

CONSTATATIV STUDY CONCERNING THE MANIFESTATION LEVEL OF THE ANAEROBE EFFORT'S CAPACITY AT PUPILS FROM HIGH SCHOOL

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Abstract

Purpose: Applying the national curriculum in the domain of the physical education and sport requires the enlargement of the knowledge area of the age characteristics and the level of manifestation of the physical condition of the scholar population from the high school cycle. The theme presents the importance by knowing new data concerning the level of manifestation of the anaerobe effort's capacity, in the conditions of the physical education and sport class, also of the practical implication in the scholar physical education. By approaching this theme we propose to know the level of manifestation of the anaerobe effort capacity at the pupils from the high school cycle depending on age and sex through a practical, significant and non-invasive method for the organism – the Sargent test. In practicing the physical education and sport the term of anaerobe effort's capacity is used in the sense of specifying the organism's possibilities to make an intense physical effort and of short duration, respectively to obtain a maximum energetic debit through the two anaerobe energetic systems (the phosphate system and the anaerobe glycolysis).

Methods: The used research methods and techniques were 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, in a transversal section, synchronic, at the same time), the statistic-mathematic method and the graphic one (the processing method, the analysis and the obtained data by applying the tests processing).

Results: The higher percentage and the increase of the value capacity of the anaerobe effort at girls from the 9th grade is due to the functional ageing of the neuromuscular system that happens faster at girls than at boys, followed by an equalizing stage, between the two sexes, at the level of the 10th grade and obtaining higher values for the boys from the 11th and 12th grades.

Closed values of the maximum anaerobe power (but low as functional value) both at boys and girls denote a high homogeneity of the researched group of subjects, in a negative way. Due to the social importance of the physical education and sport it is imposed the taking of a decision in concordance with realizing a training programs structured on physical exercises that require approaching the interests of self-exceeding of the motor possibilities.

Conclusions: The calculated values for the maximum individual anaerobe power are close, fact that denotes an evolution similar, generally valid, from individual to individual. The higher percentage of "weak" grades at the measurement of this physiologic indicator allow us to state that the researched subjects have a weak concern concerning the maintaining of a health state by making independent sport activities, movement in the fresh air and we sustain the increase of physical education classes for the superior high school cycle.

Key words: study, manifestation level, anaerobe effort's capacity, pupils.

Introduction and research objectives

In searching the identity, youth try to harmonize "in an own system the values and beliefs of every person that means something for them: parents, teachers and age group" (R. Atkinson, E. Smith, D. Bem, 2002). In the situation in which these values are incompatible, it is possible the appearance of role confusion and the successive testing of many roles, before finding out the own identity.

Domain specialists consider that the success of youth, in a professional plan, is conditioned by the biologic, motor resources of the individual (the motor capacity, the physical condition), that creates a healthy intern environment, balanced, a well physical and psychic state responsible for the working productivity; depending on the implication degree in the motor activities, they are classified in: sedentary teenagers, teenagers vaguely interested in movement and active teenagers, on a motor plan (A. Dragnea, A. Bota, 1999).

In order to eliminate the noxious effects of the social activity over the health state of youth, but also in order to insure a good effort's capacity and psychic capacity, man must possess a good health state, physical and psychic strength, easy to realize at the age of pupils from high school cycle. Physical education and sport contributes at forming an aware attitude concerning the practicing of the physical exercise in the free time, in order to obtain certain benefic effects, of long term, through the independent sport activity (M. Finichiu, M., 2008).

The peoples of the ancient world had made the movement and corporal harmony virtues; across the existence, a series of civilizations, had made from this movement a national cult; the Greek palestras, the Roman thermals represented true temples for a physical development as harmonious as possible, places for shows but also for health. In the contemporary era, movement, sport, rule more and more the humanity life, becoming true shows and financial sources, with an important role in the political influence and social existence. The diversity of acts

and motor actions but also their number and variety give the level of the motor capacity level for every individual. Man's motor capacity evolves limitative, not linear, once with the increase and the individual development, life and quotidian activities contributing to the enrichment of the skills and motor abilities luggage.

