Conclusions

The finality of our research aims at proving the impact that gymnastics program has in order to improve the values of physical development indicators. Starting from the premises that the lack of sports culture leads to a poor body development and motricity. After having implemented the aerobics program we first of all noticed a development on the part of the individual from a biological, psychological and social point of view. There is a need to create programs that aim at improving and mentaining the students health state and quality of life.

Promptly finding solutions by initiating long-term strategic programs of sports activities that prevent sedentarism, obesity, fatigue, stress, different cardio-vascular, respiratory or osteoarticular disease.

A healthy individual, with real aptitudes towards a high level life quality needs to continually practice sports activities during their free time and after finishing the courses at university, implementing physical exercise as a way of life.

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STUDY ON DEVELOPMENT OF MOTOR ABILITIES IN PHYSICAL EDUCATION LESSONS

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Abstract

Purpose. The purpose of our research consists in the emphasizing of the efficiency of some methods of preparation for the improvement of the conditioned capacities, especially the ones combined of speed and force (the swing), of students who practice sporting games in the physical education lessons.

Methods. In sporting training, it rarely occurs that only one quality dominates both effort and movement, this usually is the product or the combination of at least two driving qualities. There are situations when force and speed are equal, the combination of endurance and force produces muscular endurance; the result of combining endurance and speed is speed-resistance; agility is a combination of speed, power and coordination; agility and flexibility results in mobility. It is recommended that specific exercises are practiced, concurrent with the exercises specific to the development of the driving exercises. The development of the dominant driving qualities can have a positive or a negative transfer effect.

Results. There was significant differences, the biggest progress were made by the experimental group, and for the control group the progress was insignificant.

Conclusions. Following this research, the obtained results demonstrate that the plyometric method used during the physical training produces significant swing growth, the subjects of the experimental group having significant diminished values at the end of the training program.

Key word: swing, plyometric, leaps, anaerobic-alactacide power

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Introduction

Sporting and physical education activities make up a direct stimulus, nearly exclusive for the morfo-functional development, and their absence can lead to situations harmful to health, of which dimensions are hard to anticipate. The mobility represents the key element for the tasks that target the instructive content of any physical education programme (Colibaba-Evulet, Bota, 1998). In the physical education and sporting activity in the non-specialized universities we are interested in the exhausting effort which, through its parameters (intensity, volume, complexity), obliges their bodies to react intensive and generalized (Deacu, Finichiu, 2010).

Generally, moving qualities represent a more interesting subject among specialists, the methodology of the development of these qualities, being the centre preocupation of the experts from different sporting branches. During the driving act, the driving qualities influence each other and constantly depend on one another, and this leads to the so-called manifestation regime of the driving qualities (Bompa, 2001). This regime represents the differencial way of manifestation of a driving quality, determined by the influence of one or more driving qualities, with which the first manifests in the same time or even entirely and represents functional combinations of speed, force, skill and stamina.

The force and speed are found in a reverse proportion rapport: if the speed is bigger, the charge used is smaller (Bompa, 2003).

Testing of anaerobic processes relevant to athletes practicing speed efforts, strength, sports and for those whose samples (5 "-6") requires a maximum energy flow.

Power is defined as the M. Epuran, the amount of work (energy, work, work) that can be performed in a unit of time. Strength and speed are involved to ensure a maximum body movement values. In this category are explosive movements: throwing weights, flat 50m, high jump, long jump.
Power = (Force x Distance) / Time
Power = Work (Mechanical) / time
Power = Force x Velocity, because distance / time = speed, so power expresses how quickly the work is performed (mechanical). Measurement of the high jump (flashing) consists of reports made to weight using height nomogram Lewis (Epuran, 2005).

Since force is a measure instantaneous and all human movements are executed over a period of time, continuous force-time relationship, and not just once in a power point determines interest to study this relationship. In many sports, strength exercises are performed mainly aimed improving strength, speed of movement to a given resistance (body weight, weight of the object) and not force itself. In these cases, the maximum force is considered the basic condition for a high speed motion (Zatsiorski, 2005).

