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Effect of Plyometric Training on Physical Fitness Variables among College Level Women Basketball Players

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ABSTRACT

This research aims to assess the effect of plyometric training on physical fitness variables among college level women basketball players. To achieve this purpose, thirty basketball players were selected as subjects from Bharathiar University, Coimbatore, Tamilnadu. The subjects ranged in age from 19 to 23 years. They were randomly divided into two equal groups of 15 subjects each: Group I, which underwent strength and specific skill training, and Group II, which acted as the Control Group (CG). The training period was limited to three days a week for six weeks. The selected criterion variables—speed, agility, and leg explosive power were assessed using the AAHPERD Women Basketball Skill Test before and after the training period. The collected data were statistically analyzed using the dependent t-test. The results of the study indicated a significant enhancement in speed, agility, and leg explosive power among the women basketball players.

Keywords: plyometric Training, Basketball, Speed, agility, leg explosive power.

INTRODUCTION

Basketball is one of the fastest-paced sports, demanding high levels of conditioning, coordination, and technical and tactical skills to perform effectively (James Naismith, 1897). The game requires agility and involves strength training designed to enhance athletic performance. Specific skill training programs focus on areas such as dribbling, passing, and shooting, as well as developing speed, power, endurance, flexibility, mobility, agility, mental preparedness (including goal setting), sleep, recovery/regeneration techniques, nutrition, rehabilitation, and injury risk reduction. A general training program should incorporate all these components, while a more specific program may target only a few, depending on the athlete's individual needs, strengths, weaknesses, and the demands of their sport.

Sports performance training aims to improve an athlete's effectiveness in their specific sport. Traditional fitness training might include cardiovascular exercises, strength training, and flexibility stretching. While these can improve general fitness and athleticism, sport-specific training focuses on the physical exercises needed to enhance either physical or motor fitness aspects directly related to the sport. At higher levels of play, training programs must be tailored to the specific objectives and requirements of the sport, targeting the necessary skills and techniques for optimal performance.

Thus, the present study investigates the combination of strength and specific skill training on the performance variables of basketball players. Playing basketball requires agility, strength, and stamina, involving rapid movements and direction changes using high-intensity, short-duration muscle contractions. Muscular endurance is also crucial, as it allows muscles to apply force repeatedly over extended periods. Basketball training, combined with exercises to build lower and upper body strength, and a focus on strengthening core and back muscles, positively impacts stamina, energy levels, and overall performance.

STATEMENT OF THE PROBLEM

The purpose of the study was to find out the effect of plyometric training on physical fitness variables among college level women basketball players.

METHODS

EXPERIMENTAL APPROACH OF THE PROBLEM

To address the hypothesis presented in this study, 30 college-level women basketball players from Bharathiar University, Coimbatore, were selected through voluntary response sampling. The subjects (N=30) were randomly divided into two groups of 15 each. Group I underwent plyometric training, while Group II served as the control group (CG) for a period of six weeks. Both groups were tested on speed, agility, and leg explosive power before (pre-test) and after the training period.

TRAINING PROGRAM

The total duration of plyometric training progressed and lasted for 45 minutes. During the training period the subject were treated with plyometric training for three alternative days (Monday, Wednesday, Friday) per week.

PHASE I

During the 1st & 2nd week of plyometric training the subjects were treated with warm up for 10 minutes. Followed by plyometric exercises namely Jumping Jacks, Box step ups, Squat Jumps and Lateral hops for 2 minutes each with 3 sets. Further the session ended with cool down for 10 minutes.

PHASE II

During the 3rd & 4th week of plyometric training the subjects were treated with warm up of 10 minutes. Followed by plyometric exercises namely Box Jumps, Depth Jumps, Lateral bound and Single leg hops for 3 minutes each with 5 sets. Further the session ended with cool down for 10 minutes.

PHASE III

During the 5th & 6th week of plyometric training the subjects were treated with warm up for 10 minutes. Followed by plyometric exercises namely plyometric pushup, Tuck Jumps, Depth Push offs and split squat Jumps for 4 minutes each with 5 sets. Further the session ended with cool down for 10minutes.

STATISTICAL ANALYSIS

The collected data were systematically processed and organized for tabulation. Upon completion of the analysis, the results derived from the dependent 't' test were used to determine the effect of plyometric training on speed, agility, and leg explosive power variables. In all cases, the criterion for statistical significance was set at the 0.05 level of confidence ($P < 0.05$).

RESULTS

Table 1: Computation of 't' ratio between pre and post-test means of Experimental group on Physical fitness variables

Experimental Group					
Performance Variables	**Pre/Post test**	**Mean**	**Std. Deviation**	**Std. Error Mean**	**"t" Ratio**
Speed	Pre-Test	7.88	0.41	0.11	8.95*
	Post-Test	6.89	0.50		
Agility	Pre-Test	31.47	2.39	0.25	9.95*
	Post-Test	28.88	2.23		
Leg Explosive Power	Pre-Test	30.06	5.33	0.68	5.72*
	Post-Test	33.99	5.21		

*Significant at 0.05 level of confidence (2.14)

Table 1 The computation of the 't' ratio between the pre-test and post-test means of the experimental group on physical fitness variables reveals significant results. The 't' ratios for Speed, Agility, and Leg Explosive Power were 8.95, 9.95, and 5.72, respectively. With a required table value of 2.14 for 14 degrees of freedom at the 0.05 level of significance, the obtained 't' ratios exceeded this threshold, indicating statistical significance.

