

Efficacy of multiple jump drill training on selected power parameters of basketball players

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ABSTRACT: The purpose of the study is to find out the efficacy of multiple jump drill training on selected power parameters of basketball players. To achieve the purpose, thirty women basketball players were randomly selected as subjects. The age of the subjects was ranged between 18 to 24 years. The selected subjects were assigned into two groups of 15 subjects each. Group I underwent multiple jump drill training for three days per week for twelve weeks and group II acted as a control. Among the power parameters, explosive power in terms of vertical distance and explosive power in terms of horizontal distance were selected as criterion variables. The multiple jump drill training was selected as the independent variable. The explosive power in terms of vertical distance and explosive power in terms of horizontal distance were assessed by vertical jump and standing broad jump tests respectively. All the subjects of two groups were tested on selected dependent variables at prior to and immediately after the training programme. The data was analyzed using Analysis of covariance (ANCOVA). The .05 level of confidence was fixed as the level of significance to test the "F" ratio obtained by the analysis of covariance, which was considered as appropriate. The results of the study showed that the multiple jump drill training for twelve weeks is more effective in enhancing the explosive power in terms of vertical distance and explosive power in terms of horizontal distance of women basketball players.

Keywords: Multiple Jump Drill Training, Explosive Power in terms of Vertical Distance and Explosive Power in terms of Horizontal Distance.

1 Introduction

Basketball is probably the leading ball game in the world as far as "Action occurrence" is concerned. More things happen per second than in any other comparable game. The basketball game is played all over the world. Over the years this versatile game has established an important position due to its physical and educational values as well as to its tremendous dynamics. Basketball is a game that is played by thousands and watched by millions of spectators throughout the world. Within the span of a little more than half a century, the sport has become so popular that it is played by all. Basketball is now played with skill and fitness, teamwork and strategy, making it the fast, thrilling sport it is. Basketball is one of the most widely viewed and most popular sports in the world. Basketball is an extremely dynamic sport that requires movements in multiple planes of motion as well as rapid transitions from jogging to sprinting to jumping. Basketball is a fast moving game that involves a lot of variety, including shooting, dribbling, passing, rebounding, defense and much more. It is equally important for

the athlete to be able to perform these skills in a variety of directions and in a controlled manner to ensure injuries do not ensue [9]. Basketball is a team game, individual execution of fundamental skills is essential for team success [5]. The complexity and sensitivity of training of basketball players are undeniable; hence, the scientific and professional approaches are very important in developing the process and controlling the effects of training [8].

Power is the function of force and velocity and it can be defined as the rate of performing work when expressed by the formula $\text{power} = \text{force} \times \text{velocity}$ or work was done 1 time taken capacity 08 the individual to bring in to play maximum muscle contraction at the test rate of speed [6]. The capacity of the leg to release maximum muscular force in the shortest time as in executes a vertical jump and broad jump [12].

Explosive power mainly depends on strong muscle. The abdominal and leg strength play a vital role in a performance of jumpers. In order to develop the abdominal and leg strength, jumping exercise play a major role. Explosive power represents one of

the most important features of basketball players. Only the energetic aspect of substrate utilization represents the biological basis, as many investigators believe. Indeed, the most peculiar factors for explosive power development must be formed in neuro-muscular properties. Explosive power can be increased, either by increasing the amount of work or by decreasing the amount of time.

Jumping exercises use the force of gravity to store energy in the muscles, and then immediately release the energy in the opposite direction. In other words jumping exercise involve powerful muscle contraction in response to the rapid dynamic loading of the involved muscles strength is the form of explosive power is used move is sports and games competition whenever an athlete has to accelerate himself an external objects or both, ability to generate force with speed will be a primary determinant of success [3].

Subjects

Thirty women basketball players were selected as subjects at random. The age of the subjects was ranged between 18 to 24 years. They were divided into two equal groups and each group consisted of 15 subjects. Group-I underwent multiple jump drill training for three days per week for twelve weeks and Group-II acted as control who did not participate any special training apart from the regular curricular activities.

Variables

Among the power parameters, explosive power in terms of vertical distance and explosive power in terms of horizontal distance were selected as criterion variables. The multiple jump drill training was selected as the independent variable. The explosive power in terms of vertical distance and explosive power in terms of horizontal distance were assessed by vertical jump and standing broad jump tests respectively.

Training Programme

During the training period, the experimental group (Group-I) underwent ($n = 15$) multiple jump drill training for three days per week (alternative days) for twelve weeks and subjects in Group II as control were instructed not to participate in any strenuous physical exercise and specific training throughout the training programme apart from the regular curricular activities. Every day the workout lasted for 30 to 45 minutes approximately including warming up and warming down periods. The subjects underwent the respective programmes as per the schedules under the supervision of the investigator. Each training session was conducted only in the

morning time. The multiple jump exercise is designed to improve the explosive power in terms of vertical distance and explosive power in terms of horizontal distance required for basketball players. Care should be taken when performing specific multiple jump exercise protocol on a grass field.

