



## **Effect of basketball specific and traditional method of training on muscular strength, speed and overall playing ability of inter collegiate women basketball players**

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### **Abstract**

The purpose of the study was to find out the effect of basketball specific training and traditional method of training on muscular strength, speed and overall playing ability of inter collegiate women basketball players. To achieve the purpose of the study 60 inter-collegiate women basketball players were selected from Bharathiar University, Coimbatore, Tamilnadu, India. They were randomly divided into three equal groups namely, experimental group-I basketball specific training group (BSTG), experimental group-II traditional method of training (TMTG) and control group-III (CG). Each group consisted of twenty subjects. Experimental group-I (BSTG) underwent basketball specific training programme, Experimental group-II (TMTG) underwent traditional method of training (that is the subjects in TMTG were asked not to change their normal basketball game practice and in particular their own conditioning and training program) and control group-III (CG) were asked not to engage in any exercise throughout the training period except light activities like walking, and jogging. After assigning the subjects into various groups the pre-test was conducted on the selected variables of muscular strength, speed and overall playing ability. After completion of the pre test, the subjects were treated with their respective training programme. After 12 weeks of training period post test was conducted on the dependent variables for all the three groups. Based on the results, the basketball specific training group significantly improved ( $P < 0.05$ ) on the selected variables of muscular strength, speed and overall playing ability better than the traditional method of training. The traditional method of training group significantly improved ( $P < 0.05$ ) on the selected variables of muscular strength, speed and overall playing ability better than the control group.

**Keywords :** Exercise, muscular strength, speed, overall playing ability and basketball.

### **Introduction**

Basketball is a game which is aerobic-cum-anaerobic in nature and it demands overall fitness to excel in performance. Basketball is no longer just a game of shooting baskets and dribbling the ball around opponents. It is a complete game involving incredible levels of fitness. The results suggest a potentially important role for the training of lower body explosive strength and interval endurance capacity among youth basketball players. Specific reference values for RSA of youth players may assist basketball coaches in setting appropriate goals for individual players (Te Wierike and de Jong, 2013). The mastery of the fundamental skill is very essential in improving

the standard of the game. Besides the fundamental skills, the game is a team effort, requiring team offence and defense. In development of the game of basketball, skills of the game plays a vital role for victory. Skills are indispensable for maximum use of the motor abilities. The results of regression correlation analysis between the specific motor abilities and game efficiency have shown that the ability of ball handling has the largest impact on player quality in basketball cadets, followed by shooting precision and passing precision, and the power of the over arm throw (Marić, and Katić, 2013). Perfection of the skills and execution of them successfully are having direct impact on the total

performance in the game. Gender-specific influences of balance, speed, and power on agility performance. The balance measures were significantly related to the agility performance for men but not for women. The results indicate that balance should be considered as a potential predictor of agility in trained adult men (Sekulic and Spasic, 2013).

## **Methodology**

### **Selection of Subjects**

Sixty Inter-collegiate women basketball Players (18 to 25 years of age) were selected to participate in this study. They were played for different teams in the Bharathiar University inter-collegiate basketball tournaments and none of them were being trained by means of a basketball specific training programme.

### **Experimental design**

The study was formulated as pre test and post test randomized group design. They were randomly divided into three equal groups, namely experimental group-I basketball specific training group (BSTG), experimental group-II traditional method of training group (TMTG) and control group-III (CG). Each group consisted of twenty subjects. Experimental group-I (BSTG) underwent basketball specific training programme, Experimental group-II (TMTG) underwent traditional method of training, and control group-III (CG) did not undergo any specific training. After assigning the subjects pre-test was conducted on muscular strength, speed and overall playing ability. After completion of the pre test, the subjects were treated with their respective training programme. Training was imparted to the experimental groups for twelve weeks. After 12 weeks of training programme the post test was conducted on dependent variables for all the three groups.

### **Data Collection**

Each subject underwent measurements of their muscular strength, speed and overall playing

ability. Pre testing was conducted in 5 sessions, a week before initiation of the training period. The first session included an introduction of the testing protocols to the subjects. The second session included the measurement of 1RM military press test. In the third session, speed was determined by 50yard dash test. During the fourth session the overall playing ability was measured by three judges by using 10 point scale. Identical measurements were performed in the same order for 4days following the completion of the 12 week training period.

## **Training protocol**

### **Basketball specific training group**

The specially designed basketball specific training programme was given to the experimental group-I (BSTG). This training comprised of strength based high intensity interval training (SBHIIT), agility training, circuit weight training, complex training and speed training. These trainings were executed in the morning sessions only. In the evening sessions, basketball skills and drills practice and game practice were administered.

