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Effect of plyometric exercise on horizontal jump performance

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Abstract
The objective of the present study was to find out the "Effect of Plyometric Exercises on Horizontal Jump". The Plyometric exercises would help significantly to improve explosive power of legs was the hypothesis framed in the light of objective of the present study. The present study was conducted on forty two college going male students between age group 21 to 25 years. The subjects were the students of Government degree college budgam Kashmir. They were randomly divided into two groups. Each group consists of twenty one students. One group was treated as Experimental group and other was treated as Control group. To find out the effect of Plyometric exercises on horizontal jump, Experimental Group was given training for the nine weeks. Pre and post-test of standing broad jump was taken for both the Experimental and Control group. "t" test method of statistics was applied to test the hypothesis taken for present study. The data of this study was collected by the use of AAHPER Youth Fitness Test (1976) on the students. The level of significance was set at 0.05 level of confidence.

Keywords: Physical fitness, AAPHER test, plyometric and horizontal jump

Introduction
Physical fitness is defined as the state of general well-being, physically sound and healthy, along with mental stability. It is the capacity of the person to meet the physical demands of daily life and carry out the day's activities without undue fatigue. Physical fitness is considered a measure of the body's ability to function efficiently and effectively in work and leisure activities, to be healthy, to resist hypo-kinetic diseases, and to meet emergency situations. Fitness has a great importance and its significance increased day by day. Every person has different level of fitness which may change with time, place, work or situation. So fitness got attached to it. The performance in most of the sports is determined by three factors namely physical fitness, technique and tactics. Lack of knowledge about physical fitness is an important cause of relatively poor performance of our sports men in the international competitions.

Review Literature
The research scholar has gone through the available related literature, which are relevant to the present study and have been presented in Plyometric training. Swanik. G *et al*, (2002) [18] this study suggests that Plyometric activities may facilitate neural adaptations that enhance proprioception, kinesthesia and muscle performance characteristics. Significant neuromuscular benefits may be attained if they are implemented earlier into shoulder rehabilitation programs. Turner,

Owings and Schwane, (2003) [20] studied to determine whether a 6-week regimen of Plyometric training would improve running economy. Eighteen regular but not highly trained distance runners were randomly assigned to experimental and control groups. All subjects continued regular running for 6 weeks; experimental subjects were also given polymeric training.

Masamoto *et al*, (2008) studied on the acute effects of Plyometric exercise maximum squat performance in trained male athletes. This study examines the acute effects of Plyometric exercise on one repetition maximum (RM) squat performance in trained male athletes Twelve

men mean age (+/-SD:20.5+/-1.4years) volunteered to participated in 3 testing sessions separated by at least 6 days of rest.

Toumi H, Best *et al*, (2003) [19] examined the Effects of eccentric phase velocity of Plyometric training on the vertical jump. The aim of the study was to compare the effects of Plyometric training performed with rapid (or) slow stretch contractions on jump performance and muscle properties were compared. Thirty males between the ages of 19 and 22 volunteered for the8-week experiment.

Significance of the Study

Research shows that the powerful and fast movements in plyo training can boost the neuromuscular system because it encourages quick and powerful muscular contractions. It is among the best ways to increase jumping power. This is important for long jumpers and also develops explosive power. Plyo training also influences our physical durability. The findings of present study would provide information to coaches, trainers, scientists and sportspersons about the effects of Plyometric exercises on jumping performance.

Hypothesis

In the light of the objective of the present study, it was hypothesized that Plyometric exercises would help to improve explosive power of legs.

Research design

Forty two male students in the age group of 21 to 25 years studying in Govt. degree College budgam Kashmir, were selected randomly for the experiment of this study. They were given an orientation by the researcher. The purpose, objective, procedure and advantage of the experiment were explained in detail. The subjects were assured that their scores will be kept confidential and will be used only for the research purpose. The exercises selected for this study and their stepwise technique of performing were made clear with the help of demonstration. They were asked to be regular and punctual throughout the experiment. Two groups were formed for the experiment namely Experimental Group (N=21) and Control Group (N=21).

Selection of Variables

Dependent variables: "Horizontal jump" is only the dependent variable selected in the thesis.

