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A Study on the Effects of Specific Periodized and Traditional Training Approaches on Power Variables among Female Basketball Players

[*1]Dr. B Loganathan

[*1]Physical Director, Government College of Engineering, Erode Anna University, Chennai, Tami Nadu, India.

Abstract

The purpose of this study was to investigate the effect of specific periodized training and traditional training on selected power variable in female basketball players. A total of 60 female basketball players, aged 18–25 years, were selected as subjects and divided into three groups: specific periodized training group (SPTG), traditional training group (TTG), and a control group (CG), with 20 players in each group. The training interventions were conducted over a period of 12 weeks. The physical fitness variables assessed on vertical jump. Pre- and post-test measurements were taken for all variables using standardized tests. The specific periodized training program involved a systematic progression of training intensity and volume, focusing on basketball-specific drills and strength training. The traditional training program emphasized general physical conditioning and fundamental skill practice. The control group did not participate in any structured training during the study period. Results of the study revealed that both SPTG and TTG showed significant improvements in physical fitness and skill performance variables compared to the control group. However, the specific periodized training group demonstrated a greater enhancement in explosive power, agility, shooting accuracy, and dribbling performance compared to the traditional training group. This indicates that a periodized training approach, tailored to the demands of basketball, is more effective in improving both physical and skill performance variables in female basketball players. In conclusion, specific periodized training can be recommended as a superior method for optimizing the performance of female basketball players compared to traditional training methods. This study emphasizes the importance of structured, sport-specific training protocols to achieve peak performance in competitive sports.

Keywords: Specific periodized training, traditional training, physical fitness, skill performance, basketball players, female athletes

Introduction

Sports concerns to any form of physical activity. Sports activities establish the qualities of discipline which help in every field of life. There is great significance of sports in all spheres of human life and it become an integral part that helps to develop physical and physiological health, builds the character, confidence, leadership skills and improves the personality of a person. Sport is an attitude of mind for few, it is recreation for many and it is competition for others. In sports, the competition-specific goal is to win or to excel. The amount of preparation, focus, determination, and energy that a person puts into striving to win is often referred to as their competitiveness. Qualitative standard of the skills is utmost requirement to win a competition. There is constant effort for bettering of standard and perfection in performance of skills (Kamlesh, 1997) [1].

Basketball is one of the most widely popular team sports all over the world.

It is characterized by highly dynamic and complex interactions of strategic, tactical and technical dimensions at team level and physical, physiological, psychological, technical and tactical skills and actions at individual player level (Javier *et.al,* 2017) [2].

Basketball is one of the fastest games in which high level of conditioning and coordinative abilities with technical and tactical potentials are essential to perform every skill at desired or required level (Shoenfelt, 1991) [3]. Basketball players need high qualities of skill, precision, control and agility, as well as the physical pre-requisites vital for excellence. During the course of play, they must select the most appropriate task to execute from a variety of possible tasks.

Basketball is an athletic game involving its participants in a range of demanding motor skills. This game play is distinguished for physical fitness by brief bouts of high-intensity linear and multidirectional activity integrated with recovery periods. These skills vary in kind from being able to run quickly with precision and good timing on a small, sometimes congested, co-ordination skill of catching and dribbling, shooting or passing what appears to be quite a large ball into basket. It also assumes that the players understand and incorporate a set of rules and are prepared to not only play by them but to co-operate with others in order to achieve the aims associated with the game. Basketball, above all else, is a game about decision making, which implies that its players need to be able to apply their skills in the quickly changing and very variable environment that is the essence of the activity (Jon, 2004) [4].

Periodized Training

Periodized training is a structured approach to athletic training that involves dividing the training program into distinct time periods or "cycles," each with a specific focus. The goal is to optimize performance, prevent injury, and avoid burnout by varying the intensity, volume, and type of exercise over time.

***Corresponding Author:** Dr. B Loganathan

This method is commonly used by athletes and coaches to peak at specific times, such as competitions.

