International Journal of Physical Education, Sports and Health 2017; 4(6): 156-158

P-ISSN: 2394-1685
E-ISSN: 2394-1693
Impact Factor (ISRA): 5.38
IJPESH 2017; 4(6): 156-158

www.kheljournal.com
Received: 15-09-2017
Accepted: 16-10-2017

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Research and building system developmental strength exercises system by plyometric method for male students' major in volleyball of physical education department at An Giang University

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Abstract
The study is the result of the selection exercise system by plyometric method. The author used to interview experts and scientists in this field to choose and apply for an experiment. The result showed that the exercise system was highly effective in the developmental strength training process for male students who major in volleyball of Physical Education department at An Giang University in the first year of the first semester 2015-2016.

Keywords: Strength exercise, plyometric method

1. Introduction
1.1 Background
Today, modern volleyball training in Vietnam and the world is physical strength training, especially strength as one of the important factors has been emphasized by the coaches. It helps the athlete get the best and the highest achievement.
Currently, students' major in volleyball of physical education department at An Giang University, they do not understand and use the power exercises in a scientific manner that makes them feel hard to practice strength of volleyball.
Therefore, if students are well-equipped about foundation, in particular the specific strength of the sport and practice it in a scientific manner to improve result and advance technique. So, we have been carrying out: "Research and build a developmental strength exercise by Plyometric method for male students' major in volleyball of physical education department at An Giang University".
The research process has used the following methods such as analysis and synthesis materials, interview experts and coaches in the field of research, Pedagogical testing, Experimental pedagogy and statistical mathematical methods.

2. Research Results
2.1 Selection the developmental strength exercises by plyometric for male students major in Volleyball of physical education department at An Giang University
To build a developmental strength exercises system by plyometric for male students'major in Volleyball of physical education department at An Giang University, we have consulted the materials of the experts in Bosch and Pittera (1982), Menerdez. A (1988), Bompa. T (2000), Thanh Lam Nguyen (1998), Gonzales (2002), Hiep Nguyen and Trong Toai Bui (2004), Luis Cortegaza (2011), the coaches of the strong volleyball teams: Binh Dien Long An, Phu Rieng Rubber, Sannest Khanh Hoa, Duc Xuyen Dang, Thuc Phong Huynh, Khuong Thuong Luong, Xuan Dung Nguyen, With 41 exercises to develop strength for feet and coaches and experts' interview result we have selected nine exercises with high approval rate (≥75%) including: running 30m/s, jumping two feet forward 60m/s, jumping 1'30s/l, jumping with feet 30s/l, knee jumping 30s/l, lift the weights stand up and sit down (kg/l), lift the weights jumping 15kg/l jump in place and the hurdle 60m/s.

With 29 exercises for the hands, we have selected 10 exercises with a high approval rate (≥75%) including: training the forearm after the head (kg), lifting weights at chest (kg), lifting weights supine (kg/time), pushing weights supine (kg/time), pulling weights after hands (kg/time), lying on pushing (group/ time), lying on pushing (group/time), lying on pushing feet on chair (group/ time), pulling the back of the head with the right hand (30s/l)**,** throwing the ball with two hands by one step ahead, standing at the place throwing basketball with one hand over the net.

2.2 Build a strength exercises system by plyometric for male students' major in volleyball

From the results of the initial examination and the results of the questionnaire, we constructed an exercise system by plyometric and conducted experiments for male students' major in volleyball of physical education department at An Giang University to improve the characteristic strength of volleyball for the experimental group and assess the effectiveness.

In order to be highly effective in training we used the principles and methods of training sports in the experimental process and the experiment time was 12 weeks from September 2015 to December 2015.

The training program is required for 2 groups, so the time for experimenting and practicing is a week three session. Total time is 120 hours for both experimental and control groups.

Control group: Group A (33 males) practiced normal strength training for male students' major in volleyball at An Giang University.

Experimental group: Group B (31 males) practiced the elective strength exercise for interview.

2.3 Evaluate the effectiveness of strength training program for male students' major in volleyball at An Giang University through 12 weeks by plyometric method

After 12 weeks applying for strength training by plyometric method, we conducted a post-experimental evaluation of the two groups and considered more objective assessment than the results and comparative achievement through 4 test: high jump with momentum (cm); High jump no momentum (cm); long jump (cm); Throw a ball (1kg) with two hands (m) of two groups male students' major in volleyball at An Giang University after the experiment through T-student index.

Comparative results are presented in Table 1.1

The table 1.1 shows that:

High jump with momentum test (cm): Experimental Group $\bar{X}$ = 84.9 ± 5.91; The control group $\bar{X}$ = 75.6 ± 6.96), the average result of the experimental group and the control group after the experiment changed with t = 3.69> $t_{0.05}$ ($t_{0.05}$= 1.96), p<0.001 the difference between 2 average values is statistically significant.

High jump no momentum test (cm): Experimental Group $\bar{X}$ = 79.2 ± 5.6; The control group $\bar{X}$ = 72.9 ± 6.06, the average rusult of the experimental group and the control group after the experiment changed with t = 2.71> $t_{0.05}$ ($t_{0.05}$= 1.96), p<0.01 the difference between 2 average values is statistically significant.

Long jump test (cm): experimental group $\bar{X}$ = 286 ± 15.12; The control group $\bar{X}$ = 271 ± 14.63, the average result of the experimental group and the control group after the experiment changed with t = 2.28> $t_{0.05}$ ($t_{0.05}$= 1.96), p<0.05 the difference between the average values is statistically significant.

