

THE MANAGEMENT OF MOTOR APTITUDES EVALUATION ACCORDING TO THE KNOWLEDGE OF THE MANIFESTATION LEVEL OF THE PHYSICAL CONDITION

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Abstract

Purpose: The optimum physical condition establishes an efficient report between the skills specific to every student and the physical effort made in solving the motor responsibilities during the physical education and sport class and not only. Choosing and applying the most efficient methods and means specific to the sport branch – athleticism, in order to increase the efficiency of the students' physical condition (19 – 20 years) during the physical education and sport class, is conditioned by the manifestation level of the motor capacities, of the functional and psychic capacities of each individual but also by the bio-professional diagram requirements of the future job. The increase of the physical condition efficiency is realized through: the motor support development (strength, resistance, power, articular mobility and muscular elasticity, coordinative capacities); the increase of the functional support efficiency (the respiratory system, the cardio – vascular system, the metabolic processes, the nervous system, the immune system); the increase of the general physical structure efficiency (the decrease of the adipose tissue and the adaptation of the body form at the individual requests) and the formation of the well-being feeling.

Methods: Used research methods and techniques – the observation method, the experimental method – the provoked checking experiment, in order to observe and measure the produced effects; natural, realized in natural conditions represented by the physical education class; at the same time based on the comparison of the results of the experiment pattern with the ones of the reference pattern in a transversal, synchronic, at the same time sections and the processing, analysis and obtained data interpretation methods by applying the tests (the statistic-mathematic method, the graphic method).

Results: Using the means specific to athleticism, in a high percentage, during the physical education and sport class has a benefic effect over the individual physical condition components development (exception being the mobility from standing and maintaining in hanging). The rhythm of the increase and development process has been slowed down, fact pointed out also by the insignificant differences resulted from the calculation of the arithmetic mean after the initial and final tests of the anthropo-motor parameters.

Conclusions: Unifying the tasks for the physical condition evaluation in a battery of tests "Eurofit", on different age segments of the university population in order to organize a data base which would offer a comparison point concerning the manifestation level of the physical condition, depending on the age of the individuals. The development and maintenance of the physical condition components assures the motor functionality permanent once with the ageing of man.

Key words: management, evaluation, motor aptitude, physical condition.

Introduction and research objectives

Knowing the manifestation level of the motor aptitudes is benefic not only for the physical education but also for strengthening the health and for educating the population in order to maintain health by obtaining an optimum physical condition. Knowing the manifestation level of the human physical condition, on different age segments of the population, is underlined by the intervention of The European Union Ministry Committee towards the state members through the recommendation no. R(87)9. Having at its base these recommendations I made the following research objectives:

- The physical condition manifestation at a high level is benefic not only for the reference domain physical education and sport but also for educating the population in order to build and maintain an optimum health state.

- Learning and the motor components habituation (the motor capacities/aptitudes) must constitute a mean of self knowledge and of motivation of each individual from assuring a good physical condition, but also towards the physical education in general.

- The evaluation of the motor aptitudes of the individuals will constitute the data base necessary for the elaboration of the national politics concerning the health, nutrition, physical education and sport, education for health programs.

- The measurements precision and reliability of the motor capacities/aptitudes are useful both for the individual, the teaching staff and for the decision factors that must contain in every political program measures for improving the individual or general level of the physical condition.

The researches and analyses of the dolman specialists have confirmed the fact that individuals who participate at the motor activity institutionalized

present an individual physical condition, with until 20 – 30 %, superior towards the ones that do not participate, from various motives, at these activities.

The increase of the general metabolism efficiency is realized on the account of the motor activity; the brain, the liver and the endocrine glands intensify the chemical activity due to the made physical effort, the intellectual activity producing a slight increase of the metabolism.

Research hypotheses

The research has been made according to the following hypotheses:

- Knowing and the development of the components specific to the physical condition offer a continuous physical functionality as man is ageing.
- The improvement of strength, endurance and muscular flexibility lead to the increase of the abilities level and equilibrium required for the quotidian tasks, removing the accidents appearance.
- Practicing the physical exercises in a rhythmic way is conditioned also by the facilities, in this purpose, offered by the community and the environments responsible for the physical activity.