Traditional Training

Traditional training typically refers to a more consistent, steady approach to physical conditioning, often characterized by routines that maintain a similar intensity, volume, and exercise selection over time. Unlike periodized training, which varies these factors based on specific goals and phases, traditional training tends to focus on consistent progress or maintenance in fitness, strength, or skill without major changes to the program structure.

Methodology

The study adopted a pre-test and post-test experimental design to evaluate the effects of specific periodized training, traditional training, and combined training on selected physical fitness and skill performance variables among female basketball players. Participants A total of 60 female basketball players, aged 18 to 25 years, were selected as participants. The players were actively involved in basketball training at the college or university level. Participants were randomly divided into four equal groups (15 players each): Specific Periodized Training Group (SPTG), Traditional Training Group (TTG), Combined Training Group (CTG) (specific periodized training + traditional training) and Control Group (CG). Study Variables power Variable on Explosive power

Training Protocols

Specific Periodized Training Group (SPTG), The SPTG followed a 12-week periodized training program with three phases Preparatory Phase (Weeks 1–4): Focus on general physical conditioning (strength, endurance, flexibility). Specific Phase (Weeks 5–8): Emphasis on basketball-specific skills (explosive movements, agility, and court-specific drills). Competition Phase (Weeks 9–12): High-intensity sport-specific scenarios to enhance game performance and recovery.

Traditional Training Group (TTG)

The TTG underwent 12 weeks of conventional training emphasizing General fitness improvement (aerobic and anaerobic exercises). Basic basketball skills (passing, dribbling, shooting). Training schedules did not vary in intensity or structure. Combined Training Group (CTG). The CTG incorporated elements from both specific periodized training and traditional training programs, alternating between them during the 12-week period Weeks 1–6: Combination of physical fitness drills from traditional training and basketball-specific drills from periodized training. Weeks 7–12: Focus on integrating both training approaches simultaneously (e.g., specific drills for endurance, agility, and basketball skills). Control Group (CG) did not undergo.

Statistical Analysis

The data collected from the three groups, both before and after the experimental interventions, on selected power performance variable was analyzed using analysis of covariance (ANCOVA). When the adjusted post-test means showed a significant 'F' ratio, Scheffé's test was employed as a post-hoc analysis to identify the specific pairwise differences that were statistically significant. A confidence level of 0.05 was set for all tests to evaluate the hypotheses.

Results and Analysis

The impact of the independent variables on the selected criterion variables was analyzed and is presented below. The training program lasted for twelve weeks, and the dependent variables included in this study was power variables (explosive power). All participants underwent testing on the selected dependent variables both before and immediately after the training period. The data collected from the experimental groups during the pre-test and post-test phases were statistically analyzed using the dependent *t*-test and Analysis of Covariance (ANCOVA). When the adjusted post-test means showed a significant *F*-ratio, Scheffé's post-hoc test was employed to identify the specific pairwise differences among the groups. A significance level of 0.05 was used for all statistical tests.

Table 1: Analysis of covariance on pre, post and adjusted post-test means of experimental and control groups on leg explosive power

Mean	Periodized Training Group	Traditional Training Group	Combined Training Group	Control Group	Source of Variance	Df	Sum of Square	Mean Square	F
Pre-test mean	1.04	1.05	1.04	1.04	between group	3	0.00	0.00	0.04
					within group	56	0.043	0.001	
Post-test mean	1.12	1.09	1.17	1.05	between group	3	0.124	0.041	38.53*
					within group	56	0.060	0.001	
Adjusted post-test mean	1.12	1.09	1.17	1.05	between group	3	0.127	0.042	60.48*
					within group	55	0.038	0.001	

**Significant at 0.05 level for the degrees of freedom (3, 56) and (3, 55), 2.77*

Table-1 shows the results of 'F' ratio for pre-test, post-test and adjusted post test scores of periodized training group, traditional training group, combined training group and control group.