For this we chose that in our research we approach the conditional capacities, especially those combined of speed and strength, in physical education classes with the students of the Petroleum Gas University of Ploiești. Through this process we followed the effects which resulted after applying the preparal program in the research, adressed especially to the development of the combined driving capacities, through plyometria (Deacu, 2008).

Purpose

The purpose of our research consists in the emphasizing of the efficiency of some methods of preparation for the improvement of the conditioned capacities, especially the ones combined of speed and force (the swing), of students who practice sporting games in the physical education lessons.

Hypotheses

1. If we use the plyometric exercises during training, the raise of the swing of students who practice sporting games during the physical education lesson will be possible.
2. A higher manifestation of the maximum anaerobic-alactacide power during the sporting game will be realised based on the gatherings from the preparation program.

Tasks

- Fixing some methodical priorities and the principles of the plyometric training;
- Fixing the tests;
- Elaborating a training program using the plyometric method;
- Fixing the development level of the the combined driving qualities of the subjects (initial and final testing);
- Arranging and grouping the gathered data necessary for the statistical-mathematical processing;
- Processing the obtained data and drawing the conclusions.

Research methods

- Scientific documentation;
- The descriptive method – the observation;
- The experimental method;
- Processing and interpretation methods: the logical method, the statistics method, the grafical method.

The content of the experiment

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The experiment took place during the physical education lessons with the students of the Petroleum Gas University of Ploieşti.

The subjects of the research are 40 students from the Petroleum Gas University of Ploieşti and falls within the 15-20 years age, 20 students belonging to the experimental group and the other 20 to the control group. The subjects of the experimental group were trained with the use of plyometric exercises during the physical education classes.

➢ **The applied tests** – *The Ion Grinţescu Test* to measure the height of the vertical jump, and to measure the maximum anaerobic-alactacid power the Sargent Test was used, with the following formula:

$P = \sqrt{4,95xG}x\sqrt{D}$; where

P = power in kg/s,
G = corporal weight,
D = swing in cm.

Tabel 1. The interpretation of assessment test Sargent for men (Dal Monte, 1988)

Mark	**Age**		
	15-20 ani	*20-30 ani*	*30-40 ani*
Weak	**<113**	<106	<85
Satisfactory	**113-149**	106-139	85-111
Mediu	**150-187**	140-175	112-140
Well	**188-224**	176-250	141-168
Very good	**>224**	>210	>168

Three vertical jumps are performed -the best jump is considered - (Tudor, 2005). The estimation of the power was made in comparison with the values presented by dal Monte 1988 (Bota, 2000). For the technique not to influence the height of the jump, only one vertical jump without a big upsurge is recommended. This type of jump is called the „Sargent jump", named after the man who analysed it from a biomechanic point of view. It is one of the most relevant proofs concerning the estimation of the swing at the lower limbs level, in a vertical plan. It is executed standing next to a 4 meter long wooden ruler, the performer streches his arm up, leaves a mark on the ruler, then jumps with a small upsurge and makes another mark on the ruler. The distance between the 2 marks is measured. To measure the height of the jump we used the Ion Grinţescu method (Tudor, 2005).

➢ **The training program** included the following exercises (Deacu, 2008):

- **Multiple or sequential jumps** – the on-the-spot jumps are combined with the from the spot horizontal jumps. These require a maximum effort utilised in a sequence. The distance must not be bigger than 30 meters.
- **In-depth jumps** – counter-movement jumps are used from a high crate, followed by counter-movement jumps off boxes, benches, low fences.
- **On-the-spot jumps** – a jump in which the detachment and the landing is executed on the same spot. These jumps are of a somewhat small intensity, but they still have a short damping phase and require a fast comeback. The jump is executed sequentially, with a short damping phase between jumps.
- **From the spot horizontal jumps** – the maximum effort used when detaching from the ground horizontally or vertically is stressed.
- **Exercices with boxes** – ths type of exercises utilises jumps successive with the jumps in depth. These exercises depend on the height of the boxes. They have both horizontal and vertical components.

