OPPORTUNITIES IN THE EXPLOSIVE POWER DEVELOPMENT FOR MEDICINE STUDENTS IN UNIVERSITY ACTIVITIES OF PHYSICAL EDUCATION AND SPORTS

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Abstract

In the context of actual educational performance, we consider the explosive power development, for the medical students, a mean of achieving their future professional performance, conceived in this way within university activities of physical education and sports. Therefore, development of basic motor abilities and implicitly explosive power, has to start from the first year of study, and continue the following year. In our oppinion, by creating and developing a system based on specific means of sports games, we can successfully develop this motor ability, for medical students. The study has been developed during October 2014 – May 2015, on a number of 30 people (12 boys and 18 girls), representing 2 groups of students from Medical Faculty, 1st year of study. Data regarding the parameters of the explosive power development determined by the second test, support the hypothesis that by applying a special program based on using sports games within the University Activities of Physical Education and Sports, a visible progress is noticed, for this combined motor skill. The main conclusion drawn from this study was that the use of sports in the activities with medical students may represent an important milestone in the choice of teaching and training methods to achieve educational goals priority. At the same time, using sports games is also an extra motivation for medical students in relation to attending those teaching activities of physical education.

Keywords: Medical students, The explosive power, Sports games, Physical education;

1. Introduction

Human's driving force is decribed as the quality of the human organism that can develop in ontogenesis. Also named „physical qualities" they are of two types: basic and specifical. (Cârstea, Gh., 2000, p. 19).

Another approach describes human's driving force as an essential quality of muscles that is expressed through muscular movement, conditioned by the structure and basic capacities of different human body sistems and by psychiatric processes. (Balint, L., 2003).

The same author refers to the drive force mentions that in various weights they are present in every act of human movement. There isn't any movement that can be done remotely. During performing acts of movement there are manifestations of all the movement skills present in the same time, each one of them participating at some degree at realizing the act of movement. The level of speed, skill, endurance, strength and flexibility is not determined only by movement skill but also by it's maximum values. (Balint, L., 2003).

In conclusion, reffering to the allegations of the specialists, the drive forces are interconditioned, they have characteristical elements, that they are based on using the body's energy resource, their assessment permits objectification of physical training and fitness and are part of the driving ability of individuals based on clear and thorough systematization. In the context of the definition of driving skills, expansion (combination of speed and strength) is one of the most important (if not the most important) driving qualities in volleyball.

Representing a combined explosive power quality, taking part in speed and strength, muscle power is the maximum expression developed in minimum time, muscle strength is that quality that allows the muscle to produce an explosively labor.

Explosive power level depends on the number and speed of the neuromuscular units involved. Speed could allow a primary choice relatively early, but the number of units is determined by the neuromuscular muscle mass, so that selection is determined when it will reach an appropriate level of development. This does not preclude work aimed at developing this quality. Specific jumping attack hit of the game of volleyball, it's explosive power of lower limb muscle chains and pelvic girdle.

Plyometric exercises are designed to produce fast and powerful movements, improve nervous system functions and are used to improve performance in a large area of sports.

This type of training has long been a basic method to athletes who need to develop their explosive power. Plyometric training involves performing intense exercises that involve explosive muscular contractions, high intensity invoking stretch reflex: the maximum length of a muscle before performing contraction, leading ultimately to obtain a higher contraction force (Bibliography Web, 9).

If we compare the speed under the regime of force and force under the regime of speed, we can distinguish the following (Baroga, L., quoted in Iacob, I., Păcuraru, A., 1999):

- Speed under power (expansion) is characterized by working with loads between 30-65% of the possibilities. Only under such conditions we may obtain improvement in the indices of jumping (Alexandrescu, D., Neamțu, M., 2000);
- Strength in speed mode (explosive force) is characterized by working with loads between 65-80% of maximum possibilities. In this case only the explosive force may improve (Alexandrescu, D., Neamțu, M., 2000).

The definition of explosive power is: the ability of muscle groups to develop maximum force in a short time (Dragnea, A., quoted in Iacob, I., Păcuraru, A., 1999).