Research procedures and methods

In order to see the unification of the tasks for the physical condition evaluation, the Committee for the Sport Development of the European Council has realized a battery of tests “Eurofit” (R.Thomas, , J.P Eclache, and J. Keller, 1995) made of (table 1) 9 motor tests (*The cardio-respiratory endurance* – through the run to and fro race 20 x 50 m and the test on the ergometric bicycle, *Strength* – the static force through dynamometry, the explosive strength by jumping in length from standing; *Muscular endurance* – the functional strength by maintaining in hanging, the trunk strength by lifting from laying down; *Speed* – the coordination speed through the run to and fro race 10 x 5 m, the superior limbs speed by touching the plates; *Gracefulness* by the mobility from standing; *Equilibrium* through the Flamingo test), 7 anthropo - motor measurements (body height, body weight and 5 flexions of the adipose tissue).

Table 1. Appreciation file “Eurofit” [Thomas, R., Eclache, J.P. and Keller, J, 1995, pg. 58, fig. 5.10]

Dimension	Factor	Eurofit Test	The order of applying the test
Cardio-respiratory endurance	Cardio-respiratory endurance	The run to and fro race of resistance Test on the ergometric bicycle	9
Strength	Static strength	Dynamometry	5
	Explosive strength	Jump in length from standing	4
Muscular endurance	Functional strength	Maintaining in hanging	7
	Trunk strength	Trunk lifting from laying down position	6
Speed	Speed-coordination	The run to and fro race 10x5m	8
	Superior limbs speed	Touching the plates	2
Gracefulness	Gracefulness	Mobility from standing	3
Equilibrium	General equilibrium	Equilibrium test Flamingo	1
Anthropo-motor measurements		Body height	
		Body weight	
		Cutaneous flexions (biceps, triceps, sub scapular, supra-iliac, pulp)	
Identification data		Age, Sex	

The research has being realized across the physical education classes of the professional study groups, specialty “Petroleum and Petrochemical Equipment” from the 1st year of studies, formed of 50 students, of male sex, university year 2008-2009, *The Mechanical and Electric Engineering* Faculty of the Petroleum – Gas University of Ploiesti. The structure of the university year has been of 28 modules of physical education classes with a number of 56 conventional classes; there had been no truancy recorded.

The working program had at its base the methods and means provided in the analytical program of physical education (a special accent being on the means specific to athleticism) for the 1st year of studies. The students have been subjects to an initial test in October 2008 (that had contained a number of 9 motor tests: the equilibrium test Flamingo – expressed in seconds; Touching the plates – expressed in seconds;

Mobility from standing position – expressed in cm; Jump in length from standing – expressed in cm; Dynamometry right and left – expressed in kg/strength. Lifting from laying down – expressed in number of repetitions, Maintaining in hanging position at the fixed bar – expressed in seconds; The run to and fro race 10x5 m – expressed in seconds; The run to and fro race of resistance – expressed in minutes and seconds and 2 anthropo-motor measurements: Body height – expressed in cm and Body weight – expressed in kg) and a final test in May 2009, recording the following statistic indicators by the statistic-mathematical processing (table 2). The used means, specific to the sport branch athleticism, for the improvement of the individual physical condition, are grouped in:

- *Physical exercises for the improvement of the anaerobe effort's capacity* are characterized by maximum efforts of short duration and that assure the energy from the consumption of the glycolitic reserves

of the organism in lack of O_2 (the debt of O_2 is “paid” after finishing the effort, by the engagement of the metabolic processes of anaerobe type), this supposes the making of the exercises with maximum efforts, of short duration by using the speed running, jumps and exercises with difficulties. The physical exercises that engage the anaerobe metabolism present a series of characteristics of it: the accentuation of the activity of the ATP – PC system in the skeletal muscles, the increase of the glycogen quantity and of lactic acid in the muscles, the glycolitic enzymes are more actives and hypertrophy of the white muscle fibers. The used method for the development of the anaerobe effort’s capacity is the repetition method (Dragnea Adrian and Mate-Teodorescu Silvia, 2002), that suppose: learning and knowing the used physical exercises in order to make with a high or maximal intensity, the execution time of the speed exercises will be smaller so that these will develop with the same intensity all over its development, and the break from the repetitions must be proportioned in order to assure a rebound of the high functions of the organism.

