Effect of Basketball Specific Training and Traditional Method of Training on Agility, Explosive Power and Passing Ability of Inter Collegiate Women Basketball Players

S. Parimalam
Ph.D., Research Scholar, Department of Physical Education
Karpagam University, Coimbatore, Tamilnadu, India
Dr. A. Pushparajan
Dean, Department of Physical Education
Karpagam University, Coimbatore, Tamilnadu, India

Abstract:
The intention of the present investigation was to find out the effect of basketball specific training and traditional method of training on agility, explosive power and passing ability of inter-collegiate women basketball players. To achieve the purpose of the study 60 inter-collegiate women basketball players from Bharathiar University affiliated colleges Tamilnadu, India were volunteered to participate in this study. They were randomly assigned into three groups equally. Each group consisted of 20 subjects. The three groups were named as follows, the experimental group-I named as a basketball specific training group (BSTG), experimental group-II named as the traditional method of training group (TMTG) and control group-III. After assigning the subjects into various groups the pre test was conducted on the selected variables of agility, explosive power and passing ability. After completion of the pre test, the subjects were treated with their respective training program. Training period was scheduled for twelve weeks. Experimental group-I (BSTG) underwent a basketball specific training programme, experimental group-II (TMTG) underwent traditional method of training programme (that is the subjects in TMTG were asked not to change their normal basketball game practice and in particular their own conditioning and training programme) and control group-III (CG) did not practice any specific training. After 12 weeks of the training period post test was conducted on the dependent variables of agility, explosive power and passing ability for all the three groups. To analyze the treatment effect of training paired 't' ratio was used. To compare the significance of mean differences among all the three groups analysis of covariance was used. Results: The basketball specific training group significantly improved (P<0.05) the selected variables of agility, explosive power and passing ability better than the traditional method of training. Traditional method of training group significantly improved (P<0.05) the selected variables of agility, explosive power and passing ability better than the control group. The control group did not show any significant improvement on the selected variables. Conclusion: Based on the results it was concluded that the implication of multi components training programme specific to the basketball game might have been the source of its dominance on the improvement of agility, explosive power and passing ability of the women basketball players.

Key words: Exercise, passing, explosive power, agility and Basketball

1. Introduction

Basketball is one of the today's fastest team sports and is epitomized by grandiose maneuvers such as the slam-dunk and blocked shot. These showcases of athletic ability clearly demonstrate the nature of sports at that speed, strength and power are all major determinants of successful basketball performances. Basketball, a game played with a continuous flow of activity, has always been considered as a game of precision, timing, accuracy and agility. Although only 15% of the playing time in a basketball game has been described as of high intensity, these actions are likely to determine the outcome of a contest. Basketball player must have tremendous cardiovascular endurance to run up and down the court time after time for four quarters of play, but players will also need to be able to execute explosive bursts of speed, explosive jumps and explosive movements for agility, time after time.

2. Methods
Experimental design, selection of subjects, selection of variables and tests, training programme and statistical procedure are explained below.

3. Experimental Design
In this study sixty women basketball players were randomly divided into three equal groups namely, experimental group-I basketball specific training group (n=20, BSTG), experimental group-II traditional method of training group (n=20, TMTG) and control group-III (n=20, CG). Each group consists of twenty subjects. The selected subjects were initially tested on the selected variables of agility, explosive power and passing ability. After the completion of the initial test, the subjects belonging to experimental group-I, and II were treated with their respective training programme for twelve weeks. The experimental group-I underwent a basketball specific training programme, experimental group-II underwent traditional method of training programme and control group-III had not actively participated in any specific training. After 12 weeks of the training period post test was conducted on the dependent variables of agility, explosive power and passing ability for all the three groups.

4. Selection of Subjects
The primary purpose of the present study was to know how far the basketball specific training and traditional method of training would help the development of selected variables (agility, explosive power and passing ability) compared to the player trained with the same intervening methods individually. To achieve scientifically precise results, among the team players who participated in the Bharathiar University inter-collegiate women basketball tournaments, 60 were volunteered to participate in this study and their age ranged from 18-25years.

5. Selection of Variables and Tests
The following testes were chosen for testing variables. Agility was measured by using shuttle run test. Explosive power was measured by using medicine ball throw test and passing ability was measured by using Leilich push-pass test. The chosen tests were highly standardized, appropriate and ideal to assess the selected variables.

6. Training Programme
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 training and game practice were administered. The subjects in the traditional method of training group practiced their normal basketball game and their own conditioning and training programme without any scientific method of training.