The number of motor skills and abilities of which an individual is capable to use and put them into practice represent the true measurement of his motorness (A.Prescorniță, 2004) that if it is accompanied by high indices of the conditioned and coordinative capacities lead to the obtaining of a high sport performance; only the predispositions and aptitudes are not sufficient (V. Ludu, 1969) if they are not accompanied by lots of work and a very well managed training. On the same scale with the performance capacity notion, used a lot in the activity domain of the physical education and sport, we can place the notions of performance capacity, physical capacity and effort capacity, used more frequently in the performance sport and high performance sport.

The physical effort capacity defines the organism's possibilities to develop a travail, a mechanic thing of an intensity as higher as possible, with a duration as longer as possible (C. Bota, 2000) and presents two forms: the anaerobe effort's capacity and the aerobe effort's capacity.

The effort's capacity represents the maximum power of which an individual is capable to realize, it being the maximum intensity of the effort that can be realized by a subject, or representing the maximum working quantity of a mechanical thing that can be made in the time unity of an individual (M. Georgescu 1977).

The organism's effort capacity represents a resultant of the functional interaction of organs and systems having at the base the specific energetic potential, from which it results a mechanic thing expressed in acknowledged measurement units (A.Dragnea, A., S.Teodorescu, 2002).

The energetic sub layer immediately usable is the phosphate-macroergical connection from ATP of which resistance is realized in the intense efforts and really short ones on the account of CP; both substances with phosphate-macroergic connections constitute the so-called system of the phosphagenes.

Research objectives consist of:

- Making physical education programs and differentiating the requirements for each study year and class, that traces the useful indicators in the perception of the anaerobe effort's capacity at pupils of both sexes.

- Knowing the values of the anaerobe effort's capacity at the age of 14 – 15 can use as reference term, tracing/selecting the elements talented for the performance sport.

- In the scholar sport branches where the evolution of the anaerobe effort's capacity represents a limitative factor of the motor performance, it is urgent to know the evolution of this capacity to determine the optimum age for selection.

Research hypotheses

- Improving the anaerobe effort's capacity is conditioned by the individuals' age subject to the experiment.

- Sex particularities influence the values of the anaerobe effort's capacity, at this age.

- The appreciation of obtaining weak results are due to the reduced number of physical education classes and also of the minor preoccupations for the independent practice of the physical exercises, at the individual level and group level from where the subjects are.

Research procedures and methods

The research has been developed at the Technical College "Lazar Edeleanu" from Ploiesti, during the period 15.10 – 20.11.2009, the subjects being pupils from the 9th – 12th grades, with ages between 14-19, clinically healthy (100 boys and 106 girls).

The used research methods and techniques have been 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, in a transversal section, synchronic, at the same time), the statistic-mathematic method and the graphic one (the processing method, the analysis and the obtained data by applying the tests processing). The used test for the evaluation of the maximum anaerobe alactacid power (expressed in kg/s by measuring the detent at vertical) was the Sargent test (C.Bota, 2000).

The development manner of the testing:

- The effort consisted of the making of three maximum jumps on vertical from standing (the detent on vertical through which we measure and the value of the motor capacity/quality combined with strength-speed, named the explosive force at the level of the inferior limbs), after a previous warming period of the making musculature, recording the best value from the jump (expressed in centimeters).

- The measurement of individual body weight (expressed in kg).

- Introducing the obtained results in the calculus formula: $P = \sqrt{4.95 \times G \times \sqrt{D}}$; where **P** = the power expressed in kg/s; **G** = body weight; **D** = detent on vertical; **4,95** represents a constant.