Results

Table 2. The values of the maximum anaerobic-alactacide power – Experimental Group

Student	T.I.			T.F.		
	Stature (cm)	**Weight kg**	$P = \sqrt{4,95xG}x\sqrt{D}$ **kg/s**		**Stature (cm)**	**Weight kg**
1.	175	80	115- satisfactory	119- satisfactory	175	79
2.	183	79	119- satisfactory	123- satisfactory	183	78
3.	184	67	138- satisfactory	144- satisfactory	181	67
4.	178	57	120- satisfactory	128- satisfactory	178	56

5.	180	78	122- satisfactory	127- satisfactory	180	78
6.	175	64	100-weak	107-weak	175	63
7.	175	92	121- satisfactory	128- satisfactory	175	90
8.	181	64	113- satisfactory	119- satisfactory	181	63
9.	177	71	138- satisfactory	148- satisfactory	177	70
10.	166	62	114- satisfactory	120- satisfactory	167	61
11.	176	72	128- satisfactory	135- satisfactory	176	71
12.	166	63	104-weak	111-weak	166	64
13.	172	60	115- satisfactory	121- satisfactory	172	61
14.	173	64	129- satisfactory	132- satisfactory	173	64
15.	180	70	130- satisfactory	134- satisfactory	180	69
16.	176	74	137- satisfactory	145- satisfactory	176	74
17.	172	58	112-weak	119- satisfactory	172	57
18.	178	96	138- satisfactory	142- satisfactory	178	95
19.	164	64	136- satisfactory	144- satisfactory	164	64
20.	168	50	102- weak	107- weak	169	49

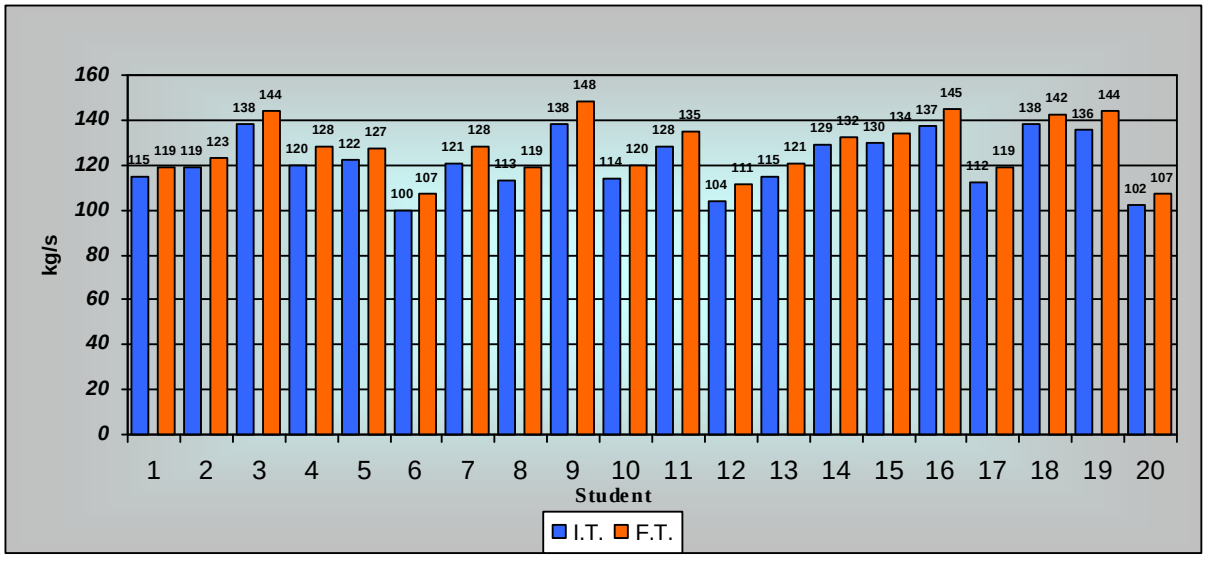

Figure 1. The values of the maximum anaerobic-alactacide power – Experimental Group
Kg/s, kilo/second; IT, initial testing; FT, final testing.