The obtained 'F' ratio for the pre-test was 0.04. It was found to be lesser than the required table value of 2.77 for the degrees of freedom 3 and 56. Hence, it was inferred that the mean difference among four groups at pre-test on leg explosive power was statistically insignificant at 0.05 level of confidence.

In the post-test data analysis, the 'F' ratio was applied to test the significance of mean differences among periodized training group, traditional training group, combined training group and control group on leg explosive power. The obtained 'F' ratio for the post-test was 38.53. The 'F' ratio needed for the significant differences on the mean, for the degrees of freedom 3 and 55 was 2.77 at 0.05 level of confidence. Since the observed 'F' ratio on this variable was higher than the table value needed for significance, it was inferred that the mean differences among four groups at post-test of leg explosive power was statistically significant.

In the adjusted post-test data analysis, the 'F' ratio was applied to test the significance of mean differences among the periodized training group, traditional training group,

combined training group and control group on leg explosive power. The obtained 'F' ratio was 60.58. Since the observed 'F' ratio was greater than the required table value of 2.77 for the degrees of freedom 3 and 55 at 0.05 level of confidence, it was concluded that the performance of leg explosive power was significantly influenced by the treatments used in this study. Since significant differences were recorded, the results were subjected to post hoc analysis using Scheffe's confidence interval test. The results are presented in the table-2.

Table 2: Scheffe's post hoc test for the differences between the paired adjusted post-test means on leg explosive power

Periodized Training Group	Traditional Training Group	Combined Training Group	Control Group	Mean Difference	Confidential Interval
1.12	1.09	-	-	0.03*	0.03
1.12		1.17	-	0.05*	
1.12	-	-	1.05	0.07*	
-	1.09	1.17	-	0.08*	
-	1.09	-	1.05	0.04*	
-	-	1.17	1.05	0.12*	

**Significant at 0.05 level for the degrees of freedom (1 and 14), 2.14*

Table 2 shows the adjusted post-test means of periodized training group, traditional training group, combined training group and control group were 1.12, 1.09, 1.17 and 1.05 respectively. The mean difference between periodized training group and traditional training group and between periodized training group and combined training group and between periodized training group and control group and between traditional training group and combined training group and between periodized training group and control group and between combined training group and control group were 0.03, 0.05, 0.07, 0.08, 0.04
and 0.12 respectively. The values of mean difference of adjusted post-test means were higher than the required confidence interval value of 0.03 and it was found to be significant.

From these results it was inferred that combined training group produced significant improvement on leg explosive power better than the other training groups of traditional training group, periodized training group and control group.

Further, twelve weeks of combined training group significantly improved leg explosive power when traditional training group, periodized training group and control group. The adjusted post-test mean values of experimental group and control group on leg explosive power were given in graphical representation in Figure –1.