### **Traditional method of training group**

The subjects in the traditional method of training group practiced their normal basketball game and their own conditioning and training programme without any supervision.

### **Statistical analyses**

To analyze the treatment effect of training, 't' ratio was used. To compare the significance of mean difference among all the three groups, analysis of co-variance was used. When the significant differences among the training programs were observed, a pair-wise comparison of the programs were done by using a post hoc test to identify significant differences between the training programs. The alpha level was set at 0.05 in order for the difference to be considered significant.

## **Results**

### **Result of the treatment effect on muscular strength**

Table-1 illustrates the statistical analysis on the effect of basketball specific training, traditional method of training and control group on muscular strength.

Table-1 shows that the pre test mean differences on muscular strength for the basketball specific training group, traditional method of training group and control group were 28.20, 28.20 and 27.27 respectively. The obtained "F" ratio of 2.68 was less than the table values of 3.16. Hence the pre test mean differences were found to be insignificant at 0.05 level of confidence for the degree of freedom 2 and 57. The post test mean values for the basketball specific training group, traditional method of training group and control group were 31.50, 28.55 and 27.20 respectively. The obtained "F" ratio of 10.23 was greater than the table value of 3.16. Hence the post test mean differences were found to be significant at 0.05 level of confidence for the degree of freedom 2 and 57. The adjusted post test mean differences of the basketball specific training group, traditional method of training group and control group were 32.43, 30.47 and 28.96 respectively. The obtained "F" ratio of 38.74 was greater than the table value of 3.16. Hence the adjusted post test mean differences were found to be significant at 0.05 level of confidence for the degrees of freedom 2 and 56. It was concluded that there was a significant mean difference among basketball specific training group, traditional method of training group and control group in developing the muscular strength of the inter-collegiate women basketball players. When a significant 'F' ratio was found, a post hoc test (Scheffe's) was done to identify significant differences among mean values and presented in table-2.

Table - 2 shows the post hoc analysis obtained on adjusted post test means. The mean difference required for the confidential interval to be significant was 1.10. It was observed that the basketball specific training group made significant improvement in muscular strength than the traditional method of training and control group. The traditional method of training made significant improvement in muscular strength better than the control group (Fig. - 1).

Table-3 shows that the pre test mean differences on speed for the Basketball specific training group, traditional method of training group and control group were 8.89, 8.79 and 8.90 respectively. The obtained "F" ratio of 0.33 was less than the table values of 3.16. Hence the pre test mean differences were found to be insignificant at 0.05 level of confidence for the degree of freedom 2 and 57. The post test mean values for the specific training group, traditional method of training group and control group were 8.43, 8.77 and 8.83 respectively. The obtained "F" ratio of 3.97 was greater than the table value of 3.16. Hence the post test mean differences were found to be significant at 0.05 level of confidence for the degree of freedom 2 and 57. The adjusted post test mean differences of the basketball specific training group, traditional method of training group and control group were 8.40, 8.84 and 8.79 respectively. The obtained 'F' ratio of 43.17 was greater than the table value of 3.16. Hence the adjusted post test mean differences were found to be significant at 0.05 level of confidence for the degrees of freedom 2 and 56. It was concluded that there was a significant mean difference among basketball specific training group, traditional method of training group and control group in developing speed of the inter-collegiate women basketball players. When a significant 'F' ratio was found, a post hoc test (Scheffe's) was done to identify significant differences among mean values and presented in the table-4.

**Table - 1. Analysis of variance on pre and post test means and analysis of co-variance of adjusted post test means among the BSTG, TMTG and CG on muscular strength (in kilograms)**

Test	Basketball specific training	Traditional method of training	Control group	Source of variance	Sum of square	df	Mean Square	F-ratio
Pre-test Mean and SD	28.20± 121.30	28.20± 4.37	27.27± 2.94	B/G W/G	86.23 916.70	2 57	43.11 16.08	2.68
Post-test Mean and SD	31.50± 33.10	28.55± 4.37	27.20± 2.81	B/ G W/G	362.27 1009.03	2 57	181.13 17.70	10.23*
Adjusted Post-test Mean	32.43	30.47	28.96	B/G W/G	114.66 82.86	2 56	57.33 1.48	38.74*

\*Significant at 0.05 level, table F-ratio is 3.16

**Table - 2. Scheffe’s post-hoc test for the differences between the adjusted post test means on muscular strength (in kilograms)**

Basketball specific training group	Traditional method of training group	Control group	Mean Difference	Confidence Interval at 0.05 level
32.43	30.47	--	1.96*	1.10
32.43	--	28.96	3.47*	1.10
--	30.47	28.96	1.51*	1.10

