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Impact of Varied Basketball Training Program on Selected Physical Fitness Variables among School Level Boys Basketball Players

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Abstract

Team sports players are required to perform repeated maximal or near-maximal efforts to develop power, acceleration, speed and speed endurance (Attene *et al.*, 2014; Austin *et al.*, 2011). Previous research has demonstrated that aerobic fitness is positively correlated with the ability to recover from high-intensity efforts, with significant implications for successful physical performance during competition (Tomlin and Wenger, 2001; Vazquez-Guerrero *et al.*, 2018). A substantial body of research has been conducted to better understand the biomechanical and physiological benefits of repeated-sprint training stimuli (Padulo *et al.*, 2016; Paulauskas *et al.*, 2018). Repeated-sprint performance appears to be influenced by the duration, intensity, quantity and distribution of work bouts (Gaitanos *et al.*, 1993) and emerging evidence supports the notion that repeated-sprint training provides potential biomechanical and physiological stimuli that are crucial to high-level performance in team sports, particularly at specific moments within game situations (Spencer *et al.*, 2005). The objective of this study was to investigate the impact of a varied basketball training program on selected physical fitness variables among school-level male basketball players. For this investigation, sixty subjects were selected and divided into four equal groups of fifteen each (N=15), comprising three experimental groups and one control group. The experimental groups underwent respective training protocols, whereas the control group did not engage in any specific research training for the duration of twelve weeks. Pre- and post-tests were conducted before and after the training period for all four groups and were statistically analyzed to determine any significant improvements in selected variables among the subjects due to the training. Two experimental groups underwent training for a period of 12 weeks. The subjects were evaluated on the physical fitness component of Change of Direction (COD). Analysis of covariance was employed to identify significant differences, if any, among the experimental groups and control group. 'F' ratios were computed to determine the variation in the groups. The 't' ratio was applied to ascertain significant improvements in all variables across groups. In all cases, a 0.05 level of confidence was established to test for significance, which was deemed appropriate. In the present study, ANCOVA was applied to interpret the effect of physical fitness training, repeated sprint training, and game-specific training on selected physical fitness variables among school-level male basketball players. The results obtained demonstrated that the training on change of direction produced significant improvements among the experimental groups.

Keywords: Fitness training, repeated sprint training and change of direction.

Introduction

Some researchers have attempted to study the importance of repeated-sprint performance in different team-sports, highlighting the information related to the locomotor profile (Buchheit *et al.*, 2010; Spencer *et al.*, 2005) [10]. Previous reports have shown that during competitive basketball games, players perform an average of 105 high-intensity bouts (2 to 6 s), occurring every 21 s (McInnes *et al.*, 1995), with the sprint intensity varying between 15 m·min⁻¹ (Scanlan *et al.*, 2011) and 19 m·min⁻¹ (Ben Abdelkrim *et al.*, 2010) [5]. Therefore, the ability to perform repeated sprints throughout the game seems a key factor for high-level performance (Padulo *et al.*, 2016). Overall, previous reports have shown that the amount of high-intensity actions decreases in the last minutes of the

game. The reduced number of high-intensity actions at the end of the first and the second half seems to be a result of fatigue caused by several physiological mechanisms during the game (Lyons *et al.*, 2006). In this sense, the decrease of high-intensity running throughout the game reflects that the ability, to recover from high-intensity bursts may constraint not only physical demands within team sports but also the collective behavior (Esteves *et al.*, 2015).

