



EFFECT OF SELECTED PLYOMETRIC TRAINING ON EXPLOSIVE STRENGTH OF COLLEGE LEVEL SPORTSMEN

Ajit Kumar Chaubey¹

Affiliation:

1. Assistant Professor, Central University, Mahendragarh, Haryana
-

ABSTRACT

The purpose of the present investigation was to find out the effects of selected plyometric exercises on explosive strength of college level sportsmen. For this purpose, sixty college level sportsmen who volunteered to participate in this study were randomly selected. The selected sportsmen were divided into two equal groups, namely experimental group and control group. Experimental group was given plyometric exercises and control group was not given any experimental treatment except of their regular workouts. Experimental Group performed plyometric drills i.e. Hopping on one leg;, Hopping, Bounding and Box Jumps and Depth Jumping. The standing broad jump was the criterion measures used to measure explosive strength of the college level sportsmen. The statistical analysis of data showed that there was significant effect of plyometric training on explosive strength. The significant improvement in explosive strength was seen more on plyometric group than control group

Keywords: Plyometric training, Explosive Strength, College level, Sportsmen

1. INTRODUCTION

Plyometrics exercises are used to improve maximum strength and speed of movement which result in an increase of explosive power. Dynamic in nature, these exercises satisfy the basic training principles of specificity, practice with movements similar in nature and speed to the skills or events for which one is trained. Though plyometric training is relatively new in India, this training technique has been used extensively in USSR and America since the early 1960's. Early researches on plyometrics were made with a little interest in hopping and bounding drills. In recent years the method of plyometrics has become a part of the training methods in sports and games (Wilf & Freeman, 1984). Plyometric exercises are specialized, high intensity training techniques used to develop athletic power (strength and speed). Plyometric training involves high-intensity, explosive muscular contractions that invoke the stretch reflex (stretching the muscle before it contracts so that it contracts with greater force). The most common plyometric exercises include hops, jumps and bounding movements. One popular plyometric exercise is jumping off a box and rebounding off the floor and onto another, higher box. These exercises typically increase speed and strength and build power.

Plyometrics consists of exercises commonly used to enhance explosive power via the stretch-shortening cycle (SSC), (Michael et al., 2001; Rahimi, 2005). The stretch component of the SSC refers to the eccentric muscle action, whereas the shortening refers to the concentric muscle action (Michael et al., 2001). Elastic energy is stored in the tendo-muscular system during the eccentric action (Michael et al., 2001). This is accomplished by optimizing the stretch-shortening cycle, which occurs when the active muscle switches from rapid eccentric muscle action to rapid concentric muscle action (Luebbers et al., 2003; Lachance et al., 1995; Wagner et al., 1997).

The purpose of the present investigation was to find out the effects of selected plyometric exercises on explosive strength of college level sportsmen.

2. METHODOLOGY

2.1 Selection of Subject:

Sixty male sportsmen who volunteered to participate in this study were randomly selected for this purpose. All of the subjects participated in inter-collegiate level sports and games competitions. They were being trained by means of a plyometric exercises. The subjects received all the necessary information about the study's procedures. $M \pm SD$ of age was 22.14 ± 1.59 years. The selected sportsmen were divided into Experimental group-I, Experimental group and control group. Experimental group was given plyometric exercises and control group was not given any experimental treatment except of their regular workouts.

2.2 Training Protocols:

Training group was trained five days per week for a period of six weeks. Training exercises were given in the morning and evening for duration of 90 minutes per day from Monday to Friday. All workouts were given after warming up. Warming up was concluded with numbering exercises, Before the initiation of the training periods, the subjects of all the groups were instructed about the proper execution of all of the exercises to be used during the training period for all training regimens. This assured good orientation and helped the subjects to explore better. The subjects in the experimental group performed the following plyometric drills:

1. Hopping on one leg: Hopping should be considered as running on one leg. The other leg does not remain passive but punches hand forward landing with feet. Both knees should be released.
2. Hopping, Bounding and Box Jumps: Bounding is an exaggeration of the running action. The athlete emphasis a vigorous thrust off the ground and step high up and forward. The progressive thigh is driven at waist height and parallel to the ground landing employ an active reach for the ground. After hopping bounding jumping drills as per the work schedule was given, the subjects were given drills on jump over hurdles and depth jump.
3. Depth Jumping: To perform depth jumping the subjects stand on top of the box and drop off to the ground it was done in single leg and double leg. He should not jump off the box.

Initial and final scores on speed were collected using standard tests before and after the experimental period. And the collected data were subjected to statistical treatment.

