# THE EFFECT OF 6 WEEK PLYOMETRIC TRAINING PROGRAM ON AGILITY OF COLLEGIATE SOCCER PLAYERS

*Raj kumar*

*Research scholar, Department of Physical Education, BHU, Varanasi,India*

ABSTRACT

*The purpose of this study was to investigate the effect of 6 week plyometric training program on agility of collegiate soccer players.To achieve the purpose of this study 30 students selected from C.S.J.M. University, Kanpur were selected as subjects. Their age ranged between 20 to 25 years. The selected subjects were randomly divided into two groups each group consists of 15 students, namely experimental group 'A' and control group 'B'. Plyometric training for 6 week was assigned to experimental group 'A', and control group 'B' does not undergone any type of experimental training. All the training programmes were scheduled for three days per week for a period of 6 week. The agility measured by the help of T Test. The data collected from the plyometric training group 'A', and control group 'B' on the criterion measures i.e., agility was statistically analyzed by the application of analysis of covariance (ANCOVA). The mean of pre test for plyometric training group (14.61) and control group (14.73). Further the mean of post test for plyometric training group (14.35) and control group (14.99). The result of ANCOVA shows that there was significant effect of 6 week plyometric training group agility of collegiate soccer players. In the light of finding it was conclude that plyometric training improves agility of collegiate soccer players. This meta-analysis extends that the plyometric training improved times in the agility measures because of either better motor recruitment or neural adaptations.*

Key Words: *Plyometric Training, Agility, Soccer Player and Motor.*

## INTRODUCTION:

Plyometric training is not a particularly new training method. Even though it has recently received much attention it has been a part of the training of athletes in a variety of sports for years. It just was not called plyometric. The word plyometric didn't appear in the training literature until the late 1960's. Scientific research has given us a fundamental understanding of the elastic properties of muscle and its trainability. A form of training that develops explosive power. It consists of performing of hops, bounds, and jumps so that maximum effort is expended while a muscle group is lengthening. During plyometric, a concentric muscle action (shortening) is immediately followed by an eccentric action (lengthening). This combination of dynamic

muscle action is believed to use the stretch reflex in such a way that more than the usual numbers of motor units are recruited. Plyometric forms part of the training programme for most sprinters, jumpers, and throwers. However, there is a high risk of injury for those who are not well-conditioned. Plyometric is a type of exercise training designed to produce fast, powerful movements, and improve the functions of the nervous system, generally for the purpose of improving performance in a specific sport. Plyometric movements, in which a muscle is loaded and then contracted in rapid sequence, use the strength, elasticity and innervations of muscle and as it was supposed to be surrounding tissues to jump higher, run faster, throw farther, or hit harder, depending on the desired training goal. Plyometric is used to increase the speed or force of muscular contractions, often with the goal of increasing the height of a jump or the speed of a punch or throw. Speed and strength are integral components of fitness found in varying degrees in virtually all athletic movements. Simply put the combination of speed and strength is power. For many years, coaches and athletes have sought to improve power in order to enhance performance. Throughout this century and no doubt long before, jumping, bounding and hopping exercises have been used in various ways to enhance athletic performance. In recent years, this distinct method of training for power or explosiveness has been termed plyometric. Whatever the origins of the word the term is used to describe the method of training that seeks to enhance the explosive reaction of the individual through powerful muscular contractions because of rapid eccentric contractions. Athletes from a wide range of sports use plyometric training to help them reach peak physical condition. Used correctly, it can be a highly effective form of power training, especially when combined with a suitable strength training program.

PURPOSE OF THE STUDY:

The purpose of this study was to investigate the effect of 6 week plyometric training program on agility of collegiate level soccer players of 20-25 years of age.

PROCEDURE:

SELECTION OF SUBJECTS-

The purpose of the study was to find out the effect of 6 week plyometric training program on agility of collegiate soccer players. Their age ranged from 20-25 years. To achieve these purpose 30 male soccer players from C.S.J.M. University Kanpur, studying in various departments were randomly selected as subjects. They were divided into two equal groups and each group consisted of 15 subjects. Group A underwent plyometric training for three days per week for 6 week and Group B acted as a control who did not participate any special training apart from the regular curricular activities. Agility was measured with the help of T Test.

EXPERIMENTAL TRAINING SCHEDULE-

A progressive training schedule for experimental group A (i.e., Plyometric training) was given for period of 6 week. The plyometric training was conducted in the evening session for the duration of one hour, 3 days per week.

