

EFFECT OF PLYOMETRIC AND CIRCUIT TRAINING PROGRAMME ON AGILITY OF MALE BASKETBALL PLAYERS OF PUNJAB

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Abstract

The purpose of this study was to compare the effect of plyometric and circuit training programme on agility. For this study, one hundred twenty (120) male basketball players were selected from Punjab, age ranging from 12 to 16 years. These players were divided into two groups: Experimental Group (n=60) and Control Group (n=60). The Agility was measured before and after a six-week training period. The players of Experimental group were trained for six days per week on alternative days (Plyometric Training on Monday, Wednesday and Friday whereas Circuit Training on Tuesday, Thursday, and Saturday), whereas Control Group did not participate in any training activity. The Agility was measured through shuttle run 10×10 Yards. Mean and Standard Deviation of the shuttle run were calculated. However, the Experimental Group showed a sign of improvement in shuttle run that was significantly lesser than Control Group. It was analysed through statistical procedure by using 't-test'. Results of this study showed significant difference between Experimental group and Control Groups in pre-test and post-test for dependent measurements ($p < 0.05$).

Key words: Basketball, Plyometric Training, Circuit Training, Agility.

Introduction

Training is an important activity which improves physical performance of the individual or a group. When we are talking about physical performance, it means sports performance and performance of our body to sustain our routine life. This shows that player's performance is important for the performance of the organization and the training and development is beneficial for the players to improve their performance. Players practice to achieve a specific goal through structured and focused training. The intent of the training is to increase the player's ability and work capacity to optimize his performance. Training is undertaken across a long period of time. The player learns to cope with highly stressful stimuli in training and competitions. Physical excellence should evolve through an organized and well-planned training program based on practical experience.

Training is good for all the games. "Games for the fun of it", is a common saying and it is indicative of the pleasure one derives through participation

in the games and sports. Basketball is one, among the most popular of modern games. It takes its pride of place as the most popular and more people in U.S.A. play Basketball than any other game. The standard of play there is so good and the game so exciting that the basketball fans of that continent outnumber all others. This wonderful game, which originated in the United States, has spread to other countries of the world largely due to Y.M.C.A. Physical Directors, Army, Navy and Air Force personnel. The pleasure and the thrill the game produces has impelled the people of all classes to play Basketball or witness the game the world over. From humble beginnings, Basketball has progressed to be a “world-wide game”, internationally popular and universally accepted.

Basketball is an American game. The game was invented by Dr. James Naismith in 1891, at the Springfield College, Massachusetts, U.S.A. The circumstance that led to the origin of basketball is interesting. The Y.M.C.A leaders felt the need for a game that would fill in during winter months, between the American Football and Baseball seasons. The task of finding a suitable game was assigned to Dr. Naismith, who first tried to modify some of the existing games. Basketball got its name from the baskets used in the first game. Basketball is a sport with various complicated demands that need an aggregation of fitness, skill, team tactics and strategies, as well as motivational attitude. The ability to generate top strength level has been estimated as the key to get high sports feat.

However, main areas that are likely to play an implicating role in a basketball player's achievement are muscular strength, speed, fitness and body size. It is a very demanding and physically challenging game. The ability of athletes has far exceeded the limits of the game put on them by the original inventors. The skills required by today's players are extremely different than those of yesterday. Basketball allows for individual athletes to exhibit physical aptitude within the context of an offence or defence. The attributes of change of direction and power are rules of the game. The athlete should be concerned with developing strength, agility and speed that enable the player to sustain maximum performance for the duration of the game. Explosive Strength is the capacity of the individual to release maximum force in the shortest period of time and agility plays important role in all games and sports, because when a player participates in the game then he/she has to bring about a purpose of fast change in direction and movement of different parts of the body.

Plyometric training is an excellent way to train for the players' demands of basketball. Training programmes should include repeated high intensity work, followed by period of recovery that imitates the specific tasks related to basketball. Other terms used in combination with Plyometric training are depth jump, box jump and jump training. Plyometric training has been used in basketball training program as a useful method for improving motor performance. Plyometric exercises are used mainly to increase the maximal power output and jumping ability. It includes training loads with a number of rebounds and intervals between sets of exercises and drills. In plyometric training, athletes perform stopping, starting and changing direction in an explosive way, which helps to improve agility. One of the most effective mean of training for power is through plyometric training. It includes training loads with a number of rebounds and intervals between sets of exercises and drills. These abilities are the necessary skills in many team games including basketball because they enable players to do activity during the game at the required height, speed and at the right moment. Several researchers have used Plyometric training in their research and have shown that it improves power output and increases explosiveness by training the muscles to do more work in a shorter amount of time (Adams, *et. al.*,1992; Holcomba, 1996)

Circuit training is a term that is usually linked with strength building but the principles that apply to building strength also apply to improving the basketball. When a player undergoes circuit training, he/she goes to various stations that are set up so that he/she can work on a variety of skills throughout the practice session. Circuit training refers to a number of specially selected exercises arranged consecutively. In the original format, there are 9-12 stations which comprised the circuit; this number may vary according to the circuit's design. Each circuit training participant moves from one station to the next with little (15-30 seconds) or no rest, performing a 15 to 45 second work session of 8-20 repetitions at each station using a resistance of about 40%-60% of One Repetition Maximum (1RM). The Circuit Training workout program may be performed with exercise machines, hand held weight, elastic resistance, calisthenics or any combination of any of these.