\*Significant at 0.05 level of confidence

**Table - 3. Analysis of variance on pre and post test means and analysis of co-variance of adjusted post test means among the BSTG, TMTG and CG on speed (in seconds)**

Test	Basketball specific training group	Traditional method of training group	Control group	Source of Variance	Sum of square	df	Mean Square	F-ratio
Pre-test Mean and SD	8.89± 0.520	8.79± 0.410	8.90± 0.430	B/G W/G	0.14 12.24	2 57	0.071 0.21	0.33
Post-test Mean and SD	8.43± 0.550	8.77± 0.42	8.83± 0.460	B/ G W/G	1.85 13.27	2 57	0.92 0.23	3.97*
Adjusted Post-test Mean	8.40	8.84	8.79	B/G W/G	2.29 1.49	2 56	1.14 0.12	43.17*

\*Significant at 0.05 levels, table F-ratio is 3.16

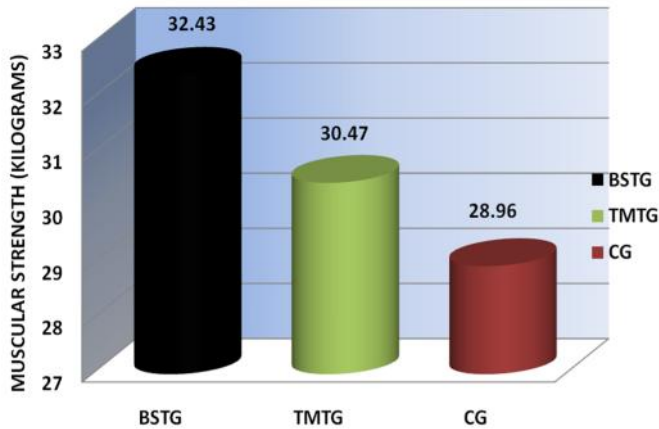


Fig. -1. The bar diagram showing the mean values of BSTG, TMTG and CG on muscular strength

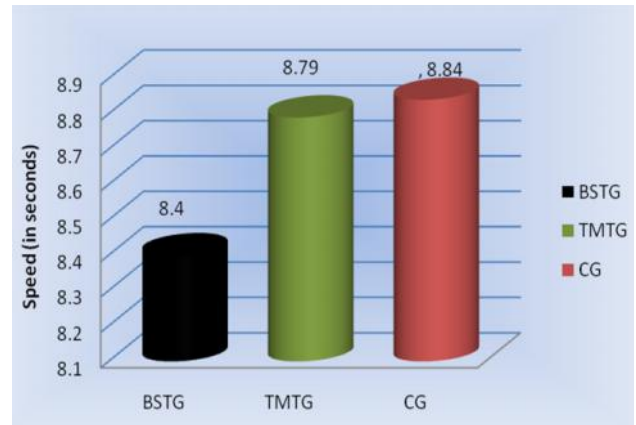


Fig. - 2. The bar diagram showing the mean values of BSTG, TMTG and CG on speed

Table - 4. Scheffe’s post hoc test for the differences between the adjusted post test means on speed (in seconds)

Basketball specific training group	Traditional method of training	Control group	Mean difference	Confidence Interval at 0.05 level
8.40	8.79	--	0.39 *	0.14
8.40	--	8.84	0.44 *	0.14
--	8.79	8.84	0.05*	0.14

\*Significant at 0.05 level of confidence

Table - 4 shows the post hoc analysis obtained on adjusted post test means. The mean difference required for the confidential interval to be significant was 0.14. It was observed that the basketball specific training group made significant improvement in speed than the traditional method of training and control group. The traditional method of training made significant improvement in speed better than the control group (Fig. -2).

Table-5 shows that the pre test mean differences on overall playing ability for the Basketball specific training group, traditional method of training group and control group were 7.45, 6.70 and 6.75 respectively. The obtained ‘F’ ratio of 2.75 was less than the table values of 3.16. Hence the pre test mean differences were found to be insignificant at 0.05 level of confidence for the degree of freedom 2 and 57. The post test mean values for the specific training group, traditional group and control group were 8.60, 7.70 and 6.55 respectively. The obtained “F” ratio of 61.86 was

greater than the table value of 3.16. Hence the post test mean differences were found to be significant at 0.05 level of confidence for the degree of freedom 2 and 57. The adjusted post test mean differences of the specific training group, traditional method of training group and control group were 8.35, 7.83 and 6.65 respectively. The obtained ‘F’ ratio of 67.05 was greater than the table value of 3.16. Hence the adjusted post test mean differences were found to be significant at 0.05 level of confidence for the degrees of freedom 2 and 56. It was concluded that there was a significant mean difference among basketball specific training group, traditional method of training group and control group in developing overall playing ability of the inter-collegiate women basketball players. When a significant ‘F’ ratio was found, a post hoc test (Scheffe’s) was done to identify significant differences among mean values and presented in the table-6.