Independent variables: Independent variables selected in the thesis are;

1. Pogo
2. Squat Jump
3. Box Jump
4. Rocket Jump
5. Star Jump
6. Double-Leg Butt kick
7. Knee-Tuck Jump
8. Single-Leg Stride Jump
9. Stride Jump Crossover
10. Quick Leap
11. Depth Jump
12. Box Jump
13. Alternate Leg Bound
14. Box Skip
15. Box Bound
16. Double-Leg Hop Progression
17. Side Hop

The tool used for this study was standing broad jump (SBJ), fourth item of American Alliance for Health Physical education and recreation (AAHPER) youth physical fitness test.

Standing Broad Jump

Purpose: This test measures the explosive power of legs.

Equipments: Long jump pit, measuring tape etc.

Test procedure: A demonstration of the standing broad jump was given to a group of subjects to be tested. The subject was then asked to stand behind the starting line with the feet parallel to each other and instructed to jump as farthest as possible by bending knees and swinging arms.

Scoring

Maximum distance measured to the nearest centimeters was the score and the best of three trials was recorded.

Result and discussion

The collected data was tabulated and computerized to draw meaningful conclusion. Mean, standard deviation and mean difference of pre and posttest of standing broad jump has been presented in the tables 1, 2, 3 and depicted in graph as well.

Table 1: Mean, Mean Differences, Standard Deviation and 'T'-Value Between Pre and Post-Test of Experimental Group

Group	Mean	Mean difference	Std. Deviation	"t"
Experimental Group	1.841 2.111	0.270	0.146 0.220	9.077*

Significant at 0.05 level t. 05(20) = 2.09

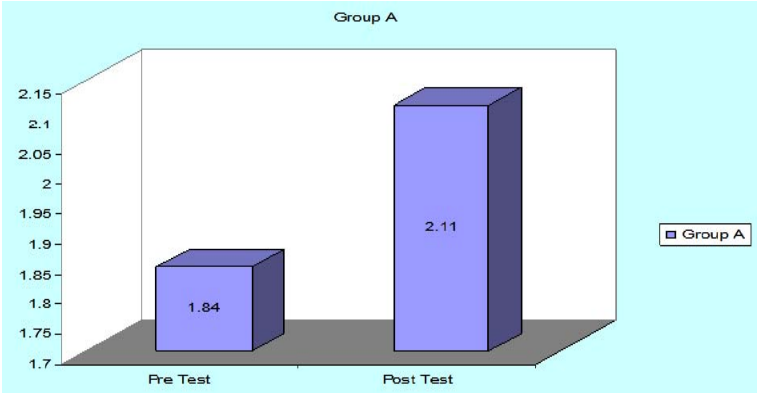

Fig 1: Graphical presentation of pre-test and post-test of experimental group

The above table shows the results of Mean, Standard Deviation and Mean differences between pre and post-test values of standing broad jump of Experimental group were 1.841 & 2.111, 0.146 & 0.220 and 0.270 respectively. It indicated that there exists significant mean difference between pre and post-test of Experimental group that was recorded 0.270. When the "t" ratio was applied to find out the statistical difference between pre and post tests, the computed "t" value 9.077 was greater than the table value of 2.09 and thus scores of post test was highly significant at 0.05 level of confidence.

Table 2: Mean, Mean Differences, Standard Deviation and 'T'-Value Between Pre and Post-Test of Control Group

Group	Mean	Mean difference	Std. Deviation	"t"
Control Group	1.874	0.006	0.161	1.813
	1.868		0.163	

Non-significant at 0.05 level $t_{.05(20)} = 2.09$

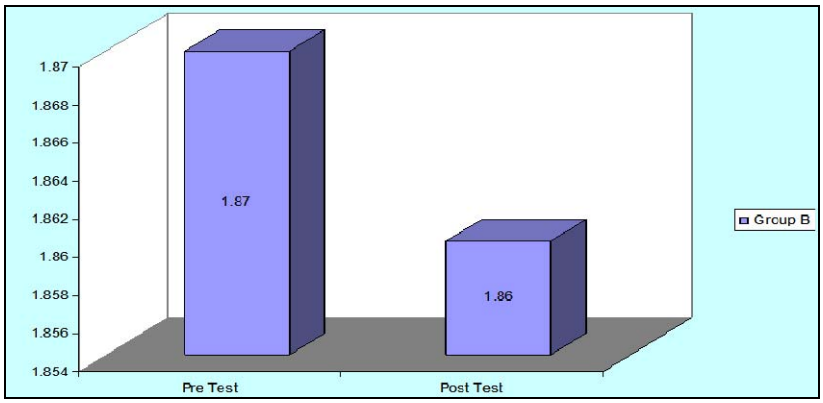

Fig 2: Graphical presentation of pre-test and post test of Control group

The results of Mean, Standard Deviation and Mean differences between pre and post-test values of standing broad jump of Control group were 1.874 & 1.868, 0.161 & 0.163 and 0.006 respectively. It showed that there exists non-significant mean difference between pre and post-test of Control group that was 0.006. When "t" ratio was applied to find out the statistical difference between pre and posttests, the computed "t" value 1.813 was less than the table value of 2.06, thus the results showed no significant difference between pre and post-test scores of standing broad jump of Control group.