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Table 3. The values of the maximum anaerobic-alactacide power – Control Group

Student	T.I.		T.F.			
	Stature (cm)	**Weight kg**	$P = \sqrt{4,95xG}x\sqrt{D}$ **kg/s**		**Stature (cm)**	**Weight kg**
1.	172	85	129- satisfactory	132- satisfactory	172	85
2.	181	79	113- satisfactory	113- satisfactory	181	78
3.	169	96	127- satisfactory	130- satisfactory	169	95
4.	186	71	108- weak	111- weak	186	70
5.	166	52	113- satisfactory	113- satisfactory	166	52
6.	174	62	105- weak	106- weak	174	62
7.	177	75	135- satisfactory	137- satisfactory	177	75
8.	172	73	105- weak	105- weak	172	72
9.	175	89	143- satisfactory	145- satisfactory	175	89
10.	180	66	129- satisfactory	127- satisfactory	180	66
11.	183	61	116- satisfactory	116- satisfactory	183	61
12.	188	92	129- satisfactory	128- satisfactory	188	91
13.	170	62	114- satisfactory	112- weak	170	62
14.	166	61	115- satisfactory	116- satisfactory	166	61
15.	180	61	108- weak	110- weak	180	60
16.	175	69	129- satisfactory	129- satisfactory	175	69
17.	175	61	111- weak	112- weak	176	61
18.	174	59	111- weak	112- weak	174	58
19.	178	56	110- weak	112- weak	178	56
20.	174	61	113- satisfactory	114- satisfactory	174	60

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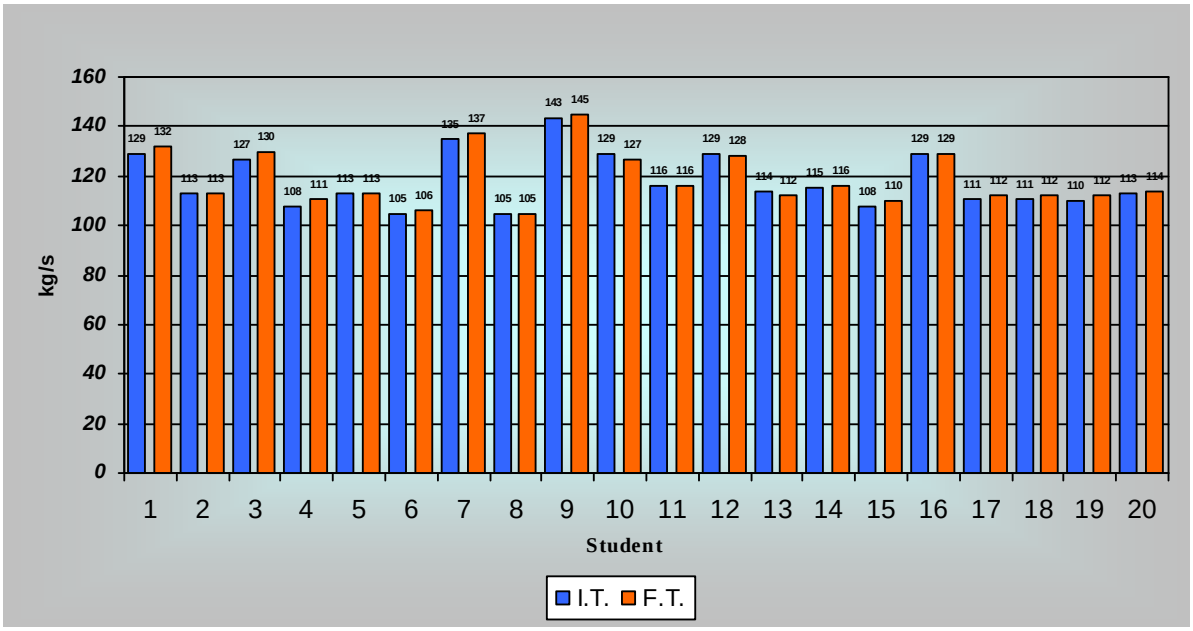
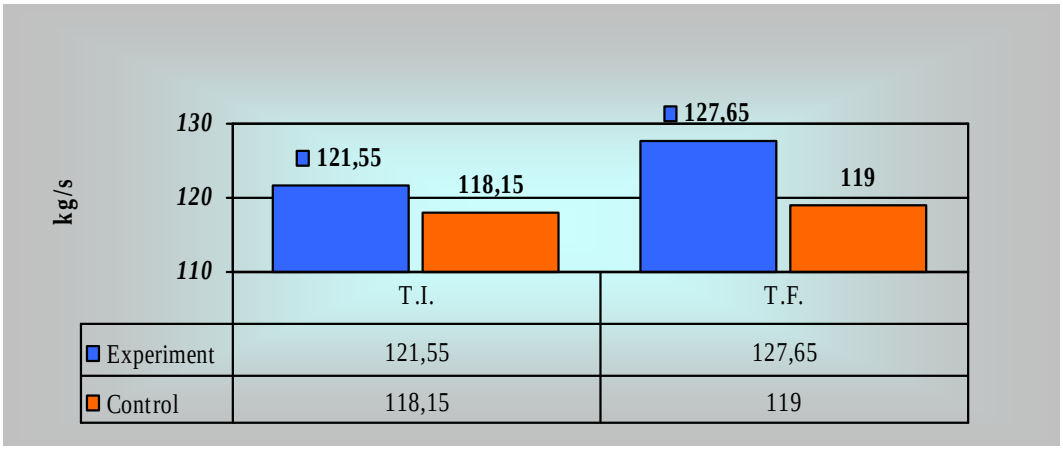