- *Physical exercises for the improvement of the anaerobe effort’s capacity* determine a series of changes, due to the chemical reactions specific to the anaerobe metabolism: the content of mioglobine from

Research results and their interpretation

The recorded data processing and interpretation has been realized by calculating (Niculescu, M., 2002):

- the normal distribution parameters, respective of the central tendencies – arithmetic mean (\bar{X}) and dispersion – the standard deviation (S);
- the variability coefficient (Cv%);
- establishing the correlation between different administrative variables of the same pattern after the two tests (the correlation coefficient of Spearman, $R =$

$1 - \frac{6\sum(X - Y)^2}{n(n^2 - 1)}$; where $R =$ the correlation coefficient by the degrees method; $X - Y =$ the difference between degrees; $n =$ the number of subjects).

1. The Flamingo Test

- the arithmetic mean (table 2, figure 1) – records a significant increase of 4,20 minutes, after applying the working program and the second test;

- The calculus of the variability coefficient presents us an “homogeneous” pattern.

2. The Touching the plates test

- the arithmetic mean (table 2, figure 1), after the second test, is improved with 3,43 seconds;

- The calculus of the variability coefficient presents us a “homogeneous” pattern.

3. The Mobility from standing test

- the calculated arithmetic mean (table 2, figure 1) shows us a regress of 0,26 cm, in comparison with the made measurement in October;

- the calculus of the variability coefficient presents us a “homogeneous” pattern, after the first test

the skeletal muscles is higher, the increase of muscle possibilities to spend carbohydrates and fats, the increase of the number and mass of mitochondria from the skeletal muscles fibers, the enzymes activity is high and the red muscles fiber hypertrophy. The anaerobe effort’s capacity indicated the human organism’s capacity to make a reduced sub maximal effort, maintained a long period of time, on the basis of oxidative processes (high share of O_2) resulted from the glucide and lipids reserves consumption. The most used exercises for the improvement and maintenance of the anaerobe effort’s capacity are grouped as followed: running on large distances that have at the base the organism’s resistance at efforts of long duration and making of each physical exercise time of a minute and of which execution duration is increased, acquires an anaerobe character. The used methods for the development of the anaerobe effort’s capacity are grouped as followed: the effort “until denial” method, the medium efforts method, the method in circuit, but the most used method is the one of the athletic exercises with difficulty that consists of the execution of the exercises specific to the sport branch – athleticism, in difficulty conditions (Alexandrescu, Dumitru, Tatu, Titus and Ardelean, Tiberiu, 1983).

and a “relatively homogenous” pattern after the second test;

- Reported at the appreciation scale established by the battery of test Eurofit, the calculated arithmetic mean for this pattern is situated at the level of “medium” grade, between 0 - 6 cm.

4. Jump in length from standing test

- the arithmetic mean (table 2, figure 2) confirms an improvement at the manifestation level of the strength in speed regime of the inferior limbs musculature, it has been recorded a progress of 5,83 cm after the final test in comparison with the initial test;

- calculating the variability coefficient points out the fact that the obtained results by the individuals of the researched pattern are “homogenous”;

- Reported at the appreciation scale established by the battery of test Eurofit, the calculated arithmetic mean is situated at the level of “weak” grade after the initial test and at the “under medium” grade level after the final test.

5. The Dynamometry test

- the calculated arithmetic mean (table 2, figure 1) after the final test, both for the right hand and for the left one, presents us a progress: for the right hand of 5,97 points and for the left one of 3,89 points.

- the calculus of the variability coefficient shows that the obtained results at the two tests for the right hand are “homogeneous” and for the left one are “relatively homogeneous”;

- Reported at the appreciation scale established by the battery of test Eurofit, the calculated arithmetic mean is situated, for the right hand: at the level of “medium” grade after the initial test and at the “over medium” grade after the final test, and for the left hand” at the level of “under medium” grade after the

initial test and at the “medium” grade after the final test.