Agility enables the athlete to change the position of his body quickly and easily. Agility is important for evading a tackler in Foot ball, dodging in Basketball and Hockey, and turning at the end of Swimming Lane. Agility refers to the manoeuvrability of the individual, i.e., the ability to change the direction of movement rapidly, without less of balance or sense of position.

It is therefore, a combination of speed, strength quick reactions, balance and coordination and can refer to the total body or to a specific part, such as the hands or feet.

Agility has been defined as the ability to maintain a controlled body position and rapidly change direction without a loss of balance, body control or speed (Roozen, 2008 & Miller, 2006). The components of agility have been defined as balance, coordination, power and speed (Angeli, 2006). Benefits from improved agility include increased body control during fast movements, increased intramuscular coordination, and decreased risk of injury or reinjure (Gabbett, 2002).

Objectives

- To prepare a Plyometric Training, Circuit Training programme for enhancing the performance of the subjects in basketball game.
- To find out the effect of Plyometric Training, Circuit Training programme on agility of male basketball players of experimental group.

Hypotheses

- There is no significant difference in Plyometric Training and Circuit Training programme on Agility between Experimental group and Control group.
- There is no significant difference in Plyometric Training and Circuit Training programme on Agility between pre- test and post-test of Experimental Group.

Delimitations

The research was delimited to male basketball players of Punjab.

The study was delimited to one hundred twenty male basketball players (sixty in Experimental Group and sixty in Control Group).

All the subjects who have participated in interschool, District and State competitions - age ranging from 12 to 16 years were selected randomly.

The training programme of plyometric training and circuit training was restricted to one hour for six weeks in which subjects attended the training for three days each in a week on alternate days.

Training Schedule

The Plyometric Training, Circuit Training Programme will be administrated thrice a week on alternate days. Plyometric Training Programme would be on Monday, Wednesday and Friday whereas Circuit Training Programme would be carried out on Tuesday, Thursday and Saturday per week for six

weeks. The load for the training programme will be progressively increased from beginning to the end of the training session.

Table-1 Plyometric Training Programme

	Week 1 & Week 2		Week 3		Week 4 & Week 5		Week 6	
	Repetition	Sets	Rep	Sets	Rep	Sets	Rep	Sets
MONDAY								
Jump Squat	15	2	20	2	20	3	20	4
Box Jump	15	2	20	2	20	3	20	4
Side Jump	15	2	20	2	20	3	20	4
Strides	15	2	20	2	20	3	20	4
Skipping	15	2	20	2	20	3	20	4
WEDNESDAY								
Side way box jump	15	2	20	2	20	3	20	4
Jump over to tuck jump	15	2	20	2	20	3	20	4
Sumo Jump	15	2	20	2	20	3	20	4
Hamstring curl fast	15	2	20	2	20	3	20	4
Jumping on Toes	15	2	20	2	20	3	20	4
FRIDAY								
One Leg Hop jump	15	2	20	2	20	3	20	4
Box Jump	15	2	20	2	20	3	20	4
Side Way Jump	15	2	20	2	20	3	20	4
Depth jump	15	2	20	2	20	3	20	4
Scissor Jump	15	2	20	2	20	3	20	4

Table-2 Circuit Training Programme

	Week 1 & Week 2		Week 3 & Week 4		Week 5 & Week 6	
	Duration(sec)	Sets	D (sec)	Sets	D (sec)	Sets
TUESDAY, THURSDAY, SATURDAY						
Jumping Jacks	20	3	30	3	45	3
Kicking back	20	3	30	3	45	3
High knee strides	20	3	30	3	45	3
Side hopes	20	3	30	3	45	3
Squat	20	3	30	3	45	3
Flutter kick	20	3	30	3	45	3
Pilates Leg Pulls	20	3	30	3	45	3
Pilates Leg Pulls	20	3	30	3	45	3

Method And Procedure

The study is experimental in nature. In this study, the sample of one hundred and twenty male basketball players was selected from Punjab, age ranging from 12 to 16. The selected male basketball players were further divided into two groups (one is Experimental Group and second is Control Group) with sixty players in each. Experimental group went through Plyometric and Circuit Training Programme for one hour, after 15 minutes of warm-up and stretching exercise, for six weeks, whereas the Control Group did not undergo any special training programme. Agility was measured with the help of shuttle run and the score was recorded in seconds. The data would be collected by the pre- test (T1) and the post-test (T2) after Six-week training programme.

Statistical Techniques

For analysis of the data collected from pre-test and post test of Experimental Group and Control Group of basketball players, Mean and Standard Deviation were computed. For this purpose 't-test' was applied and for testing the hypotheses, the level of significance was set at 0.05%.

