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To determine the effect of plyometric training on players of different sports

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Abstract
The purpose of the study was to determine to effect of plyometric Training on students of Physical Education.
Methodology: for the present study 60 male students of Govt college of physical education Ganderbal J&K, who participated in Inter –college/National level tournaments in various sports were short listed for this study. The subjects are divided into two groups one as experimental group (Group A),who receives thirty six plyometric training sessions for 8 weeks and another is control group (Group B).
Result: To Assess Pre-versus Post training performance of 30 student through statistical tool (t test) and selected experimental test were utilized. The researcher has tried to test the null hypothesis which was based on t test at 0.05 level of confidence. Conclusion Overall it can be conclude that the performance of plyometric training was highly influenced to respondents and pre-test and post-test also suggested improving result of training in Group A It was found that polymetric training increases Performance of players.

Keywords: Determine, plyometric, players, sports, plyometric

Introduction

Plyo-metric training is a form of training that is used to help develop and enhance explosive power, which is a vital component in a number of athletic performances. This training method is meant to be use with other power development methods in a complete training program to improve the relationship between maximum strength and explosive power. In order to understand how plyometric training works or why it is so effective, one must understand what is meant by "power." Power is similar to strength but with the time factor included, meaning speed. So power is relationship between strength and speed and deals with the ability to perform a certain activity' or movement the fastest". The first key aspect of plyometric training is warming up/cooling down by jogging, stretching, and simple calisthenics. This exercise is important because many plyometric exercises involve agility and flexibility. The next key, high intensity, is critical because the quickness of execution in the drill determines the training results.

The study of plyometrics may help the physical education teachers as well as coaches in training their players as well as athletes (Gambetta. Vem. (1989) [2]. might provide criteria for selecting the players.

Methodology

Introduction: One question that many high jumpers and long jumpers ask, "How can 1 get my jumps higher?" The repetitive execution of Plyometrics is used to improve timing, alignment, strength, torso stability, co-ordination of joint movement, and finally, as a first component of other movements such as pirouette, relieve and all aerial movements. Many of the skills required for jumpers are also used in sports The before training techniques that have become prominent in sport may also beapplicable to jumpers. Jumping exercises and plyometrics enhance performance and speed in sports because they increase leg strength. In a study, power and training the nervous system to activate large muscle groups when you move conducted by Hutchinson, Tremain, Christiansen, and Beitzel (1998).

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The researchers suggested that Plyometrics; training improved the jumping ability of jumpers. The objective of plyometrics is to generate the greatest amount of force in the shortest of time. Plyometrics trains the nervous system and metabolic pathways to increase explosiveness, giving the athelete the extra push needed to go higher and faster. Plyometrics requires acceleration through a complete range of motion and then relaxation into a full stretch.

For this study 60 students from Govt. college of Physical education Ganderbal, (J&K) who also participated in different tournament in different sports were selected for this study.60 subjects are divided into two groups. Group A experimental group who receive plyometric training for 8weeks and Group B (control group) without doing any plyometric training or other exercises. To collect the data following test were administered before and after training.

- Test-1: 6*10 Shuttle run. To determine the agility of the subjects.
- Test-2: Standing Broad Jump. To measure explosive strength of the legs.
- Test-3: 800 meters. To measure the maximium speed.

Administration of test
Test-1: 6x10 Shuttle Run
1. To determine the agility of the subject.
2. Stop watch measuring 1/100th of second was used.
3. 10 metres of distance is marked by two paralleled lines of 5 metres each.
4. The subject stands behind the starting line. On getting the start signal "Go" he runs faster, goes nearest to the other line and touches it with the one hand, turns and comes back to starting line, touches it with hand, turns and repeats it for a total of 6 times.
5. The time taken by the performer to complete the course of 6x10mtrs to the nearest 1/100th second is recorded as score of the test.
6. Scoring: Achievement of each subject was recorded in seconds and standardized norms were applied for getting raw scores converted into results.