Guidelines for Multiple Jump Drill Training

(i) Pre-adolescent boys and girls should avoid multiple jump exercise, unless other factors indicate more advanced maturity, because of greater susceptibility to injury prior to puberty (ii) Multiple jump exercise should also be postponed for an athlete who does not have a sufficient strength base. Avoid lower body multiple jump exercise until athlete can leg press 2.5 times of body weight: avoid upper body exercise until athlete perform five consecutive clap push-ups (iii) Athletes who do not respond well to the instructions of coaches are also at greater risk of injury and under – or over training (iv) Precede a multiple jump exercise workout with a general warm-up period consisting of walk-jog-stride-sprint cycles for one-half to three quarters of a mile, followed by careful stretching exercises (v) Use footwear with good ankle and arch support, lateral stability and a wide, non-slip sole, such as basketball or aerobic shoe. Running shoes with narrow soles and poor upper support can lead to ankle problems and are not recommended. Heel cups may be needed for those who are prone to heel bruises (vi) Multiple jump exercise should be performed only on surfaces with good shock-absorbing properties, such as soft grassy areas, well-padded artificial turf, and wrestling mats. Never do plyometric multiple jump exercise on asphalt or gymnasium floors (vii) Boxes should be sturdy and have a non-slip top (viii) Depth jumping from objects that are too high increases the risk of injury, particularly to larger athletes, and prevents the rapid switch from eccentric to concentric activity. The following multiple jump drills are given in the training programme in Table - I.

Statistical Procedures

All the subjects of two groups were tested on selected dependent variables at prior to and immediately after the training programme. The analysis of covariance (ANCOVA) was used to analyze the significant difference if any, between the groups on each selected criterion variables separately. In all the cases, .05 level of confidence was fixed to test the significance, which was considered as an appropriate.

Table – I Training Programme

Type	Multiple Jump Drills	Sets / Repetition	Rest	Progression
Low intensity (4 Weeks) 3 sessions / week	1. Zigzag drill 2. Standing long jump 3. Step close jump and reach 4. Double leg tuck jump	3 x 5 - 8 3 x 5 - 8 3 x 5 - 8 3 x 5 - 8	2 min (30 sec to 45 sec for each set)	Add one repetition after each week
Medium intensity (4 weeks) 3 sessions / week	1. Front and back jump 2. Standing long jump with sprint 3. Double leg hops 4. Standing jump	3 x 9 - 11 3 x 9 - 11 3 x 9 - 11 3 x 9 - 11	2 min (30 sec to 45 sec for each set)	Add one repetition after each week
High intensity (4 weeks) 3 sessions / week	1. Side jump 2. Standing long jump with lateral sprint 3. Pike jump 4. Single leg bounding	3 x12 - 14 3 x12 - 14 3 x12 - 14 3 x12 - 14	2 min (30 sec to 45 sec for each set)	Add one repetition after each week

Results

It is clear from Table - II that there is no significant difference between the multiple jump drills training groups and control group on explosive power in terms of vertical distance and explosive power in terms of horizontal distance before commencement of training, as obtained F ratio of 1.70 and 3.22 are less than the required table value of 4.20 at 0.05 for the df of 1 and 28. It denotes that the random assignment of subjects to the two groups is successful; however initial difference is not elicited in explosive power in terms of vertical distance and explosive power in terms of horizontal distance.

Table - II also reveals that there is a significant difference on explosive power in terms of vertical distance and explosive power in terms of horizontal distance during post test. The obtained F ratio of 5.16 and 4.52 are greater than the required table value of 4.20 at 0.05 for the df of 1 and 28. Thereby it infers that the explosive power in terms of vertical distance and explosive power in terms of horizontal distance found to change significantly before and after twelve weeks of training.

Further, Table -II clearly shows that explosive power in terms of vertical distance and explosive power in terms of horizontal distance differ between the groups after adjusting the pre test scores, as obtained

F ratio of 30.32 and 69.62 are greater than the required table value of 4.21 at 0.05 for the df of 1 and 27, indicating that after adjusting pre-test scores, there was a significant difference between the two groups on adjusted post test scores on explosive power in terms of vertical distance and explosive power in terms of horizontal distance. Thus, it is concluded that twelve weeks of multiple jump drills training significantly increased both the explosive power in terms of vertical distance and explosive power in terms of horizontal distance.

Discussion

In the present study, twelve weeks of multiple jump drill training significantly increased the explosive power in terms of vertical distance and explosive power in terms of horizontal distance are presented in Figure - I & II.

In the present study, the multiple jump drill training elicited improvements in selected power parameters such as explosive power in terms of vertical distance and explosive power in terms of horizontal distance. The plyometric exercises significantly increase power (8.6 %) [7]. The plyometric training improves leg strength, leg explosive power, and leg endurance (10).