2. Material and Methods

The study was conducted during October 2014 - May 2015 on a number of 30 subjects (12 boys and 18 girls), representing two groups of students from the Faculty of Medicine, year I of study: experimental group (Table 1) and the control group (Table 2):

Table 1. Experimental Group

No.	Name and Surname	The class	The sex
1.	B.D.	27	Feminine
2.	C.R.	27	Feminine
3.	N.D.	27	Feminine
4.	P.E.	27	Feminine
5.	S.O.	27	Feminine
6.	S.G.	27	Feminine
7.	S.B.	27	Feminine
8.	V.T.	27	Feminine
9.	Z.G.	27	Feminine
10.	D.B.	27	Masculine
11.	H.A.	27	Masculine
12.	L.R.	27	Masculine
13.	P.M.	27	Masculine
14.	P.N.	27	Masculine
15.	V.C.	27	Masculine

Table 2. Control Group

No.	Name and Surname	The class	The sex
1.	A.A.	28	Feminine
2.	B.E.	28	Feminine
3.	G.O.	28	Feminine
4.	K.I.	28	Feminine
5.	M.T.	28	Feminine
6.	M.B.	28	Feminine
7.	P.I.	28	Feminine
8.	R.G.	28	Feminine
9.	T.A.	28	Feminine
10.	C.M.	28	Masculine
11.	C.C.	28	Masculine
12.	J.K.	28	Masculine
13.	K.A.	28	Masculine
14.	L.A.	28	Masculine
15.	O.R.	28	Masculine

We have ensured that the two groups are homogeneous in terms of age, level of education and gender ratio.

Through this study we aimed to confirm the hypothesis that the application and implementation of a system with the specific of sports games can successfully develop the explosive power of medical students.

The control group has worked with the specifical physical education and basic athletics and gymnastics.
The experimental group received a program based on specific elements and techniques of sports games (Table no. 3):

Table 3. Experimental's Group exercises

No.	Game	Technical element	Technical process
1.	Volleyball	The bird	The bird with two hands from vault
		Attack	Attack from Zone 4
			Attack from Zone 2
			Attack from second line
		Block	Individual block
			Collective block
		Serve	Serving the ball from a vault
2.	Basketball	Dunking	Short range dunk
			Mid-range dunk
			Long-distance dunk
3.	Handball	Penalty throws	Short-distance throw
			Long-distance throw

Testing explosive power in the two groups was achieved through long jump from standstill. Two jumps were made and the best performance was noted.

3. Results and Discussion

The following tables show the evolution of the explosive power gained by the medical students that was gained within an academic year, the testing was done through the long jump from standstill.

Table 4. Long jump from standstill - Experimental Group

No.	Name and Surname	Initial Testing (cm.)	Final Testing (cm.)
1.	B.D.	180	185
2.	C.R.	160	170
3.	N.D.	180	185
4.	P.E.	190	205
5.	S.O.	150	155
6.	S.G.	165	175
7.	S.B.	180	195
8.	V.T.	190	195
9.	Z.G.	125	140
	Average	***168,88***	***178,33***
10.	D.B.	220	235
11.	H.A.	210	220
12.	L.R.	250	250
13.	P.M.	240	245
14.	P.N.	235	245
15.	V.C.	225	235
	Average	***230,00***	***238,33***

Table 5. Long jump from standstill - Control Group

No.	Name and Surname	Initial Testing (cm.)	Final Testing (cm.)
1.	A.A.	170	170
2.	B.E.	170	175
3.	G.O.	180	180
4.	K.I.	175	170
5.	M.T.	150	160
6.	M.B.	160	165
7.	P.I.	185	180
8.	R.G.	190	190
9.	T.A.	140	135
	Average	***168,88***	***169,44***
10.	C.M.	230	235
11.	C.C.	200	205
12.	J.K.	245	245
13.	K.A.	240	235
14.	L.A.	230	230
15.	O.R.	220	220
	Average	***227,50***	***228,33***

a. The comparative results of the average values between the initial and final testing of the two experimental groups are as following (Table 6):