TEST-2 Standing Board Jump
a. To measure the explosive strength of the leg.
b. Measuring tape, a leveled long jump pit with the take off line.
c. A line is marked near the edge of the jumping pit
d. The performer stands behind the take off line with feet together. He flexes his lance, takes back arms, raising the heels a little and along with a vigorous forward and upward arm swing be extends the knees into the jumping pit to cover the maximum horizontal distance.
e. The distance covered the centimeters between the take off line and then earnest landing mark is measured. The score will be best of three trials.
f. Scoring: Achievement of each subject was recorded in metres /centimetres and standardized norms were applied for getting raw scores converted into results.

TEST-6: 800 *Meter*
1. To measure the maximum speed.
2. Stop watch (1/10th of a second).
3. The time taken by the performer to complete the course of 800 Mts to the nearest 1/100th second is recorded as of the test.

4. Scoring: Achievement of each subject was recorded in metres / centimetres and standardized norms were applied for getting raw scores converted into results.

Analysis of data
Hypothesis testing through statistical tools
To assess pre- versus post training performance of 30 students, through statistical tool (t test) and selected samples were utilized. The researcher has tried to test the null hypothesis which was based on t-test. The test was also based for pre-test and post-test. In order to test, the impact of training on the pre-test and post-test. The raw score of pre-and post test are collected and converted into t-test as:-

Total Score (Experimental group Group A)
Physical performance

Table 1: T-value between pre-test and post-test of plyometric training group (group-a) in total score

Item	Mean	SD	Df	T Value
Pre-test and Post-test of Plyometric training group experimental group A	18.31	0.91	19	109.8

Table value (5% level of significanc, df 19)=2.04

Above table No. 1 reveals that the significance level of Group-A which his purely based on plyometric training to this group. The table further revealed that the calculated value of t-test was 109.862 while the table value of t-test was only 2.045 at 5% level of significance and degree of freedom is 19.
Here, the hypothesis 'There is no significant difference between the mean score of pre-test and post-test of plyometric training group of the total score of physical performance" is rejected. It means that there was a significant difference in plyometric training in Group-A. So further it can be concluded that the pre- and post-plyometric training process was significantly affect the performance of respondents which were selected for study. The table No. 1 show that the mean score of pre- and post-plyometric training was 18.31 where as the standard deviation was 0.91, It means that there is no deviation in the data. So the stability of observations and data are stable. Over all it can be concluded that the performance of plyometric training was highly influenced to respondents and pre-test and post-test also suggested improving result of training in Group-A.

Shuttle Run

Table 2: T-value between pre-test and post-test of plyometric training group (group-a) in 6x10 mts shuttle run

Item	Mean	SD	Df	T value
Pre-test and Post-test of Plyometric training group (Group A)	6.94	0.616	29	61.68

Table value (5% level of significance and df) = 2.045

The table No. 2 shows that the mean of score was 6.9467 which was indicating 6x10 MTS shuttle run of Group-A in pre- and post-test, where as the standard deviation was 0.6169 The standard deviation was very low value, which indicates the very low fluctuation in the data. The calculated t-value was 61.682 while table value of t-test was 2.045 at 5% level of significance.
The null hypothesis "There is no significant difference between the mean score of pre-test and post-test of plyometric training group of the score of physical performance in terms of 6x10 MTS Shuttle Run" is not accepted. It means that there

was a significant difference in pre- and post plyometric training of 6x10 MTS Shuttle Run in Group-A. Here also concluded that the impact of plyometric training was highly influence on post training in 6x10 MTS shuttle runs. The standard deviation also suggested the very uniform stability and low fluctuation.

Standing Broad Jump.