6. Trunk ascension from standing test

- the calculated arithmetic mean (table 2, figure 1) is the proof that the recorded progress by the students after making the program used during the university year 2008-2009 which is of 3,33 number of repetitions;

- The calculated variability coefficient presents us the fact that the recorded results at this test are “homogeneous”.

7. The maintaining from hanging test

- the calculated arithmetic mean (table 2, figure 1) shows us a slight regress of the final test results in comparison with the initial one, its value being of 0,58 seconds;

- The calculated variability coefficient shows us that the results at the two tests are “homogeneous”.

8. The run to and fro race 10x5 m

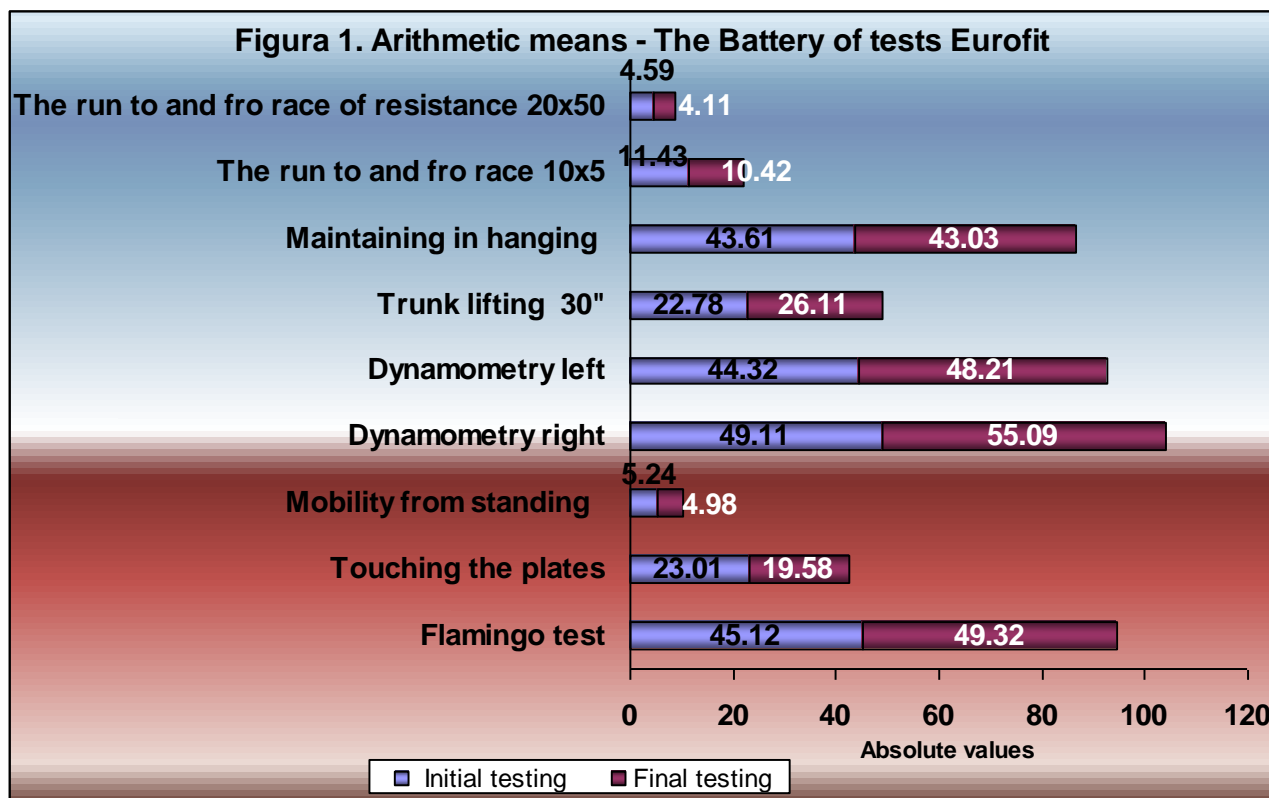
- speed – coordination records an obvious progress of 1,01 seconds, fact pointed out also by the calculus of the arithmetic mean for this test (table 2, figure 1);

- the obtained results at the two tests are “homogenous”, confirmed by the calculus of the variability coefficient;

9. The run to and fro race 20x50 m

- the calculated arithmetic mean (table 2, figure 1) presents us an improvement of the cardio-vascular endurance of 0,48 seconds in comparison with the initial test;

- The recorded results at the two tests are “homogenous” by calculating the variability coefficient.