Findings And Discussion

The statistical analysis on significance of the mean was carried out between pre-test of EG & CG, post-test of EG & CG and pre-test & post test of EG for six weeks. The results have been dedicated below:

Table 3 : Mean, S.D and t-value of pre-test on Agility between Experimental Group and Control Group

Groups		N	Mean	SD	df	t-test
Experimental Group	Pre-test	60	11.33	0.93	118	0.62*
Control Group	Pre-test	60	11.24	0.85		

*Table Value=1.96 at 0.05 level

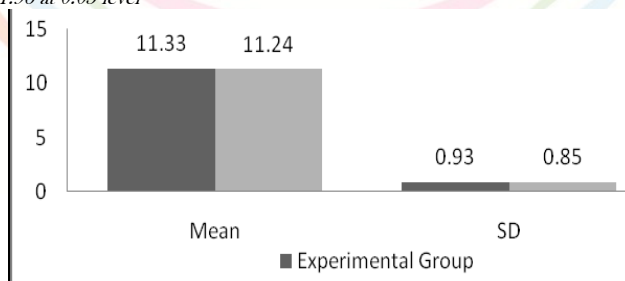


Fig. 1 -Comparison of Mean and S.D of Pre-test on Agility between Experimental Group and Control Group.

Figure 1 shows the Mean score (11.33) of the agility component of Pre-test of Experimental Group which is higher than the Mean score (11.24) of Control group of male basketball player of Punjab. However, the t-ratio is 0.62, which is not significant at 0.05 level. The calculated value of agility is less than the table value (1.96), hence we accept the null hypothesis. There is no significant difference between Experimental Group and Control Group of male basketball players of Punjab.

Table 4 : Mean, S.D and t-value of Post-Test on Agility between Experimental Group and Control Group

Groups		N	Mean	SD	Df	t-test
Experimental Group	Post-test	60	9.76	0.32	118	6.63
Control Group	Post-test	60	10.96	1.43		

*Table Value=1.96 at 0.05 level

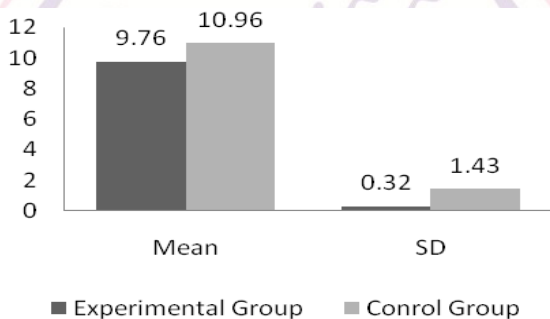


Fig. 2 Comparison of Mean and S.D of Post-Test on Agility between Experimental Group and Control Group.

Figure 2 shows the Mean score (9.76) of the Agility component of post-test of Experimental Group is less than the Mean score (10.96) of Control group of male basketball players of Punjab. However, the t-ratio is 6.63, which is significant at 0.05 level. It means that Experimental group has better Agility than Control group of male basketball players of Punjab. The calculated value of Agility (6.63) is more than the table value (1.96), hence we reject the null hypothesis. There is a significant difference of post-test between Experimental Group and Control Group of male basketball players of Punjab.

Table 5 : Mean, S.D and t-value between Pre-test & Post-test on Agility of Experimental Group

Groups		N	Mean	SD	Df	t-test
Experimental Group	Pre-test	60	11.33	0.93	118	6.43
Experimental Group	Post-test	60	9.76	0.32		

**Table Value=1.96 at 0.05 level*

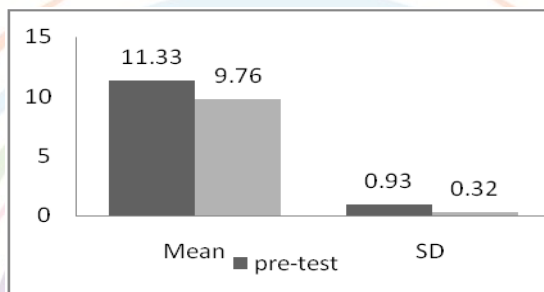


Fig 3. Comparison of mean and S.D between Pre-test and Post-test on Agility of Experimental Group.

Figure 3 shows the Mean score of the Agility component of Pre-test of Experimental Group of 11.33 which is higher than the Mean score i.e. 9.76 of Post-test of Experimental Group of male basketball players of Punjab. However, the t-ratio is 6.43, which is significant at 0.05 level. It means that Post-test of Experimental Group should better Agility than Pre-test of Experimental Group of male basketball players of Punjab. The calculated value of Agility (6.43) is more than the table value (1.96), hence we reject the null hypothesis. There is a significant difference of pre-test & post-test between EG of male basketball players of Punjab.

Discussion And Conclusion

The Plyometric and Circuit Training improved or increased lower body muscular strength from pre to post training. The Plyometric and Circuit Training programme brings positive effect on shuttle run of Agility on male basketball players of Punjab.

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