Table- 3: T-value between pre-test and post-test of Plyometric/c training group (group-a) in standing broad jump

Item	Mean	SD	Df	T value
Pre-test and Post-test of Plyometric training group (Group A)	6.13	0.39	29	85.61

Table value (5% level of significance and df) = 2.045

The above-mentioned table represents the calculated value of mean, standard deviation and t-value of the sample taken for the studs' where degree of freedom is 19. The mean of selected sample of the students is 6.1367 and standard deviation is 0.3926.
The calculated value of t-test was 85.616 and tabulated value of t-test was 2.045 when degree of freedom was 29. This shows that the calculated value was higher than the tabulated value. Hence, the null hypothesis 'There is no significant difference between the mean score of pre-test and post-test of Plyometric training group of the score of physical performance in terms of Standing Broad Jump" is rejected. Finally, it can be said that the plyometric training has positive impact on the respondents under the students.

800 Meter Run

Table- 4: T-value between pre-test and post-test of plyometric training group (group-a) in 800 mts run

Item	Mean	SD	df	T value
Pre-test and Post-test of Plyometric training group experimental group A	1.0033	0.288	29	20.73

Table value (5% level of significance and df) = 2.045

The table No.4 depicts that the mean. SD and t-value of between pretest and post-test of plyomeric training in 800 meter Run of group-A. The calculated value of t-test was 20.736 which was higher than the table value of 2.045. Hence, the null hypothesis "There is no significant difference between the mean score of pre-test and post-test of plyomeric training group of the score of physical performance in terms of 800 MTS Run" is rejected. It means that there was significance difference in pre-test and post-test of plvometric training in 800 MTS Run. Keeping in view of all the parameters taken for testing hypothesis, in all cases the Null Hypothesis rejected. This shows that the results were not as per our expectations that there is no significant relation between pre-test and post-test results. Finally, it can be strongly said that the plyometric training has positive impact on the players / subjects.

Control Group C (30 Subjects)
Total Score
Physical Performance

Table 5: Table showing the t-value between pre-test and post-test of control group (group-b) in total score

Item	Mean	SD	df	T Value
Pre test and post test of Plyometric training Control Group	1.41	0.677	29	11.392

Table value (5% level of significance and df) = 2.045

Table 5 indicates the Mean. Standard Deviation and T value of Pre Test and Post Test of Control Group (Group - C) in total score. The mean is 1.41 and SD is 0.6778. The Calculated value of T is 11.392, which is higher than table value at 5% level of significant is 2.456. So null hypothesis "There is no significant difference between the mean score of pre-test and post-test of control group of the total score of physical performance" is rejected. It indicated that training has positive influence among the samples.

6X10 MTS Shuttle Run

Table-6: table showing the t-value between pre-test and post test of control group (group-c) in 6x10 mts shuttle run

Item	Mean	SD	df	T Value
Pre test & Post test of Plyometric Training Control Group B	0.12	0.151	29	4.33

Table value (5% level of significance and df) = 2.045

It is clear from Table 6 that the Mean, Standard Deviation and T value of Pre Test and Post Test of Control Group (Group - B) in 6 x 10 Mtrs. Shuttle Run. The mean is 0.12 and SD is 0.15I. It shows the uniformity of data. The Calculated value of T is 4.331. which is higher than table value at 5% level of significant is 2.456. So null hypothesis "There is no significant difference between the mean score of pre-test and post-test of control group of the score of physical performance in terms of 6x10 MTS Shuttle Run" is rejected and alternative hypothesis is accepted. It represents that control group training has favourable influence in 6x10 MTS Shuttle Run.

Standing Broad Jump

Table 7: Table showing the t-value between pre-test and post-test of control croup (croup-b) in standing broad jump

Items	Mean	SD	Df	T value
Pre Test & Post Test of Plyometric Training Control Group B	0.29	0.22	29	7.26

Table value (5% level of significance and df) = 2.045

The statistical analysis result of Control Group (Group B) in Standing Broad Jump is presented in Table 7. The mean is 0.29 and SD is 0.22. It indicates the uniformity of data. The Calculated value of T is 7.264. which is higher than table value at 5% level of significant is 2.456. So null hypothesis " There is no significant difference between the mean score of pre-test and post-test of control group of the score of physical performance in terms of Standing Broad Jump" is rejected. It indicated that control group training has favourable influence in Standing Broad Jump.