Table 6. The comparative results - Experimental Group

The sex	Initial Testing (average)	Final Testing (average)	Average difference (progress)
Feminine	168,88	178,33	9,45
Masculine	230,00	238,33	8,33

By analyzing Table 6 we see an increase in explosive power values recorded at final testing compared to initial testing of the experimental group. This is shown in Figure 1:

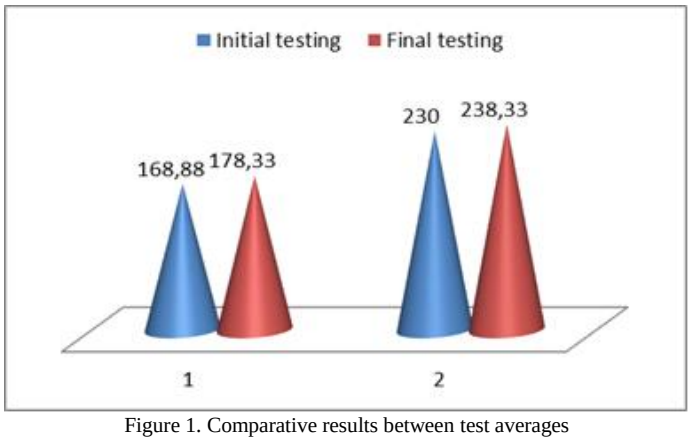

Figure 1. Comparative results between test averages

Legend:
1. Experimental Group – feminine

2. Experimental Group – masculine

b. The comparative results of average values between the initial and final testing of the control group are as following (Table no.7):

Table 7. The comparative results - Control Group

The sex	Initial Testing (average)	Final Testing (average)	Average difference (progress)
Feminine	168,88	169,44	0,56
Masculine	227,50	228,33	0,83

c. The comparative results of the avrege difference (progress) between the two groups (Table no.8):

Table 8. Comparative results between the two groups

The sex	Experimental Group	Control Group
Feminine	9,45	0,56
Masculine	8,33	0,83

From analyzing Table no.8 we can see that the Experimental Group recorded higher values than the Control Group. We can see more details in Figure no.2:

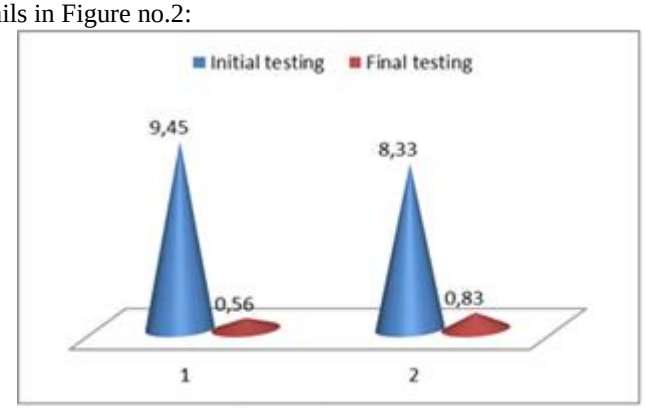

Figure 2. Difference of the two groups averages

Legend:
1. Group feminine
2. Group masculine

4. Conclusions and suggestions

Following the experiment conducted using concrete arguments reinforced by mathematics, namely research hypothesis is confirmed that the application and implementation of a drive system with the specific sports games can successfully develop explosive power to medical students.

Accompanied by plotting mathematical processing as eloquently reflecting upward dynamics of the subjects corresponding results achieved, enables us to make the following partial conclusions, as a whole, will strengthen the hypothesis of this study:

- The superior results obtained by the sample of subjects at final testing compared to initial testing in relation to the explosive power development, proposed training program is due to be implemented in university teaching physical education activities;

- The difference between progress (average difference) of the experimental group compared to the control is major, which entitles us to conclude that the effectiveness of sports in relation to the explosive power development has proven to be beneficial to the detriment of athletics and gymnastics.

We recommend using sports in physical education classes, both for the development of certain motor skills and, especially, for an increase of class attendancy.

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