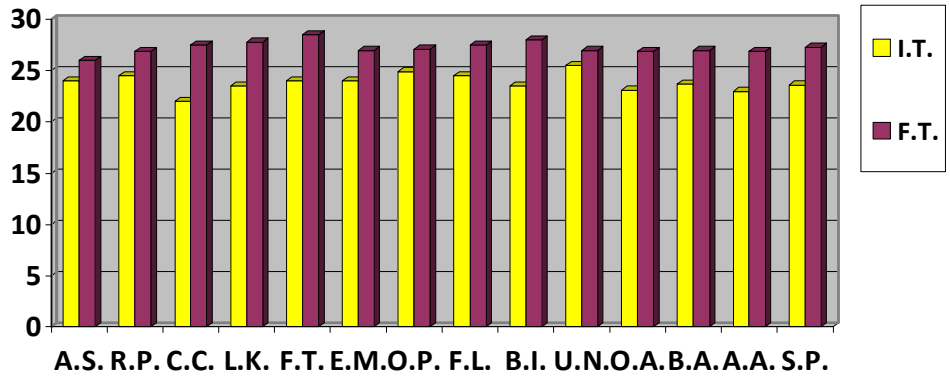

Fig. 2. *Graphical representation of the initial and final values for the Cooper Test*

Figure 2 highlights the fact that the subjects' work training over the course of the study has led to a better functioning of their bodies, an increase in their endurance. At the same time, the constant exercise, associated with breathing exercises, have led to a better functioning of the respiratory system, which is essential for the oxygenation of the blood; this is vital for a good function of the organs.

In regard to the *calculation of the Physical Activity Index (PAI)*, the assessment of the three markers (intensity, duration and frequency), during the initial evaluation the subjects recorded values between 6 and 18 points, which showed very poor fitness, a sedentary person, in relation to the benchmark points; during the final evaluation, the subjects recorded values between 64 and 80 points, representing very good fitness, an active and healthy person in relation to the benchmark score.

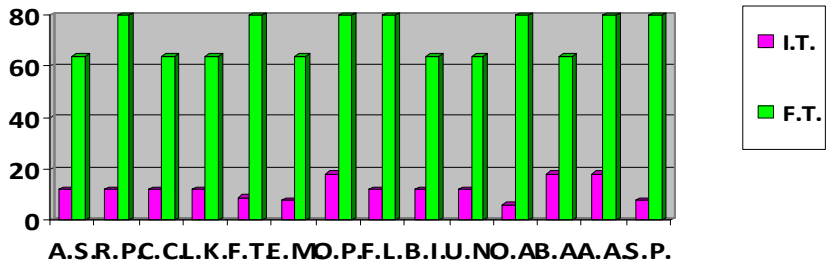

Fig. 3. *Graphical representation of the initial and final values for the Physical Activity Index*

During the testing of the Physical Activity Index (PAI), the subjects had very poor fitness, with values below 20 (initially), gradually progressing toward reasonable to very good fitness (finally), recording values above 60 points.

6. Conclusions

The recorded results have validated the initial hypotheses: by applying specific assessment tests, one can identify the work capacity, and by familiarizing oneself and implementing prophylactic measures, one can improve/maintain one's work capacity and health.

At the end of the research, the recorded values and the progress of the subjects' fitness have shown that one way to improve and maintain the work capacity is to exercise in correct doses, constantly.

It can be said that all the means, methods and techniques described over the course of the study and applied to the subjects are important because they have contributed to an increase in the subjects' joint mobility, muscle strength, improving their fitness and health.

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