800 MTS Run

Table 8: Table showing the t-value between pre-test and post test of control croup (croup-b) in 800 mts run

Items	Mean	SD	Df	T value
Pre test &Post test of Plyometric Training Control Group B	8.00	0.47	29	0.0093

Table value (5% level of significance and df) = 2.045

It is clear from Table 21 that the Mean, Standard Deviation and T value of Pre Test and Post Test of Control Group (Group - B) in 800 Mis. Run. The mean is 8.00 and SD is 0.4701. It shows the uniformity ot data. 1 he Calculated value of T is 0.093, which is lower than table value at 5% level of

significant is 2,456. Here null hypothesis "There is no significant difference between the mean score of pre-test and post-test of control group of the score of physical performance in terms of 800 MTS Run" is accepted. It indicates training does not influence the control group.

Comparision

Table 9: Table showing the comparison of t-value between pre-test of plyometric training group (group-a) and control group (group-b) in total score

Items	Mean	SD	df	T value
Pre-test of plyometric training Group A and Control Group B	0.703	1.025	29	1.97

Table value (5% level of significance and df) = 2.045

Table No. 9 provides detail of the comparison of t-value between pre-test of plyometric training group subject and control group subject in the total score. It also gives the details of the mean of both the groups, the standard deviation and calculated value of t. For the purpose of study the basic assumption is "There is no significant difference between the pre-test of Plyometric training group (Group-A) and Control group (Group-B) of the total score of physical performance". The mean of both the group is 0.7033, which makes clear about the average output of both the groups of data. Standard deviation for

These groups is worked out 1.0257. The calculated value of t score is 1.976. While the table value is 2.045 It is respectfully submitted that the null hypothesis "There is no significant difference between the pre-test of Plyometric training group (Group-A) and Control group (Group-B) of the total score of physical performance" is accepted for this data. As the total number of variables are 30 pairs, the degree of freedom is n-1 = 29 and the level of significance is considered at 5% for the purpose of analysis.

Table 10: Table showing the comparison of t-value between post-test of plyometric training group (group-a) and control group B.

Items	Mean	SD	df	T value
Post test of plyometric training of experimental group and control group in total score	17.6	0.93	29	103.37

Table value (5% level of significance and df) - 2.045

Table No. 10 is showing the comparison of value between post-test of plyometric training group (Group-A) and control group (Group-B) in total score. It also reveals mean and standard deviation.

For the puipose of analysis in null hypothesis is framed. "There is no significant difference between the post-test of Plyometric Paining group (Group-A) and Contol group (Group-B) of the total score of physical performance". The data makes clear that the average performance of the subject groups is 17.6067. Looking to the results of the same group before the training, the performance has increased after the training. Variation in the data shown by the standard deviation is found less. It is 0.9329 after the training. The calculated value of t is 103.372 which is higher than table value. This data shows that the performance after the training programme has increased among the group members. Gambetta. V.[1] (1989). Conclusion:

Results and Discussion

According to this research project on students of Govt. college of physical education Ganderbal. It is found that, the students who have taken plyometric Exercise during their physical activity, their performance level was increased more than all other groups of this experiment.

The study shows that the plyometric exercises plays on important role to in enhance the performance of the athletes (Chu, Donald A. (1998) [3]. Plyometric training is specific work for the enhancement of explosive power. It is not a general fitness activity. Its is highly specialized. It is a training. Method to be used in conjunction with other power-development methods in a complete training program to improve the relationship between maximum strength and explosive power. It is not a stand alone training method. For maximum effectiveness, it must be trained in conjunction with other power development methods. Correct basic technique in execution of the exercises, proper progression and periodization must be emphasized for maximum. (Constello, Frank[4])

Conclusion

The study found that plyomatric training increased the performance of students of Govt. College of physical education Ganderbal.

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