For the two anthrop-motor parameters (table 2, figure 2), *body height and body weight*, the calculus of the arithmetic means points out that the rhythm of increasing in height process has been slow down (the difference between the two measurements being of 0,18 cm - insignificant), also the decrease in weight,

has insignificant values (64 grams); the obtained values by calculating the variability coefficient for the body height are “homogeneous” and “relatively homogeneous” for the body weight parameter, for both tests.

Table 2. Calculated statistic indicator

Statistic indicators		Eurofit Tests											
		1	2	3	4	5		6	7	8	9	10	11
						right	left						
Initial test	X	45,12	23,01	5,24	209,46	49,11	44,32	22,78	43,61	11,43	4,59	176,11	66,45
	S	2,71	1,69	0,45	2,87	3,11	4,56	1,77	2,94	0,38	0,44	6,03	8,81

	Cv%	6	7,34	8,58	1,37	6,33	10,28	7,76	6,74	3,32	9,58	3,42	13,25
Final test	X	49,32	19,58	4,98	215,29	55,08	48,21	26,11	43,03	10,42	4,11	176,29	65,81
	S	2,85	1,57	0,52	9,31	2,98	5,71	1,82	2,86	0,37	0,39	6,01	9,06
	Cv%	5,77	8,01	10,44	4,32	5,41	11,84	6,97	6,64	3,55	9,48	3,40	13,76

Note: 1 – The Flamingo test; 2 – Touching the plates; 3 – Mobility from standing; 4 – Jump in length from standing; 5 – Dynamometry – right and left; 6 – Trunk lift from standing position; 7 – Maintaining in hanging; 8 – Run to and fro race 10x5 m; 9 – Run to and fro race of resistance 20x50 m; 10 – Body height; 11 – Body weight.

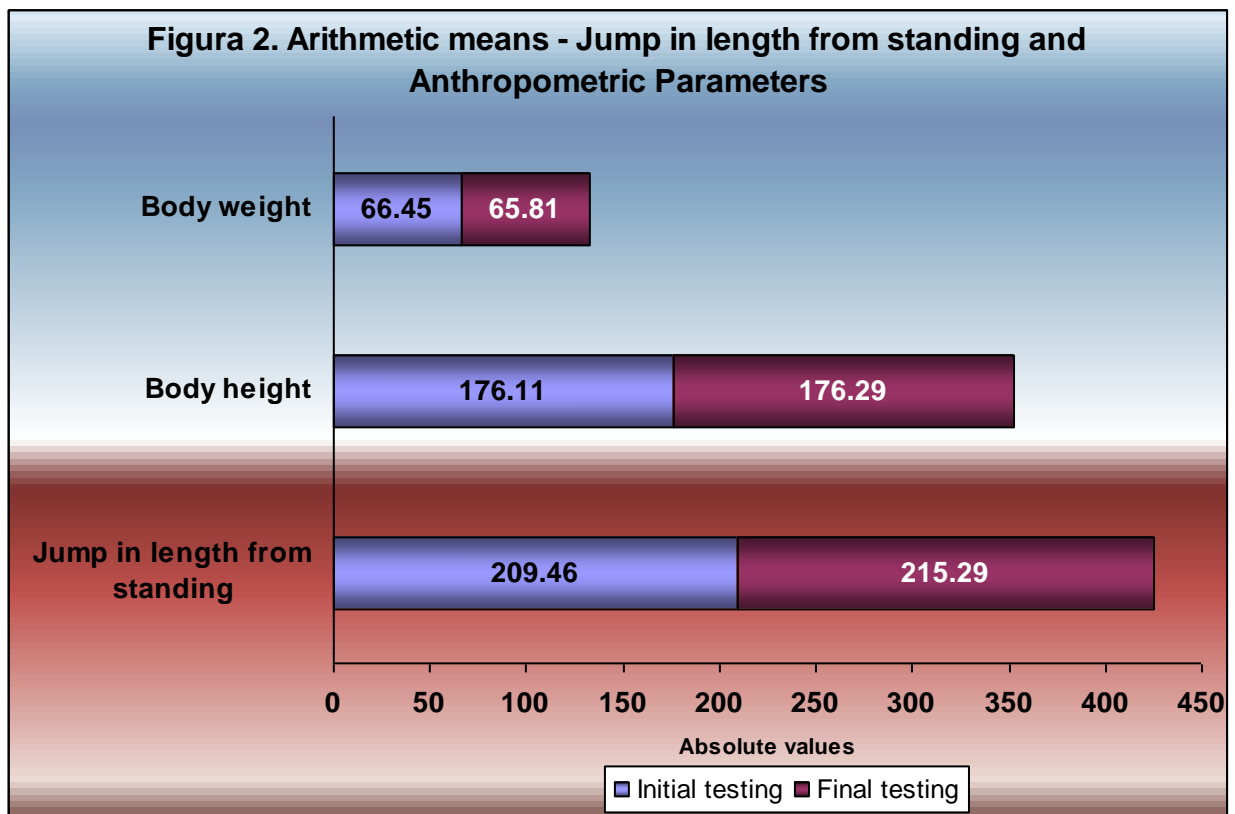
Calculating the correlation (**R**) to determine the “strength” of the connection between the different obtained results at the two tests presents us the following situation:

➤ calculating the index of the correlation with value between 0,81 and 0,90 (*very good correlation*) between the results at tasks – dynamometry with left hand and dynamometry with the right hand (0,89) that tested the static strength at the level of the plantar musculature; jump in length from standing and the run to and fro race 10 x 5 m (0,87) that tested the explosive strength and the repetition strength – coordination at the level of the inferior limbs.

➤ calculating an index of correlation with a value between 0,61 and 0,80 (*good correlation*) between the results at the tasks – touching the plates and run to and

fro race 10 x 5 (0,80) that have tested the speed of repetition – coordination at the level of the superior limbs and inferior ones; dynamometry right hand and maintaining in hanging (0,80), dynamometry left hand and maintaining in hanging (0,78) that tested the static strength of the superior limbs feet and the functional strength of the superior limbs; the run to and fro race 10 x 5 m and the run to and fro race 20 x 50 m (0,78) that have tested the speed of repetition – the coordination of the inferior limbs and the cardio-respiratory endurance; jump in length from standing and touching the plates (0,76);

➤ the other calculated values are framed at the level of *weak correlation* (0,21 – 0,40), *very weak* (0,00 – 0,20) or having negative values.



Conclusions

- Unifying the tasks for the evaluation of physical condition in a battery of tests “Eurofit” on different age segments of the university population in

order to organize a data base that will offer a comparison point concerning the manifestation level of the physical condition, depending on the individuals' age.

- The development and maintaining of the physical condition components assure the motor functionality permanent once with man ageing.

- The manifestation level of the abilities and equilibrium are in report of direct proportionality with the development level of the strength, endurance, muscular flexibility and quotidian requests.

- In order to answer to the requests and increased exigencies of UE it is necessary the more and more implication of the local communities in order to assure certain material conditions benefic for the practice of physical exercises in a rhythmic manner.

- The necessity of making a physical activity at least one hour/day, especially by youth; the general profit of the physical activity is represented by the improvement of the health state and the possibility to realize certain activities, with an acceptable efficiency, for a long period of time.

- Improving the optimum level of the manifestation of the physical condition must be realized in a total equilibrium, reported to the future situation of graduate of a technical faculty; health state is the aspect that fundamentals the man's evolution and on this base, we can build a high level of manifestation of the individual physical condition.

- Besides its compensatory psycho-biological function, physical education and sport contribute also to the stimulation of the intellectual capacity, at the enrichment of the theoretical knowledge volume of the students.

- Using during the physical education and sport, in a high percentage, the means specific to athleticism has contributed to the increase of the medium arithmetic values (exception mobility and maintain in hanging) for the other 7 motor tasks.

- The values of these arithmetic means, in comparison with the appreciation scales battery of test "Eurofit" are at the level of the "weak" or "under medium" grades.

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