7. Statistical Analyses
To analyze the comparative treatment effects of training 't' ratio was used. To compare the significance of the mean differences among the three groups analysis of co-variance was used, when the F-ratio was significance, Scheffe's post-hoc test was used to identify the significant differences between the training groups. To test the significance of the derived results, the alpha level was set at 0.05 level of confidence.

8. Results of the Study
Analysis of covariance was applied to determine whether the training programmes produced significantly different improvements in agility, explosive power and passing ability among basketball specific training group, traditional method of training group and control group. The analysis is presented in the following tables.

9. Analysis of the Results of Agility
The data collected before and after the training period on agility of basketball specific training group, traditional method of training group and control group was analyzed statistically and presented in table-1.

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 & SD	52.98± 4.22	53.08± 3.72	53.01± 3.33	B/G W/G	0.107 814.08	2 57	0.05 14.28	0.004
Post-test Mean & SD	48.50± 3.76	51.58± 3.39	53.01± 3.33	B/G W/G	212.16 698.95	2 57	106.08 12.26	8.65*
Adjusted Post-test Mean	48.54	51.53	53.02	B/G W/G	208.64 7.84	2 56	104.32 0.14	745.09*

Table 1: Analysis of variance on pre and post test mean and analysis of co-variance of Adjusted post test means among the BSTG, TMTG and CG on agility (in seconds)
*Significance at 0.05 levels

Table-1 shows that the pre test mean differences on agility for the Basketball specific training group, traditional method of training group and control group were 52.98, 53.08 and 53.01 respectively. The obtained "F" ratio of 0.004 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 48.50, 51.58 and 53.01 respectively. The obtained "F" ratio of 8.65 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 48.54, 51.53 and 53.02 respectively. The obtained "F" ratio of 745.09 was greater than the table value of 3.16. Hence the adjusted post test mean difference was found to be significant at 0.05 level of confidence for the degrees of freedom 2and 56. It was inferred that there was a significant mean difference among basketball specific training group, traditional method of training group and control group in developing the agility of the inter-collegiate women basketball players. When significant 'F' ratio was found, a post hoc test (Scheffe's) was done to identify significant differences among mean values and presented in table-4.

- **The bar diagram showing the pre-test, post-test and adjusted post test mean values of BSTG, TMTG and CG on agility (in seconds)**
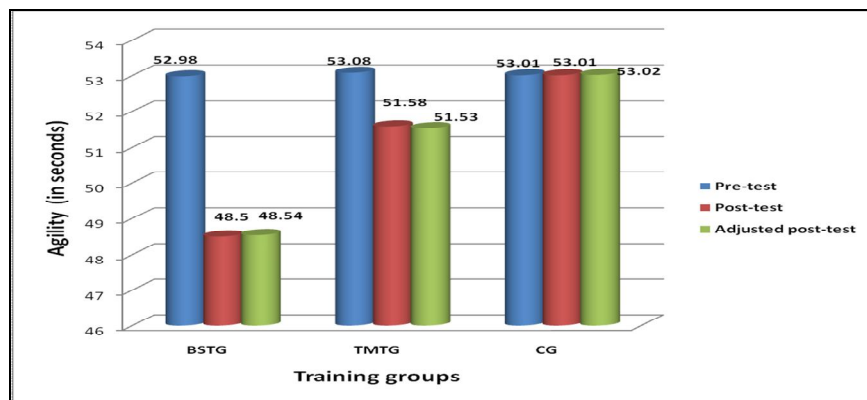

Figure 1

10. Analysis of the Result of Explosive Power
The data collected before and after the training period on explosive power of basketball specific training group, traditional method of training group and control group were analyzed statistically and presented in table-2.

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 & SD	3.27± 0.24	3.18 ± 0.27	3.23± 0.36	B/G W/G	0.78 5.20	2 57	0.03 0.09	0.42
Post-test Mean & SD	5.06± 0.41	4.26± 0.34	3.26± 0.34	B/G W/G	32.73 7.91	2 57	16.36 0.13	117.79*
Adjusted Post-test Mean	5.01	4.31	3.26	B/G W/G	31.25 2.15	2 56	15.62 0.03	406.56*

Table 2: Analysis of variance on pre and post test mean and analysis of co-variance of Adjusted post test means among the BSTG, TMTG and CG on explosive power (in meters)
Significance at 0.05 levels

Table-2 shows that the pre test mean differences on explosive power for the Basketball specific training group, traditional method of training group and control group were 3.27, 3.18 and 3.23 respectively. The obtained "F" ratio of 0.42 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 5.06, 4.26 and 3.26 respectively. The obtained "F" ratio of 117.79 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 5.01, 4.31 and 3.26 respectively. The obtained "F" ratio of 406.56 was greater than the table value 0f 3.16. Hence the adjusted post test mean difference was found to be significant at 0.05 level of confidence for the degrees of freedom 2and 56. It was inferred that there was a significant mean difference among basketball specific training group, traditional method of training group and control group in developing the explosive power of the inter-collegiate women basketball players. When significant 'F' ratio was found, a post- hoc test (Scheffe's) was done to identify significant differences among mean values and presented in table-4.