- The appreciation scale after Dal Monte 1998 for the individuals with age between 15 – 20. *Men*: weak grade < 113; satisfactory between 113-149; medium between 150-187; good between 188-224; very good >224. *Women*: weak grade <92; satisfactory between 92-120; medium between 121-151; good between 152-182; very good >182.

Research results and their interpretation

The analysis and processing of the obtained data has been realized on the basis of the calculus of the

arithmetic mean (X), of the standard deviation (S), of the variability coefficient (Cv), of the estimation of the medium error (EEm) and of the significance of the difference between the two means – the “z” test (M. Niculescu, 2002).

The obtained results after making the testing and their introduction in the calculus formula, shows us the following situation, on age and sex groups:

❖ *The arithmetic mean* calculated for the researched pattern (table 2 and figure 3) presents values, both for boys and girls, that is framed, after the appreciation scale, at the level of “weak” grade.

For the boys’ pattern, the calculated arithmetic mean is framed in a 58% percentage at the level of “weak” grade, 29% satisfactory grade and 13% “medium” grade.

On age and class groups, the maximum anaerobe power values (table 1, figure 1) are appreciated as followed:

- 14 – 15 years (9th grade) 68% “weak” grade and 32% “satisfactory” grade;
- 15 – 16 years (10th grade) 64% “weak” grade and 36% “satisfactory” grade;
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- 16 – 17 years (11th grade) 48% “weak” grade, 24% “satisfactory” grade and 28% “medium” grade;

- 17 – 18 years (12th grade) 52% “weak” grade, 24% “satisfactory” grade and 24% “medium” grade.

For the girls pattern, the calculated arithmetic mean is framed in a 52,83% at the level of “weak” grade, 33,01% “satisfactory” grade and 14,15% “medium” grade.

On age and class groups, the maximum anaerobe power values (table 1, figure 1) are appreciated as followed:

- 14 – 15 years (9th grade) 42,85% “weak” grade, 28,57% “satisfactory” grade and 28,57% “medium” grade;

- 15 – 16 years (10th grade) 55,55% “weak” grade, 25,92 “satisfactory” grade and 18,51 “medium” grade;

- 16 – 17 years (11th grade) 52% “weak” grade, 40% “satisfactory” grade and 8% “medium” grade;

- 18 – 19 years (12th grade) 61,53 % “weak” grade and 38,46% “satisfactory” grade.