Figure 2. The values of the maximum anaerobic-alactacide power – Control Group
Kg/s, kilo/second; IT, initial testing; FT, final testing.

Table 4. The progress realised by each group (average) – Sargent Test (kg/s)

Group	Sargent Test			
	T.I.	**T.F.**	D = T.F. - T.I.	$D_{T.F. - T.I.}$ (%)
Experimental	121,55	127,65	6,1	5,01
Control	118,15	119	0,85	0,72

Figure 3. Values of the arithmetical mean - Sargent test



Kg/s, kilo/second; IT, initial testing; FT, final testing; Control Group; Experimental Group

Discussions

The result of the Sargent Test for determining the maximum anaerobic-alactacid power is:

The Experimental Group, at the final testing, registers a gain in power of 5,01% (6,1 kg/s) in comparison with the initial testing. One student modified his grade from weak to satisfactory.

The Control Group, at the final testing, registers a gain in power of 0,72% (0,85 kg/sec) in comparison with the initial testing. One student modified his grade from satisfactory to weak.

In terms of the coefficient of variation, all the groups have a high homogeneity both in the initial test and final testing. Similar studies have been addressed by Bocioaca, 2003 and Vaida, 2011.

Conclusions

- At the Sargent test which evaluates the maximum anaerobic-alactacid power, the biggest progress were made by the experimental group, and for the control group the progress was insignificant. On a whole, it can be appreciated that regarding the anaerobic-alactacid capacity of the subjects, there still is the possibility of improvement in a significant quantity through the use of plyometric exercises, which concludes to the fact that the functional reserves of young people are insufficiently explored.

- Following this research, the obtained results demonstrate that the plyometric method used during the physical training produces significant swing growth, the subjects of the experimental group having significant diminished values at the end of the training program.

- Strength training is essential for jumpers and sprinters as body weight (during the beat movement with vertical separation) and body mass provide a very high resistance.

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