Table 1
TRAINING SCHEDULE
PLYOMETRIC EXERCISE TRAINING SCHEDULE FOR 6 WEEK

| Weeks | Days | Plyometric Drill | Sets X Reps | Training Intensity |
|---|---|---|---|---|
| 1st | Monday | Side to side ankle hops | 2 x 15 | Low |
| | Wednesday | Standing jump and reach | 2 x 15 | Low |
| | Friday | Front cone hops | 5 x 6 | Low |
| 2nd | Monday | Side to side ankle hops | 2 x 15 | Low |
| | Wednesday | Standing jump and reach | 5 x 6 | Low |
| | Friday | Lateral jump over barrier | 2 x 15 | Low |
| | | Double leg hops | 5 x 6 | Medium |
| 3rd | Monday | Side to side ankle hops | 2 x 12 | Low |
| | Wednesday | Standing jump and reach | 4 x 6 | Low |
| | Friday | Lateral jump over barrier | 2 x 15 | Low |
| | | Double leg hops | 3 x 8 | Medium |
| | | Lateral cone hops | 2 x 12 | Medium |

| | | | | |
|---|---|---|---|---|
| 4th | Monday<br>Wednesday<br>Friday | Diagonal cone hops<br>Standing long jump with lateral sprint<br>Lateral cone hops<br>Single leg bounding<br>Lateral jump single leg | 4 x 8<br>4 x 8<br>2 x 12<br>4 x 7<br>4 x 6 | Low<br>Medium<br>Medium<br>High<br>High |
| 5th | Monday<br>Wednesday<br>Friday | Diagonal cone hops<br>Standing long jump with lateral sprint<br>Double leg hops<br>Single leg bounding<br>Lateral jump single leg | 2 x 7<br>4 x 7<br>3 x 8<br>4 x 8<br>2 x 8 | Low<br>Medium<br>Medium<br>High<br>High |
| 6th | Monday<br>Wednesday<br>Friday | Diagonal cone hops<br>Hexagon drill<br>Cone hops with change of direction sprint<br>Double leg hops<br>Lateral jump single leg | 2 x 12<br>2 x 12<br>4 x 6<br>3 x 8<br>4 x 6 | Low<br>Low<br>Medium<br>Medium<br>High |

ANALYSIS OF DATA AND RESULTS OF THE STUDY:

The data which was obtained from the subject was analyzed statistically by the application of analysis of covariance (ANCOVA). Then obtained "F" ratio was tested at 0.05 level of significance.

Table-2

Mean and Standard Deviation of agility for Experimental and control group of soccer players

| GROUPS | Mean | | Std. Deviation | |
|---|---|---|---|---|
| | Pre | Post | Pre | Post |
| Plyometric training | 14.61 | 14.73 | 0.40 | 0.27 |
| Control | 14.35 | 14.99 | 0.48 | 0.60 |

Table -2 reveal that the mean and standard deviation of Agility of Pre Test (Experimental Group 14.61± 0.40, control Group 14.35±0.48), Post Test (Experimental Group 14.73 ±0.27, control Group 14.99 ±0.60).

Table -3

ANALYSIS OF CO-VARIANCE OF THE MEANS OF EXPERIMENTAL GROUP AND THE CONTROL GROUP IN RELATION TO AGILITY

| | Groups | | Sum of Squares | | df | Means sum of squares | F-ratio |
|---|---|---|---|---|---|---|---|
| Mean | Experimental | Control | | | | | |
| Pre-test | 14.61 | 14.73 | A | 0.12 | 1 | 0.12 | 1.02 |
| | | | W | 3.30 | 28 | 0.11 | |
| Post-test | 14.35 | 14.99 | A | 3.10 | 1 | 3.10 | 10.37* |
| | | | W | 8.38 | 28 | 0.29 | |
| Adjusted post test | 14.39 | 14.96 | A | 2.30 | 1 | 2.30 | 8.77* |
| | | | W | 7.07 | 27 | 0.26 | |

* Significant at 0.05 level of significance

F = Ratio needed for significance at 0.05 level of significance = df (1, 28) = 4.20, df (1,27) = 4.21

The analysis of co-variance for agility indicated that the resultant F-ratio of 1.02 was insignificant in case of pre-test means from which it is clear that the pre-test mean does not differ significantly and that the random assignment of subjects to the experimental groups was quite successful. The post-test means of all the two groups yielded a F-ratio of 10.37 which was significant at 0.05 level of confidence. The F-ratio needed for significance with 1, 28 degree of freedom is 4.20 at 0.05 level of confidence.

The difference between the adjusted posts means was found significant as the obtained F-ratio was 8.77. The F-ratio needed for significance at 0.05 level of confidence was 4.21. Thus, mean significant difference exits between experimental and control group in relation to agility.