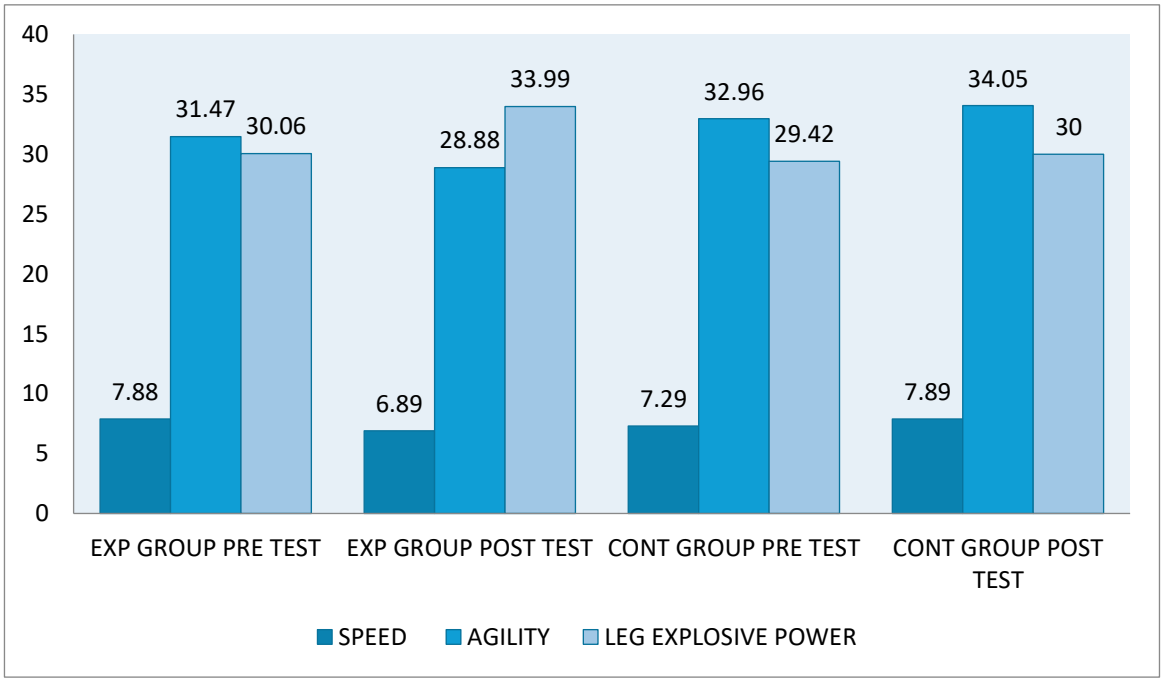
Table 2: Computation of 't' ratio between pre and post-test means of Control group on Physical fitness variables

Control Group					
Performance Variables	**Pre/Post test**	**Mean**	**Std. Deviation**	**Std. Error Mean**	**"t" Ratio**
Speed	Pre-Test	7.29	1.36	0.48	1.25
	Post-Test	7.89	1.15		
Agility	Pre-Test	32.96	3.80	0.98	1.10
	Post-Test	34.05	0.00		
	Pre-Test	29.42	7.01	1.81	0.31

Leg Explosive Power	Post-Test	30.00	0.00		

*Significant at 0.05 level of confidence (2.145)

Table 2 The computation of the 't' ratio between the pre-test and post-test means of the control group on physical fitness variables reveals the following results: The 't' ratios for Speed, Agility, and Leg Explosive Power were 1.25, 1.10, and 0.31, respectively. With a required table value of 2.14 for 14 degrees of freedom at the 0.05 level of significance, the obtained 't' ratios were less than this threshold, indicating that the results were not statistically significant



DISCUSSION ON FINDINGS

The results of the study indicated that performance variables such as speed, agility, and leg explosive power significantly improved after the subjects underwent plyometric training. These positive changes in the selected parameters were attributed to the proper planning, preparation, and execution of the training regimen provided to the players.

Plyometric training has proven to be highly beneficial for basketball players. This study specifically examined the effect of plyometric training on the physical fitness variables of college-level women basketball players, comparing the results between the plyometric training group and the control group. The physical fitness variables assessed included speed, agility, and leg explosive power. The plyometric training program comprised various exercises, including warm-ups, jumping jacks, box step-ups, squat jumps, lateral hops, box jumps, depth jumps, lateral bounds, single leg hops, plyometric push-ups, tuck jumps, depth push-offs, and split squat jumps, along with cool-downs.

This training not only improved speed, agility, and power but also enhanced game tactics, anaerobic capacity, quickness, eye-hand coordination, and overall physical fitness. The results demonstrated that the plyometric training group showed significant improvements in these areas compared to the control group.

Supporting studies, such as the one by **Turk and Dagłoglu (2023),** examined the effect of plyometric training on athletic performance and oxygen saturation in young male basketball players, involving 22 male participants who regularly practiced basketball. Another study by **Senthil Kumaran (2018).,** Impacts of Plyometric Training on Selected Physical Fitness Variables among Basketball Players. Both studies support the findings of the present study, which had not been previously replicated with a sample of college students. The results showed that the control group did not exhibit significant improvements, further highlighting the effectiveness of the plyometric training program.

CONCLUSIONS

Based on the findings and within the limitations of the study, it is evident that the combination of plyometric training significantly improved the speed, agility, and leg explosive power of college-level women basketball players. A progressive improvement in these selected criterion variables was observed in the plyometric training group after six weeks. This training effectively enhances these physical fitness attributes.

1. It was concluded that the plyometric training group showed a statistically significant positive impact on the physical fitness variables of college-level women basketball players over the treatment period.
2. It was concluded that the control group showed statistically insignificant changes in the physical fitness variables of college-level women basketball players over the same period.
3. The comparative results indicate that the plyometric training group had significantly better improvements in physical fitness variables (speed, agility, leg explosive power) compared to the control group.

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