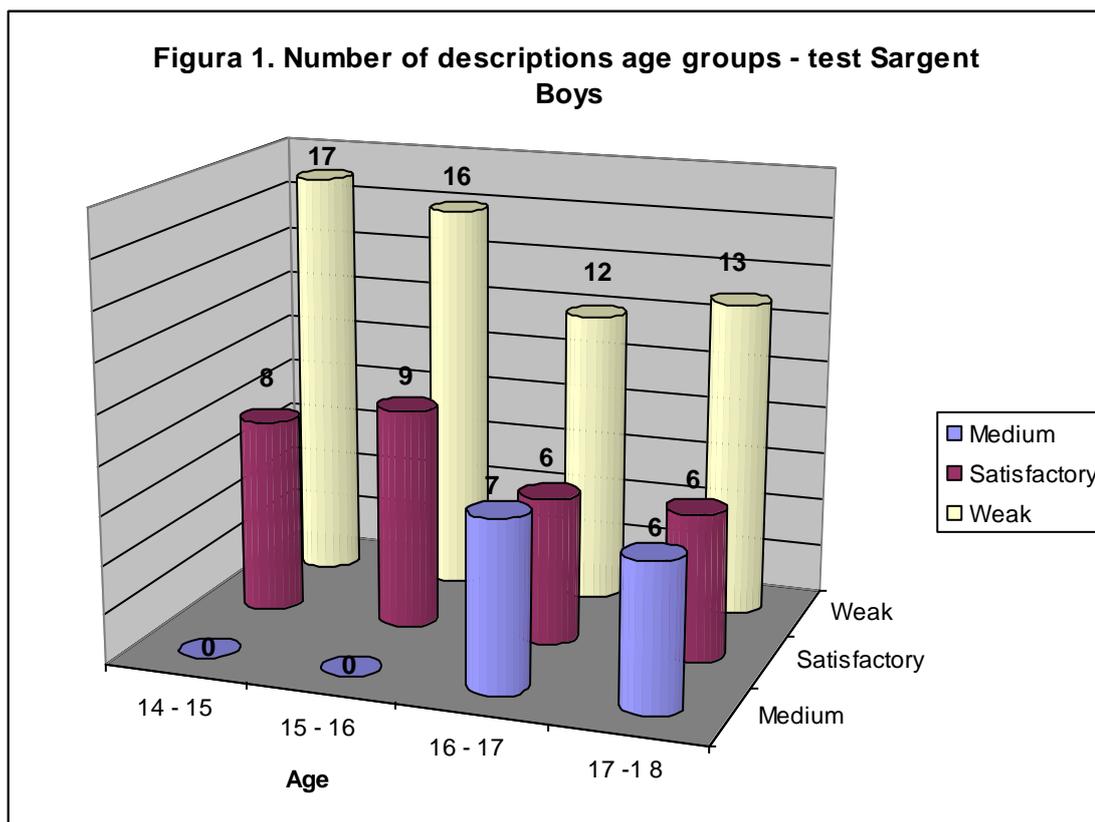


Table 1. Number of subjects – appreciation scale

Grade	Boys (number of pupils and %)					Girls (number of pupils and %)				
	Age group					Age group				
	14/15	15/16	16/17	17/1 8	14/18	14/15	15/16	16/17	17/1 8	14/18
Weak	17	16	12	13	58%	12	15	13	16	52,83%

Satisfactory	8	9	6	6	29%	8	7	10	10	33,01%
Medium	-	-	7	6	13%	8	5	2	-	14,15%

❖ *The variability coefficient* Cv% (table 2) calculated, presents us the perceptual approximation of the report between the standard deviation and the arithmetic mean, as followed: at the classes and boys groups level a group with moderate homogeneity (18,52%) and at the level of classes and girls groups a group with high homogeneity (12,95%).

❖ *The calculus of the estimation of the medium error* EEm (table 2) presents us a framing in the value interval 100,71 – 102,69 (101,70±0,99) of the arithmetic mean, for the boys pattern, representing the trust interval of the mean at the significance level p<0,01. The trust limits of the pattern mean are 100,71

and 102,69 and the real mean is between this value interval.

For the girl pattern the arithmetic mean si between the value interval 88,05 – 90,09 (89,07±1,02), representing the trust interval of the mean at the significance level p<0,01. The trust limits of the pattern mean are 88,05 and 90,09 and the real mean is between this value interval.

❖ *Calculating the significance between the two means* (table 2) – the “z” test = 8,95, we can notice that it is higher than the “t” value from the Fischer table, so, the difference between the two means is significant at the significance level p<0,01, the research hypothesis is valid.