3. TEST ADMINISTRATION

The standing broad jump (Yobu, 1988) was the criterion measures used to measure explosive strength of the college level sportsmen. The criterion measure is explained below:

Purpose : To measure the explosive power of legs. Materials: Tape, Jumping pit. Procedure: The student stands behind a take off line with his feet several inches apart. Before jumping, the student dips at the knees and swings the arm backward. He then jumps forward by simultaneously extending the knee and standing the arms forward three trials are permitted. Scoring: The scoring is the distance between the take off line and the nearest points where any part of the student body touches the floor. Best performance out of three trials is taken as his score.

4. RESULTS AND DISSCUSION

The collected data on the explosive strength prior to and after 6 weeks of plyometric exercise were statistically analysed using t- test and data pertaining to this has been presented in Table 1 and 2

TABLE 1
DESCRIPTIVE STATISTICS OF EXPLOSIVE STRENGTH OF LEG OF COLLEGE LEVEL MALE BEFORE PLYOMETRIC TRAINING

Test	Groups	M	SD
Pre-test	Experimental Group	1.99	0.41
	Control Group	1.90	0.56
Post-test	Experimental Group	2.45	0.32
	Control Group	2.01	0.53

TABLE 2
SIGNIFICANCE OF DIFFERENCE BETWEEN THE PRE-TEST AND POST-TEST MEAN SCORES ON EXPLOSIVE STRENGTH OF COLLEGE LEVEL SPORTSMEN

Test	Experimental Group	Control Group	MD	DM	t-ratio
Pre-test Mean	1.99	1.90	0.09	0.081	1.10
Post-test Mean	2.45	2.01	0.44	0.21	2.13*

* Significance at .05 level, $t_{.05}(58)=2.00$

It is evident from Table 2 that the significant difference was not found between pre-test mean scores between experimental and control group on explosive strength of college level sportsmen, as the obtained t-value of 1.10 was less than the required $t_{.05}(58)$

= 2.00. So, it is demonstrated that the random assignment of the subjects for three groups (Plyometric, Weight training and control group) was successful

But the significant difference was found between post -test mean scores between experimental and control group on explosive strength of college level sportsmen, as the obtained t-value of 2.13 was high than the required t.05 (58) = 2.00. So, it was found that there was significant improvement due to treatment of plyometric training exercises on the subjects.

It was also documented that due to plyometric exercises, there was significant mean gains over experimental group. The findings of this study were in agreement with the findings of Mullai (1987), who found that plyometric exercises improved sprinting ability. The findings of this study were also in agreement with the findings of Watson (1983), who found that plyometric exercises were better in improving physical fitness of the subjects.

5. CONCLUSIONS

Based on the results and discussions of the study. it was concluded that

1. Significant difference was found between post -test mean scores between experimental and control group on explosive strength of college level sportsmen
2. There was more improvement in explosive strength was observed more in plyometric group than control group.

REFERENCES

- Lachance, P. F.** "Plyometric Exercise". Journal of Strength Conditioning . Research. 8 (1995) : 16-23.
- Luebbers, P. E., Potteiger, J. A., Hulver, M. W., Thyfault, J. P., Carper, M. J., & Lockwood, R. H.** "Effects of Plyometric Training and Recovery on Vertical Jump Performance and Anaerobic Power" Journal of Strength Conditioning . Research.17 :4 (2003) : 704–709.
- Mullai, T.D.** "Effect of Selected Piyometric Exercises on the Performance of Long Jump", Unpublished Master's Thesis, University of Madras, 1987.
- Michael, M., & Ciser, C.** "The Influence of Varied Rest Interval Lengths on Depth Jump Performance". Journal of Strength Conditioning . Research.15 : 3 (2001) : 279-283
- Rahimi, R., & Behpur, N.** "The Effects of Plyometric, Weight and Plyometric-Weight Training on Anaerobic Power and Muscular strength". Journal of Physical Education and Sport. 3 : 1 (2005) : 81 – 91.
- Watson, A.W.S.,** Physical fitness and Athletic performances, New York: Longman Inc, 1983.
- Yobu, A.** Test, Measurement and Evaluation, Madras: Grace Printers, 1988. p. 212
- Wagner, D.R., & Kocak, M.S.** "A Multivariate Approach to Assessing Anaerobic Power following a Plyometric Training Program". Journal of Strength Conditioning . Research., 11 (1997) : 251–255.
- Wilf, Paish and Freeman, Everlyne** Plyometrics, Iowa: Championship Books,,1984.