Methodology

The purpose of the study was to find out the impact of varied basketball training program on selected physical fitness variables skill among school level boys basketball players. To achieve the purpose of this study, 60 school boys from the

school zonal level basketball players were selected in Kanyakumari, District Tamil Nadu, India. The data were collected on the selected variables before and after the training period of 12 weeks. The differences between the initial and final scores in selected variables were subjected to statistical treatment using 't' ratio to find out whether the mean differences were significant or not and analysis of covariance was applied to find out the significant mean difference among the groups. The subjects were divided in to four groups randomly 15 in each group. Experimental group I physical fitness training, Experimental group II repeated sprint training, Experimental group III game specific training participated and control group did not engaged with any specific training for the period of twelve weeks. The subjects were tested on selected criterion variables. Analysis of Co-variance (ANCOVA) was applied to find out the significant differences in each criterion variables among the groups. The process through which the pretests mean differences between the groups can be adjusted to posttest mean. 'F' ratio was computed to access the variation, interaction from the group. Scheffe's post hoc test was applied, to determine which of the two paired mean of experimental groups are significant.

Training Schedule

During the training period, the experimental groups underwent their respective training programme in addition to their routine works. The training underwent their respective programmes on five days per week for twelve weeks. Group-IV served as control group who was not inducted into any specific training programme. Since the people with Basketball School boys were average in their level of fitness the intensity and load was fixed on the basis of results of the pilot study. The load was increased by every four weeks of their training programme by increasing the distance for physical fitness training, repeated sprint training, game specific training and

by increasing the number of repetitions for physical fitness training, repeated sprint training and game specific on the basis of results of the pilot study. The respective training programme as per schedules under the supervision of researcher who provided motivation, advice and encouragement to the subjects. Each day the training schedule was conducted for experimental groups only in the morning session that lasted for forty five minutes. Prior and after every training session subjects of experimental groups had ten minutes of warm up and ten minutes of warm down exercises.

Statistical Technique

The data were collected on the selected variables before and after the training period of 12 weeks. The differences between the initial and final scores in selected variables were subjected to statistical treatment using 't' ratio to find out whether the mean differences were significant or not and analysis of covariance was applied to find out the significant mean difference among the groups. The subjects were divided in to four groups randomly 15 in each group. The subjects were tested on selected criterion variables. Analysis of co-variance (ANCOVA) was applied to find out the significant differences in each criterion variables among the groups. The process through which the pretests mean differences between the groups can be adjusted to posttest mean. 'F' ratio was computed to access the variation, interaction from the group. Scheffe's post hoc test was applied, to determine which of the two paired mean of experimental groups are significant.

Results and Discussions

The analysis of data collected from the samples under study. This study was designed to find out the impact of varied basketball training program on selected physical fitness variables skill among school level boys basketball players.

Table 1: Analysis of covariance among physical fitness training group, repeated sprint training group, game specific training group and control group on change of direction.

	Physical Fitness Training Group	Repeated Sprint Training Group	Game Specific Training Group	Control Group	Source of Variance	Sum of Square	Degrees of Freedom	Mean Square	F-Value
Pre-test mean	11.47	11.29	11.51	11.51	Between	0.017	3	0.006	0.23
					Within	1.325	56	0.024	
Post-test mean	11.27	11.25	11.37	11.52	Between	0.568	3	0.189	6.59*
					Within	1.698	56	0.29	
Adjusted post mean	11.29	11.20	11.36	11.51	Between	0.492	3	0.164	10.29*
					Within	0.877	55	0.016	

*Significant at 0.05 level of confidence

Table-1 shows the obtained 'F' values on pre-test, post-test and adjusted post-test means on change of direction of physical fitness training group, repeated sprint training group, game specific training group and control group.

The pre-test means on change of direction were 11.47, 11.29, 11.51 and 11.51 respectively. The 'F' value observed for the pre-test on change of direction was 0.23. It fails to reach the table value of 2.77 for degrees of freedom 3 and 56 at 0.05 level of confidence. Based on the results it was confirmed that the mean differences among the groups of physical fitness training group, repeated sprint training group, game specific training group and control group on change of direction before the start of the respective treatments were found to be insignificant.

The post-test means on change of direction of physical fitness training group, repeated sprint training group, game specific training group and control group were 11.27, 11.29, 11.25 and 11.52 respectively. The 'F' value observed for the post-test on change of direction was 6.59. It was greater than the table value of 2.77 for degrees of freedom 3 and 56 at 0.05 level of confidence. Thus, the results obtained proved that the training on change of direction produced significant improvement among the experimental groups.