**Table - 5. Analysis of variance on pre and post test means and analysis of co-variance of adjusted post test means among the BSTG, TMTG and CG on overall playing ability (in points)**

Test	Basket ball specific training Group	Traditional method of training group	Control group	Source of Variance	Sum of square	Df	Mean Square	F-ratio
Pre-test Mean ±SD	7.45±0.600	6.70±0.570	6.75±0.710	B/G W/G	7.03 22.93	2 57	3.51 0.40	2.75
Post-test Mean ±SD	8.60±0.500	7.70±0.570	6.55±0.600	B/ G W/G	26.78 12.12	2 57	13.39 0.21	61.86*
Adjusted Post-test Mean	8.350	7.830	6.650	B/G W/G	42.23 17.95	2 56	21.11 0.31	67.05*

\*Significant 0.05 levels, table 'F'-ratio is 3.16

**Table - 6. Scheffe's post hoc test for the differences between the adjusted post test means on overall playing ability (in points)**

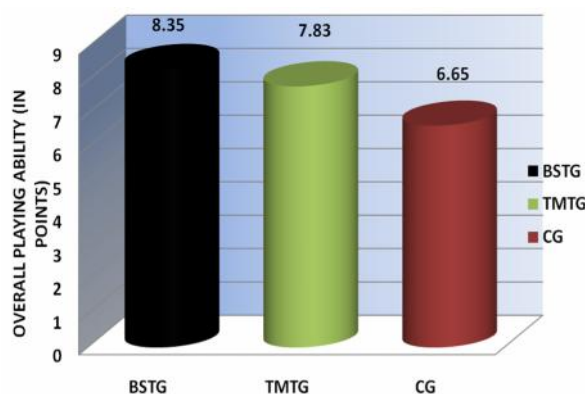
Basketball specific training group	Traditional method of training group	Control group	Mean difference	Confidence Interval at 0.05 level
8.35	7.83	--	0.52*	0.43
8.35	--	6.65	1.70*	0.43
--	7.83	6.65	1.18*	0.43

\*Significance at 0.05 level of confidence

Table-6 shows the post hoc analysis obtained on adjusted post test means. The mean difference required for the confidential interval to be significant was 0.43. It was observed that the basketball specific training group made significant improvement in overall playing ability than the traditional method of training and control group (Fig. - 3).

**Discussion**

The inter-group comparison shows that basketball specific training group had significantly higher averaged adjusted mean values than the traditional method of training group and control group in the development of muscular strength (P<0.05). The traditional method of training group had significantly higher averaged adjusted values than the control group on muscular strength. The



**Fig.-3. The bar diagram showing the mean values of BSTG, TMTG and CG on overall playing ability**

inter-group comparison shows that basketball specific training group had significantly higher averaged adjusted mean values than the traditional method of training group and control group in the

development of speed ( $P<0.05$ ). Traditional method of training group had significantly higher averaged adjusted values than the control group on speed.

The inter-group comparison shows that basketball specific training group had significantly higher averaged adjusted mean values than the traditional method of training group and control group in the development of overall playing ability ( $P<0.05$ ). Traditional method of training group had significantly higher averaged adjusted values than the control group on the overall playing ability.

This study confirms that basketball specific training and traditional method of training produced improvements in muscular strength, speed and overall playing ability of inter-collegiate women basketball players. The improvements are greater when they practice with specific basketball training than the traditional method of training in improving muscular strength, speed and overall playing ability. One of the well established laws of motor learning is that the only way to improve a skill is to practice that skill as accurately as possible. In basketball specific training the skills involved in the game like passing, dribbling and shooting are practiced repeatedly and accurately by means of drills and lead-up games. This might have helped the players to improve their overall playing ability. One of the basic thrusts of resistance training is to improve the functional performance of the neuromuscular system and nerve pathways that direct and control the movement (Pearson *et al.*, 2000). In addition to this resistance training helps to increase muscular strength including enhanced function of the respiratory, cardiac and metabolic system along with strengthening of supportive tissue (Dochery and Sporer, 2000).

## **Conclusion**

The results of this study provide evidence of supporting the effectiveness of basketball specific training in improving muscular strength and speed. The results also strongly indicated that sports specific training may also have positive effects on overall playing ability of the basketball players. These results indicate that basketball specific training comprised of strength based high intensity interval training, speed training, agility training and complex training might provide a sufficient stimulus to improve all the three components of basketball players, such as muscular strength, speed and overall playing ability.

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