Throw a ball (1kg) with two hands test (m): Experimental team $\bar{X}$ = 13.86 ± 1.27; The control group $\bar{X}$ = 12.44 ± 0.84, the average result of the experimental group and the control group after the experiment changed with t = 3.75> $t_{0.05}$ ($t_{0.05}$ = 1.96), p<0.05 the difference between 2 average values is statistically significant.

The results showed that the experimental group and the control group were statistically significant difference especially experimental group (p<0.05).

Through results Table 1.1; 1.2 and graphs 1.1; 1.2 showed that all the tests of the experimental group (the selected exercises) were better than control group according to the old program.

Thus, after 120 periods applying for strength exercises, the evaluation criteria of the experimental group have increased. This is showed in graphs 1.1; 1.2.

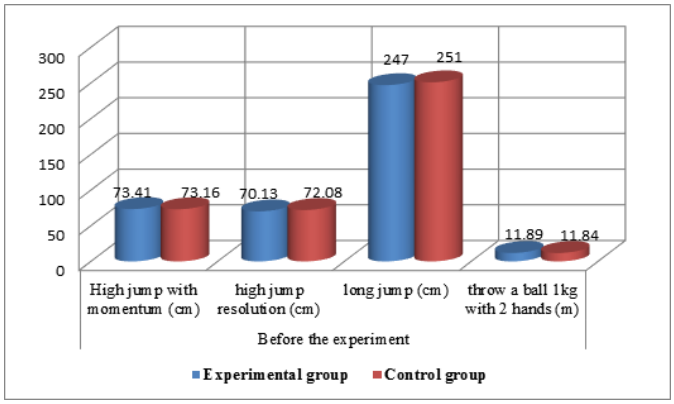

Fig 1.1: Before the experiment

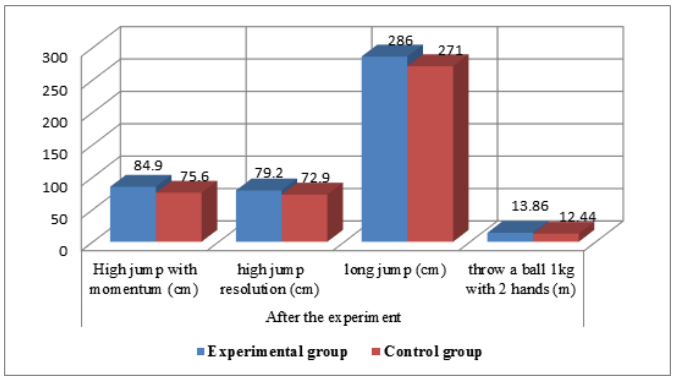

Fig 1.2: After the experiment

The experimental group had a good improvement in comparison to the control group that was tested by comparing the experimental results with the pre-experimental results (T bigger than T-table,) (Table 1.1)

Table 1.1: Test results of the two groups before and after the experiment

Order	Test	Experimental group N=31		Control group N=33		t	P
Before the experiment		$\overline{X}$	σ	$\overline{X}$	σ		
1	High jump with momentum (cm)	73.41	5.69	73.16	5.89	0.15	> 0.05
2	High jump no momentum (cm)	70.13	4.91	72.08	5.14	0.19	> 0.05
3	Long jump (cm)	247	16.32	251	14.20	0.75	> 0.05
4	Throw a ball (1kg) with two hands (m)	11.89	0.95	11.84	0.85	0.42	> 0.05
After the experiment							
1	High jump with momentum (cm)	84.9	5.91	75.6	6.96	3.69	<0.001
2	High jump no momentum (cm)	79.2	5.6	74.9	6.06	2.71	<0.01
3	Long jump (cm)	286	15.12	271	14.63	2.28	<0.05
4	Throw a ball (1kg) with two hands (m)	13.86	1.27	12.44	0.84	3.75	<0.001

At the same time, it was also demonstrated by the growth according to Brody (W%) the post-experimental criteria with pre-experiment. The average growth of the control group was 4.25%, the average growth of the experimental group was 14.15%. It means the growth of the experimental group increased significantly in comparison to the control group. Table 1.2:

Table 1.2: The growth of experimental and control group before and after experiment

Order	Test	Experimental group		W	Control group		W
		Before the experiment	After the experiment		Before the experiment	After the experiment	
1	High jump with momentum (cm)	73.41	84.9	14.51	73.16	75.6	3.28
2	High jump no momentum (cm)	70.13	79.2	12.15	72.08	72.9	1.13
3	Long jump (cm)	247	286	14.63	251	271	7.66
4	Throw a ball (1kg) with two hands (m)	11.89	13.86	15.30	11.84	12.44	4.94
$\overline{X_W}$				14.15%			4.15%

This shows that the developmental strength exercises had more positive effects than the developmental strength of students.

3. Research Results

1. Through the analysis, summary and interview experts, the study has selected 13 developmental strength exercises at hands and 9 developmental strength exercises at feet.
2. The research results have established a strength exercise system by appropriation and science of plyometric method for male students' major in volleyball of physical education department at An Giang University.
3. The strength exercises system by plyometric for male students' major in volleyball of physical education department at An Giang University of experimental and control groups has a significant increase (p<0.05) in Figure 1.2. Therefore, the growth of the experimental group increased an average 14.15% in comparison to 4.25% of the control group in four tests. This shows that the plyometric method is effective freshman's strength of physical education department at An Giang University.

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