The adjusted post-test means on change of direction test of physical fitness training group, repeated sprint training group, game specific training group and control group were 11.29, 11.28, 11.20 and 11.51 respectively. The 'F' value observed for the adjusted post-test means on change of direction was

10.29. It was greater than the table value of 2.77 for degrees of freedom 3 and 55 at 0.05 level of confidence.

The observed F-value on adjusted post-test means among the groups on change of direction was highly significant as the value was higher than required table value of 2.77. Thus the results obtained proved that the training on change of direction test produced significant improvements among the experimental groups. Since significant differences were recorded, the scores were further subjected to statistical treatment using Scheffe's post hoc test and the results were presented in the Table-2.

Table 2: The Scheffe's post hoc test on change of direction.

Physical Fitness Training Group	Repeated Sprint Training Group	Game Specific Training Group	Control Group	M.D	C.I
11.29	11.15			0.14*	0.13
11.29		11.36		0.07	
11.29			11.51	0.22*	
	11.15	11.36		0.21*	
	11.15		11.51	0.36*	
		11.36	11.51	0.15*	

*Significant at 0.05 level of confidence.

Table-2 revealed that the mean differences between the paired adjusted post-test means of all groups.

The mean difference between physical fitness training group and repeated sprint training group and between physical fitness training group and control group and between repeated sprint training group and game specific training group and between repeated sprint training group and between game specific training group control group were 0.14, 0.22,0.21,0.36 and 0.15 respectively. The values of mean difference of adjusted post-test means were higher than the required confidence interval value of 0.13 and it was found to be significant.

Thus, the mean differences of paired adjusted post-test mean between physical fitness training group and game specific training group were 0.07 lesser than the required confidence interval value of 0.13 it was found to be insignificant at 0.05 level of confidence.

From these results it was inferred that repeated sprint training group produced significant improvement on change of direction better than the other training groups of physical fitness training group, game specific training group and control group. Further, twelve weeks of repeated sprint training group significantly improved change of direction when physical fitness training group, game specific training group and control group.

The adjusted post-test mean values of experimental group and control group on change of direction were given in graphical representation in Figure-1.



Fig 1: Bar diagram showing the adjusted post-test mean values of physical fitness training group, repeated sprint training group, game specific training group and control group on change of direction

Results on Change of Direction

In the present study on physical fitness training, repeated sprint training, game specific training on selected physical fitness variable differences in comparison between baseline and post-test. The results of the study indicate there was significant improvement in change of direction due to the influence of physical fitness training, repeated sprint training, game specific training. Also there were no statistically significant changes in change of direction of control group.

Comparing overall result of the study physical fitness training, repeated sprint training and game specific training had improved change of direction significantly than the control group. Also the repeated sprint training group had significantly improved in change of direction than the physical fitness training group and game specific training group.

The consistency in determining the significant contribution of repeated sprint training group, physical fitness training and game specific training on change of direction in this study was similar to the finding of other studies using repeated sprint training group, physical fitness training group and game specific training group.

The result of the study proved that there was significant change due to the 12 weeks of change of direction and the findings of this study are in agreement with the studies of Bishop (2011) [7] who found that change of direction can be beneficially altered with repeated sprint training, physical fitness training and game specific training.

Discussion and Findings

From the analysis of the data, the following conclusion were drawn:

- i). From the findings of the study it was concluded that the experimental groups had better improvement than the control group in Physical fitness variables in change of direction
 - ii). The effect of physical fitness training group significantly improved the selected physical fitness variables among school level basketball players.
 - iii). The effect of repeated sprint training group significantly improved the selected physical fitness variables among school level basketball players.
 - iv). The effect of game specific training group significantly improved the selected physical fitness variables among school level basketball players.
 - v). It was concluded that the repeated sprint training group had better improvement than the physical fitness training group and game specific training group in change of direction.
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