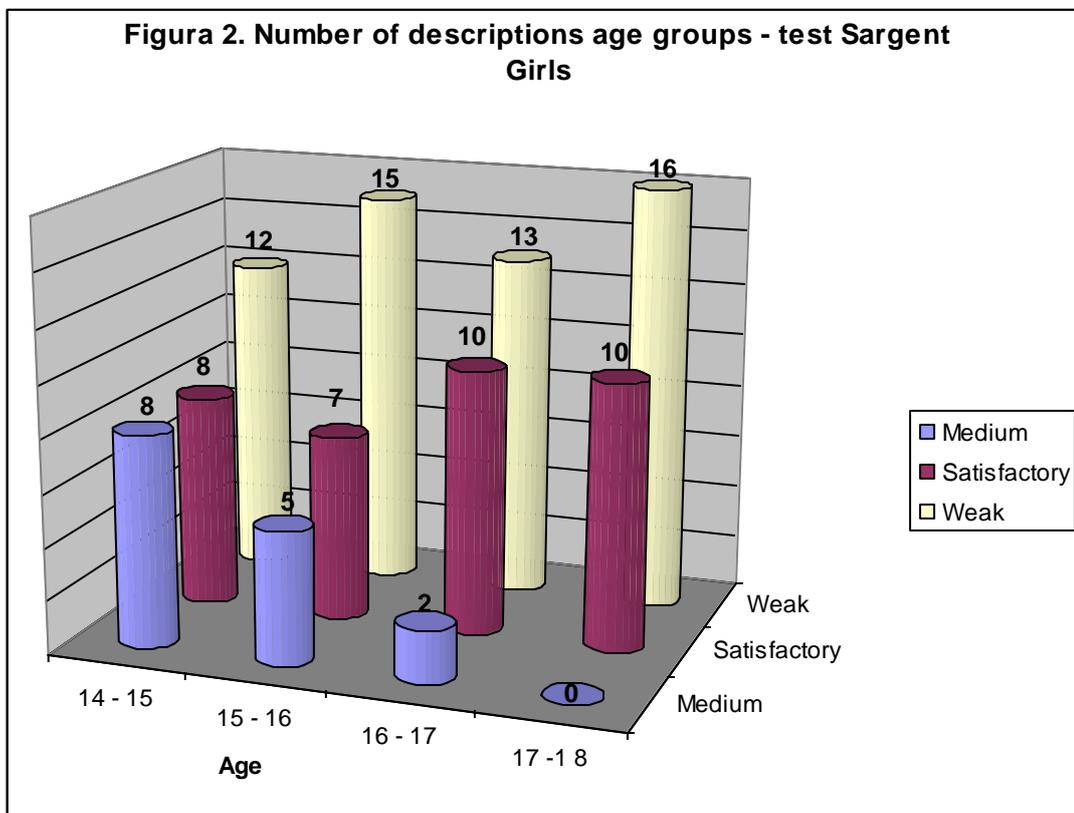
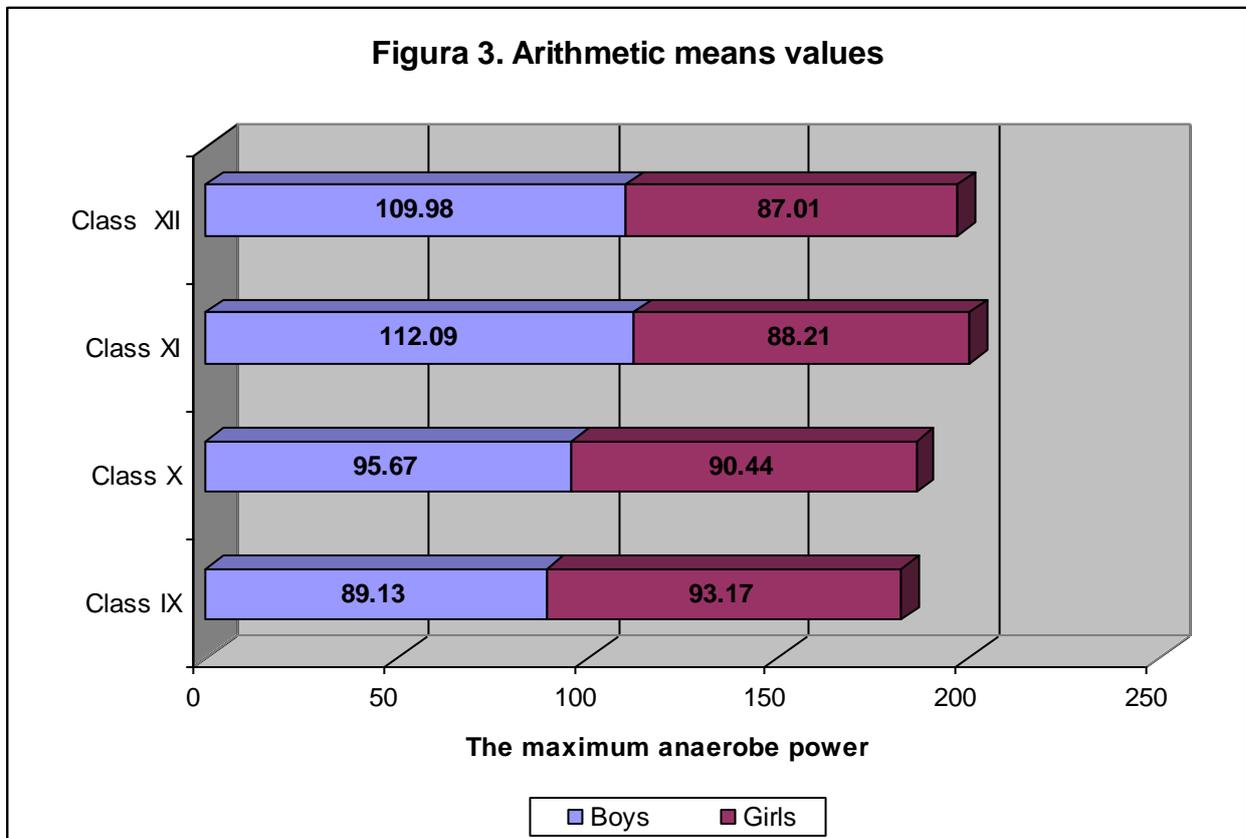