- **The bar diagram showing the pre-test, post-test and adjusted post test mean values of BSTG, TMTG and CG on explosive power (in metres)**
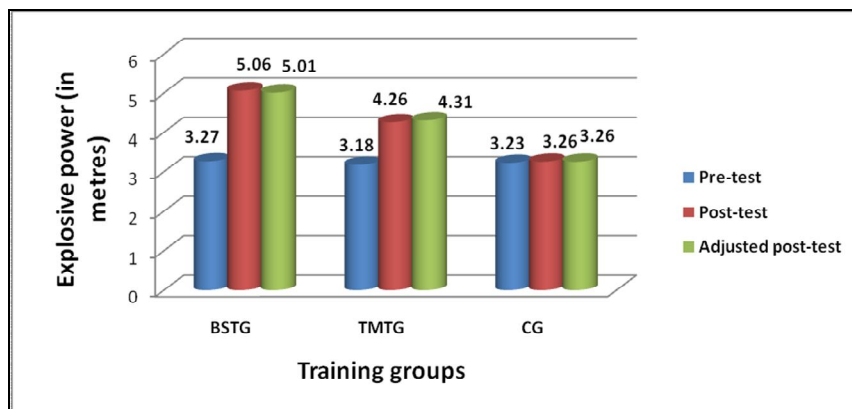

Figure 2

11. Analysis of the Result of Passing Ability
The data collected before and after the training period on passing ability of basketball specific training group, traditional method of training group and control group were analyzed statistically and presented in table-3.

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 & SD	93.75± 5.21	90.60± 9.70	88.85± 9.87	B/G W/G	246.63 4157.10	2 57	123.31 73.93	1.69
Post-test Mean & SD	114.30± 10.16	101.55± 10.56	90.45± 7.50	B/G W/G	5697.30 5150.10	2 57	2848.65 90.35	31.52*
Adjusted Post-test Mean	112.28±	101.90	92.11	B/G W/G	3847.23 2808.09	2 56	1923.61 50.14	38.36*

Table 3: Analysis of variance on pre and post test mean and analysis of co-variance of Adjusted post test means among the BSTG, TMTG and CG on passing ability (in numbers)
*Significance at 0.05 levels

Table-3 shows that the pre test mean differences on passing ability for the Basketball specific training group, traditional method of training group and control group were 93.75, 90.60 and 88.85 respectively. The obtained "F" ratio of 1.69 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 of the basketball specific training group, traditional method of training group and control group were 114.30, 101.55 and 90.45 respectively. The obtained "F" ratio of 31.52 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 were112.28, 101.90 and 92.11 respectively. The obtained "F" ratio of 38.36 was greater than the table value 0f 3.16. Hence the adjusted post test mean difference was found to be significant at 0.05 level of confidence for the degrees of freedom 2and 56. It was inferred that there was a significant mean difference among basketball specific training group, traditional method of training group and control group in developing the passing ability of the inter-collegiate women basketball players. When significant 'F' ratio was found, a post hoc test (Scheffe's) was done to identify significant differences among mean values and presented in table-4.

- **The bar diagram showing the pre-test, post-test and adjusted post test mean values of BSTG, TMTG and CG on passing ability (in numbers)**
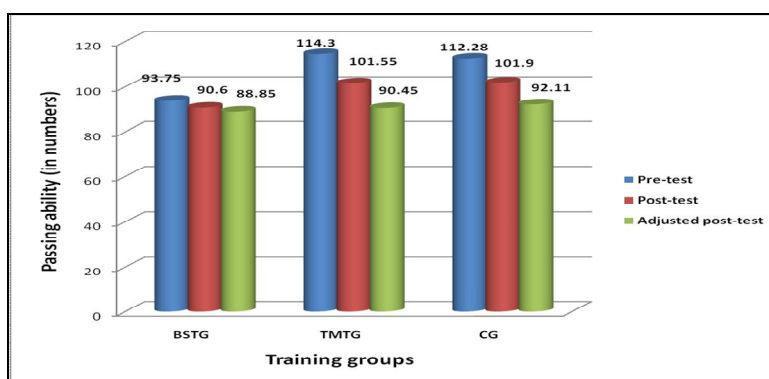