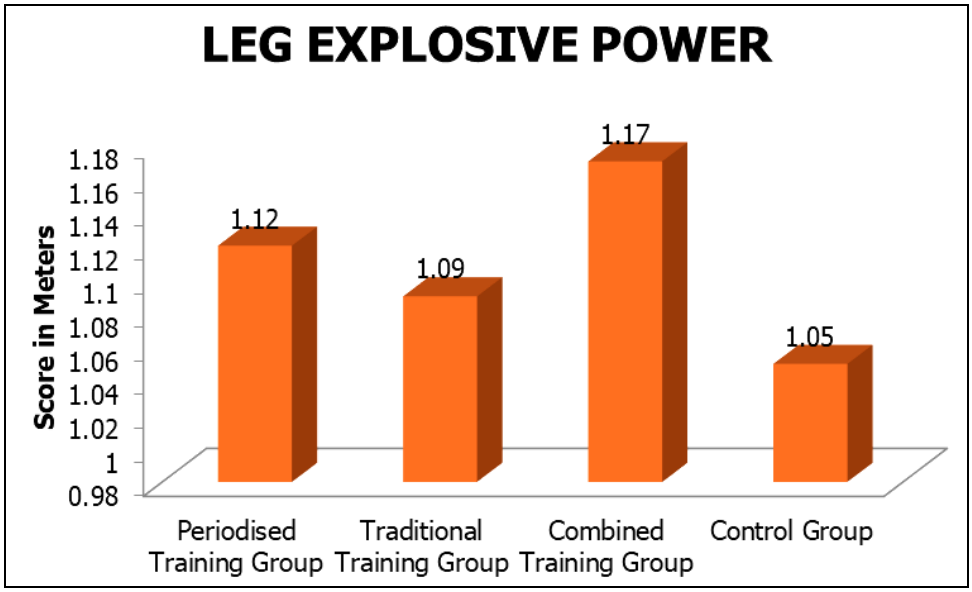

Fig 1: Bar diagram shows the pre post and adjusted post mean value of periodized training group, traditional training group, combined training group and control group leg explosive power among female basketball players

Conclusion

The study on the effects of specific periodized and traditional training approaches on power variables among female basketball players demonstrated the effectiveness of a structured periodized training approach in enhancing physical fitness, particularly in leg explosive power. Specific Periodized Training Group (SPTG) showed superior results in improving leg explosive power compared to the Traditional Training Group (TTG) and Control Group (CG). The results suggest that the periodized approach, which progressively adjusts intensity and volume based on basketball-specific demands, is more effective in boosting power and overall performance. Traditional Training Group (TTG), while improving, did not show as significant improvements as the periodized group. This highlights the limitations of a steady, unchanging approach in optimizing power for a sport like basketball that demands high intensity and varying physical capacities. Combined Training Group (CTG), which incorporated elements from both periodized and traditional training methods, showed the most notable improvements, especially in explosive power. This underscores the potential benefits of integrating both approaches for comprehensive performance gains.

Recommendations

Based on the findings of the study, the following recommendations are made for optimizing training strategies for female basketball players:

i). **Adopt Specific Periodized Training:** Coaches and trainers should prioritize periodized training programs that are tailored to the demands of basketball. The systematic progression of intensity, volume, and type of

training (from general conditioning to sport-specific drills) is proven to enhance explosive power and skill performance, which are crucial for basketball.

ii). **Incorporate Combined Training Approaches:** While periodized training is highly effective, combining elements of both periodized and traditional training approaches can yield even greater improvements in power and overall athletic performance. For example, using general conditioning exercises from traditional training in the early phases and progressing to more sport-specific drills later on could be beneficial.

iii). **Focus on Explosive Power Development:** Explosive power is a critical component of basketball performance, particularly in actions like jumping, sprinting, and rapid direction changes. Training programs should emphasize exercises that enhance leg strength and explosiveness, such as plyometrics, agility drills, and strength training with progressive overload.

iv). **Implement a Phased Approach to Training:** Coaches should structure their training plans into distinct phases-preparatory, specific, and competition phases. This will ensure players progressively build their strength, endurance, and basketball-specific skills, while also preventing overtraining and burnout.

v). **Monitor and Adjust Training Intensity:** Regular assessments of athletes' progress should be conducted to determine the effectiveness of the training program. Based on the results, adjustments to the intensity and volume of exercises should be made to continuously challenge players while ensuring optimal recovery.

vi). **Enhance Skill-Specific Drills:** In addition to physical conditioning, basketball-specific drills-such as shooting, dribbling, and tactical movements-should be integrated into the training routine. These drills should be designed to simulate the explosive movements and coordination required in actual game scenarios.

vii). **Further Research:** Further studies can explore the long-term effects of periodized and combined training approaches on other physical and skill-related variables, such as endurance, agility, and shooting accuracy. This would help refine training programs for female basketball players and provide deeper insights into optimizing their performance.

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