Table 2. Calculated statistic indicators

Statistic indicators	Boys/grade					Girls/grade				
	IX	X	XI	XII	Pattern	IX	X	XI	XII	Pattern
X	89,13	95,67	112,09	109,98	101,70	93,17	90,44	88,21	87,01	89,07
S	10,66	9,97	9,65	9,09	9,90	10,45	9,97	10,88	10,25	10,49
Cv%	17,98	18,66	18,01	19,45	18,52	13,67	14,05	11,78	12,32	12,95

EEm					0,99					1,02
The „z” Test	8,95									



Conclusions

1. The anaerobe effort's capacity represents an indicator that is dependent of the pupils' age, until the age of 17, boys 11th grade; at girls this aspect is obvious only until the age of 14-15, 9th grade.

2. The anaerobe effort's capacity progresses in a different manner at boys in comparison with girls; girls have a better anaerobe effort's capacity, reported to the appreciation scale presented by the domain specialists.

3. Calculated values for the maximum individual anaerobe power are close, fact that denotes an evolution of it similar, generally valid, from individual to individual.

4. The higher percentage of "weak" grades at measuring this physiologic indicator allows us to state that the researched subjects have a weak concern in what concerns the maintaining of the health state by making independent sport activities, movement in the fresh air.

5. To limit the practice of physical exercise just as a scholar obligation (as it is looked for today through all the education programs, that limit the number of physical education classes, motivating the

specific of the specialties and exceeding the weekly number of study hours) would mean a serious error for the young generation, that is why we sustain the necessity of the increase of physical education and sport classes, especially at the 11th and 12th grades, from the superior high school cycle and not only.

6. Practicing the favored sport, in a rhythmic manner, independent or organized, is made in a permanent necessity, representing a call to reflection to

apply in the daily life at the specific means of the favored sports, as factors of fortification and relaxation.

7. Measuring the maximum anaerobe power, through the Sargent test, has pointed out the fact that, the development of the anaerobe effort's capacity can have at its base the use during the physical education and sport of the self-organizing capacities, self-leading and self-evaluation of pupils.

8. The assimilation process of the motor skills and abilities has aimed the increase of the independence degree of the pupils in the instructive-educational process, through a thoroughly observation

and the reception of information and through an aware and creative attitude.

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