Table – 4

Post Hoc mean comparison of experimental and control group in relation to vital capacity

| Experimental group | Control group | Mean difference | Critical difference |
|---|---|---|---|
| 14.39 | 14.96 | 0.57* | 0.38 |

The above table reveals that significant difference exist between experimental and control group as the mean difference of 0.57 is greater than the critical difference of 0.38. As the mean of experimental group is greater than control, thus there was significant effect of plyometric training on agility.

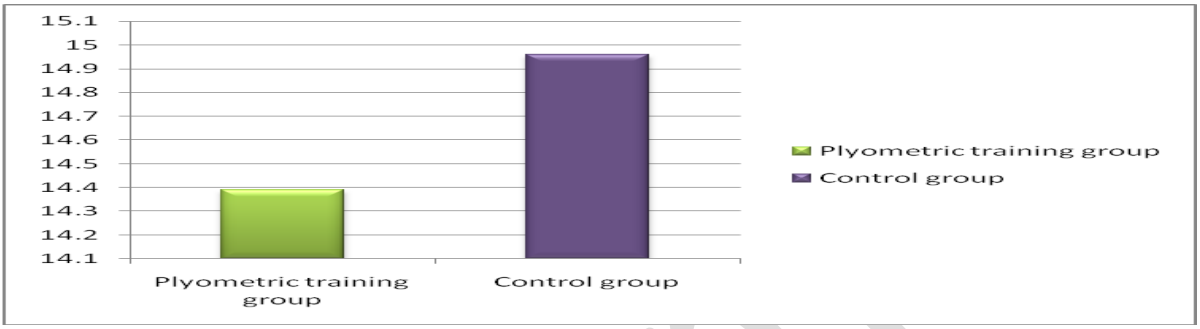


Figure 1 Difference in Means of Plyometric and Control Group for Agility

DISCUSSION:

There is a significant change in all the subjects of experimental group in the plyometric training program during the training period. From the table it is evident that, in agility significant changes were noticed after 6 week of plyometric training program. With regards to control group no significant change were noticed in the selected variables.

By finding significant difference for agility test, this result indicates that the plyometric training improved times in the agility measures because of either better motor recruitment or neural adaptations. Neural adaptations usually occur when athletes respond or react as a result of improved coordination between the CNS signal and proprioceptive feedback (Craig, 2004). However, we could not determine if neural adaptations occurred via synchronous firing of the motor neurons or better facilitation of neural impulses to the spinal cord which also supports the suggestions of Potteiger et al. (1999). Subjects who underwent plyometric training were able to improve their times significantly on 'T'- test. This improvement in agility is beneficial for soccer players who require quick movements while performing their sport. Thus result is supported by the studies done by Michael G. Miller, Jeremy J. Herniman, Mark D. Ricard, Christopher C. Cheatham and Timothy J. Michael (2006).

References

*Narasimham T.K., "Encyclopedia of sports training introduction to sports training volume- I" (Crescent Publishing Corporation, New Delhi, 2008)*

*Thomas J.P., "Let us Coach Soccer" (New Delhi: YMCA Publication House, 1964)*

*Uppal A.K., "Principles of sports training" (Indian: Friends publications, 2001)*

*Wtlest A Deborah and Bucher A.Charles, "foundation of physical education and sports" (New Delhi: Janapath, BI publication Pvt. Ltd. 1992)*

*G Miller Michael et.al "The effects of a 6-week plyometric training Program on agility" Journal of Sports Science and Medicine, (2006).*

*G.Markovic, "Does plyometric training improve vertical jump height? A meta-analytical review" British Journal of Sports Medicine, 2007 June; 41(6).*

*GF Martel et. al., "Aquatic plyometric training increases vertical jump in female volleyball players" Medicine and Science in Sports and Exercise, 2005 October; 37(10).*

*GJ Wilson, AJ Murphy, A Giorgi, "Weight and plyometric training: effects on eccentric and concentric force production" Canadian Journal of Applied Physiology, 1996 August; 21(4).*

*H Carter, AM Jones, JH Doust, "Effect of 6 weeks of endurance training on the lactate minimum speed" Journal of sports science, 1999 December, 17(12).*

*Helgerud Jan et. al., "Aerobic endurance training improves soccer performance" Medicine and Science in Sports and Exercise, Vol. 33, No. 11, 2001.*

*J Hoff et.al, "The soccer specific aerobic endurance training" British journal of sports medicine, 2002 June; 36(3).*

*J Hoff., "Training and testing physical capacities for elite soccer players" Journal of Sports Science, 2005 June;23(6).*