Table - II

ANCOVA on Explosive Power in terms of Vertical Distance and Explosive Power in terms of Horizontal Distance

Variables	Testing Conditions	Multiple Jump Drill Training Group	Control Group	S OV	SS	df	MS	'F' Ratio
Explosive Power in Terms of Vertical Distance (Cm)	Pre (M ± SD)	35.81 ± 2.14	35.14 ± 3.26	B	89.51	1	89.51	1.70
				W	1463.12	28	52.25	
	Post (M ± SD)	41.33 ± 3.85	34.21 ± 3.80	B	156.89	1	156.89	5.16*
				W	851.38	28	30.41	
	Adjusted (M)	40.67	34.68	B	100.66	1	100.66	30.32*
				W	89.67	27	3.32	
Explosive Power in Terms of Horizontal Distance (Cm)	Pre (M ± SD)	131.71 ± 6.12	135.31 ± 6.15	B	163.52	1	163.52	3.22
				W	1423.28	28	50.83	
	Post (M ± SD)	146.00 ± 6.52	131.60 ± 6.74	B	150.83	1	150.83	4.52*
				W	935.34	28	33.41	
	Adjusted (M)	142.70	134.79	B	132.31	1	132.31	69.62*
				W	51.31	27	1.90	

A significant improvement was found due to plyometric training on leg strength, back strength [4]. The plyometric training programme improves the leg power [2]. These findings are also in agreement with, that the leg strength, explosive strength, strength endurance were improved significantly by plyometric training [11]. And the plyometric exercises improve dynamic leg strength and leg power [1]. In the present study, the specifically designed multiple jump drill training are highly relevant to the selected criterion variables.

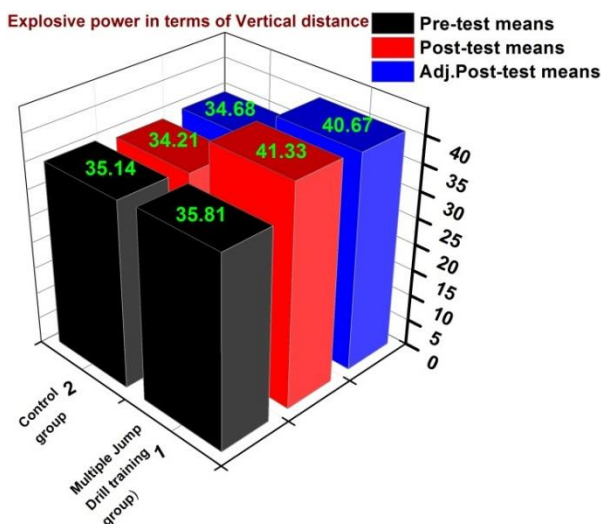


Figure - I Mean Values of Multiple Jump Drills Training Group and Control Group on Explosive Power in Terms of Vertical Distance

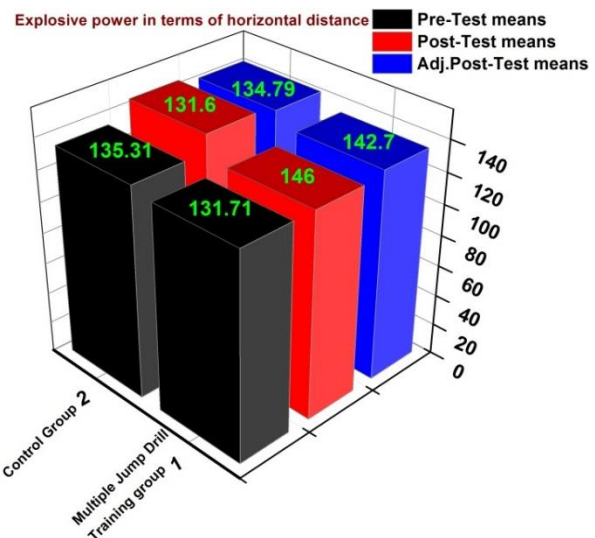


Figure - II Mean Values of Multiple Jump Drills Training Group and Control Group on Explosive Power in Terms of Horizontal Distance

Conclusions

Observing the results derived from the efficacy of multiple jump drill training, it is concluded that the multiple jump drills are the sources to develop selected power parameters of women basketball players. It is inferred from the above literature and from the results of the present study that systematically designed multiple jump drill training to enhance the selected criterion variables. These selected criterion variables are very important qualities for better performance in almost all sports and games. Hence it is concluded from the results of

the study that systematically and scientifically designed multiple jump drill training may be given due recognition and be implemented properly in the training programmes of all the disciplines in order to achieve maximum performance. Hence, it was concluded from the results of the study, that twelve weeks multiple jump drill training is efficient enough to improve the explosive power in terms of vertical distance and explosive power in terms of horizontal distance. And also the multiple jump drill training is very essential and inter related to selected criterion variables.

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