Table 3: Mean, Mean Differences, Standard-Value between Post-Test of Experimental and Control Group

Groups	Mean	Mean difference	Std. Deviation	't'
Experimental group	2.111	0.243	0.220	4.076*
Control group	1.868		0.163	

Significant at 0.05 level $t_{.05(41)} = 2.02$

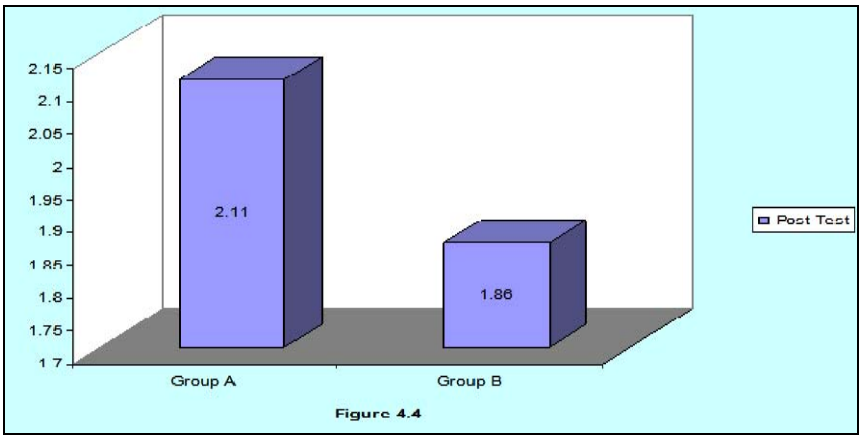

Fig 3: The table 3 reveals the Mean, Standard

Deviation and Mean difference of post-tests of Experimental and Control group that were 2.111&1.868, 0.220&0.163 and 0.243 respectively. It is evident that there exists significant difference between Mean scores of post-tests of Experimental and Control group that was 0.243. The computed "t" value of 4.076 was greater than the table value of 2.02, thus indicating that scores of post-test of Experimental group was highly significant than the scores of post-test of Control group.

Discussion on Findings

The Subjects selected for the present study were students of Govt. College of Physical Education
Ganderbal Kashmir. They were randomly divided into two groups namely Experimental Group and Control Group. The

Experimental group was given training for nine weeks whereas Control group was not given any type of training, but was permitted to join regular classes. The Mean value and Standard Deviation of pre-test and post-test of Experimental group were 1.841, 2.111 and 0.146, 0.220 respectively. When statistical comparison of pre-test and post-test of Experimental group was compared, the post-test was better than pre-test of this group ("t" 9.077). The findings regarding Mean value and Standard Deviation of pre and post-test of Control group were 1.874, 1.868 and 0.161, 0.163 respectively. The statistical comparison of the pre and post-test of Control group showed statistically non-significant difference ("t"=1.813). The Mean value and Standard Deviation of post-test of Experiment group and Control group were 2. 111, 1.868 and 0.220, 0.163.The statistical comparison of post-test of these two groups predict that the Experimental group was more better than the Control group i.e.; the difference was statistically found significant at 0.05 level of confidence ("t" = 4.076). Major

Major Conclusions

On the basis of present study following conclusions have been drawn.

1. There was non-significant difference in pre-test and post-test of Control group.
2. There existed significant difference in pre-test and post-test of Experimental group.
3. There existed significant difference in post-test of Experimental group and post-test of Control group.

Recommendations

From the results of the present study, it is clear that the Plyometric exercises are the most essential part of sports that needs jumping abilities.

1. The study may be conducted on both males as well as female players at difference level of sports participation.
2. It may be meaningful to compare on large number of the sample.
3. The Plyometric exercise should be the necessarily part of the training schedule for all levels of the competitions
4. The study may be conducted on various students of various colleges to check their physical efficiency or explosive power.

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