Figure 3

12. Scheffe's Post-Hoc Analysis
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.

Variables	Basketball specific training group	Traditional method of training group	Control group	Mean Difference	Confidence Interval at 0.05 level
Agility	112.28	101.90	-	10.38*	6.41
	112.28	-	92.11	20.17*	6.41
	-	101.90	92.11	9.79*	6.41
Explosive power	5.01	4.31	-	0.70*	0.17
	5.01	-	3.26	1.75*	0.17
	-	4.31	-	1.05*	0.17
Passing ability	48.54	51.53	-	2.99*	0.34
	48.54	-	52.02	4.48*	0.34
	-	51.53	52.02	1.49*	0.34

Table 4: Scheffe's post-hoc analysis of basketball specific training group, traditional method of Training group and control group on agility, explosive power and passing ability
*Significance at 0.05 level of confidence

Table-4 shows the post-hoc analysis obtained by adjusted post test means of agility, explosive power and passing ability. In the case of agility the mean difference required for the confidential interval to be significant was 6.41. It was observed that the basketball specific training group significantly improved the agility, better than the traditional method of training group and control group. The traditional method of training group significantly improved the agility, better than the control group. In the case of explosive power the mean difference required for the confidential interval to be significant was 0.17. It was observed that the basketball specific training group significantly improved the explosive power better than the traditional method of training group and control group. The traditional method of training group significantly improved the explosive power better than the control group. In the case of passing ability the mean difference required for the confidential interval to be significant was 0.34. It was observed that the basketball specific training group significantly improved the passing ability better than the traditional method of training group and control group. The traditional method of training group significantly improved the passing ability better than the control group.

13. Results and Findings
The experimental group-I (BSTG) had significantly higher averaged adjusted mean values than the traditional method of training group and control group in the development of agility (P<0.05). Experimental group-II (TMTG) had significantly higher averaged adjusted values than the control group on agility.
The experimental group-I (BSTG) had significantly higher averaged adjusted mean values than the traditional method of training group and control group in the development of explosive power (P<0.05). Experimental group-II (TMTG) had significantly higher averaged adjusted values than the control group on explosive power.
The experimental group-I (BSTG) had significantly higher averaged adjusted mean values than the traditional method of training group and control group in the development of passing ability (P<0.05). Experimental group-II (TMTG) had significantly higher averaged adjusted values than the control group on passing ability.

14. Discussion
This study confirms that basketball specific training and traditional method of training produced improvements in agility, explosive power and passing ability of inter- collegiate women basketball players.
- Agility: The basketball specific training group and traditional method of training group significantly improved the agility from pre test to post test. The agility increased in basketball specific training group from pre test (52.98±4.22) to post test (48.50±3.76); traditional method of training group from pre test (53.08±3.72) to post test (51.58±3.39), the agility significantly improved pre test to post test in all the two experimental groups with no change in control group. The result of the present study is in line with previous study [Michael G. Miller et.al (2006)] found that the plyometric training can improve the athlete's agility.
- Explosive Power: The basketball specific training group and traditional method of training group significantly improved the explosive power from pre test to post test. The explosive power increased in basketball specific training group from pre test (3.27±0.24) to post test (5.06±0.41); traditional method of training group from pre test (3.18±0.27) to post test (4.26±0.34), the explosive power significantly improved pre test to post test all the two experimental groups with no changes in control

group. The result of the present study is in line with the previous study [M.Brown et.al (1996)] found that the plyometric exercise is often used to improve explosive power.

- Passing Ability: The basketball specific training group and traditional method of training group significantly improved the passing ability from pre test to post test. The dribbling ability increased in basketball specific training group from pre test (93.75±5.21) to post test (114.30±10.16); traditional method of training group from pre test (90.60±9.70) to post test (101.55±10.56), the dribbling ability significantly improved pre test to post test all the two experimental groups with no changes in control group. [Sharma et.al (2012)] found that to improve the specific skills, specific training procedures should be incorporated during the basketball training sessions. They further recommended that the players should be involved in some type of plyometric training and resistance training programme to improve their skills in the game.

15. Conclusion

Observing the results derived from the individualized effect of Basketball specific training, it is concluded that the skill related drills and specific skill practices are the sources to develop the agility, explosive power, dribbling ability and overall performance of the inter-collegiate women basketball players. It is further concluded that the varied forms of intensity, load and frequency as in the case of basketball specific training programme would help the basketball players to free from injuries and to maintain the tempo of performance over the course of the training period positively.

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