International Journal For Advanced Research In Science & Technology
A peer reviewed international journal www.ijarst.in
ISSN: 2457-0362

IMPACT OF ENDURANCE STRENGTH ON FITNESS ELEMENTS TOWARDS FEMALE PLAYERS

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ABSTRACT
The performance of Indian female junior Basketball team is poor at the Asian as well as in the international level. This has become a challenge to the Basketball coaches, physical educationists and sports scientists of India. Though efforts are being made to improve the performance of Indian female junior Basketball players however, very little success has been achieved so far in this regard due to fact that in India the emphasis during selection of teams has been only based on skills and tactics without much consideration of specific physical fitness components and performance characteristics of Basketball players. In this respect the research scholar realizes the importance of physical fitness components in the game of Basketball and undertaken this topic. The present study was aimed to assess the physical fitness components of strength, speed, power, agility, flexibility and muscular endurance of Indian junior female Basketball players and to compare the results with age matched Controls. Also, compare the findings of the Indian female junior Basketball players with that of the international standards from available literatures and to make some suggestions for the improvement of their performance level. The study was carried out in nineteen (19) junior Indian female Basketball players aged between 16 to 20 years and nineteen (19) ages matched female Control group. Physical fitness components namely strength, speed, power, agility, flexibility and muscular endurance were measured by standard tests. all physical fitness components i.e. strength, speed, power, agility, flexibility and muscular endurance of Indian junior female Basketball players were statistically significantly in compared to their age matched Control group but when values of the each physical fitness components were compared to international standards, the Indian junior female Basketball players were behind the recommended norms for the elite international female Basketball players. The Indian junior female Basketball players have more advantages in strength, speed, power, agility, flexibility and muscular endurance of physical fitness components in compared to their age matched Control group.

KEYWORDS: physical fitness components, strength, speed, power, agility, flexibility, muscular endurance, Indian junior female basketball player

INTRODUCTION

Nowadays, elite Basketball players are quicker, stronger and in better physical condition than before, which could be a result of year-round scientific training and developing skills that added strength, power and fitness specific to their sport (Scates & Linn, 2003). Millions of people play Basketball across the world. In many countries, it has been ranked as one of the

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top level competitive sport. During a Basketball match players are involved in various performance movements such as; defensive and offensive jumps, blocks, spikes and sprints where power, strength, agility, and speed are required (Gabbett & Georgieff, 2006) [6] . Basketball is a team sport which requires intermittent bouts of high intensity exercise, followed by periods of low intensity activity (i.e. walking or standing) (Marques et al., 2006). These high-intensity bouts include both horizontal approach movements (spike jumps) and movements without an approach i.e. jump setting, jousts, blocking (Sheppard et al., 2008). The performance of Basketball players is influenced by many factors such as physical, physiological and psychological variables, technique, tactics, physique, body size, body composition and application of biomechanical principles. It has been well established that special physical characteristics indicates whether the player would be suitable for the competition at the highest level in a specific sport (Slater et al., 2005). No doubt the performance of player influenced by many factors but still physical fitness components of a specific game is the primary factor among those entire factors (Lidor & Ziv, 2010). Thakur and Sinha, (2010) pointed out that, "world's topmost sporting nations are very much conscious on fitness factors which are supposed to play a dominant role in its future performance in sports and games." During the course of game, players are required to serve, pass, set, attack, block and dig the ball. Playing Basketball requires strength, power, agility, flexibility, balance, speed, cardiovascular endurance along with skills in order to be played effectively. The poor performance of Indian athletes and different sports at international competitions has been of great concern, especially to the coaches, physical educationists and sports scientists. Efforts have been made to improve the standards of our sports persons since long; however, little success has so far been achieved in this respect. Performance of any game at national and international level mainly depends upon the specific fitness components of that particular game along with others performance related components.

Strength:

The competitive Basketball is techno-tactical sport. The requirement of the performance in this sport is the development of a high degree of conditional and coordinative abilities. Therefore, the physical fitness components like strength, speed, power, endurance, agility and flexibility which determine performance in this sport must be measured. Muscular strength especially of legs, arms, abdomen and fingers are the important requirement of a Basketball player. Spiking contributes 44% of the game which is the outcome of muscular strength and power of legs and arms. Strength of arms muscles for diving, rolling, blocking and even in serving plays a dominant part in the Basketball game. (Horak, J. 1978). The perusal of table 3 indicates that the mean ± SD of arm strength for Study group and Control group were 6.465 ± 0.927 and 3.733 ± 0.739 respectively. There was a significant difference exist in arm strength between the mean scores of Study group and Control

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A peer reviewed international journal www.ijarst.in
ISSN: 2457-0362

group, since the calculated t-value 10.03 was higher than the tabulated t-value 2.02 which was required to be significant at 36 degree of freedom with 0.05 level of confidence. It shows that Study group i.e. Indian junior female Basketball players have performed significantly better in arm strength component than of Control group. Nikolaidis, et al., (2012) conducted a study on Greek junior female Basketball players (14-18 years age) and they found their players were obtained 8.85 meter in arm strength. From the above discussion it may be stated that, Indian Junior female Basketball players are poor in arm strength that that of International counterpart.

Table 1: Mean, standard deviation, mean difference & independent sample t-test of study group and control groups of selected physical fitness components

Physical Fitness Components	Study/Control Group (N=19)	Mean	S.D	S.E.M	t-value	Sig. (2-tailed)	S/ NS
Strength	Study Group	6.465	± 0.927	0.212	10.03	0.000*	S
	Control Group	3.733	± 0.739	0.169			
Speed	Study Group	4.048	± 0.221	0.050	9.37	0.000*	S
	Control Group	5.617	± 0.694	0.159			
Power	Study Group	48.578	± 3.863	0.886	7.89	0.000*	S
	Control Group	37.684	± 4.607	1.057			
Agility	Study Group	12.317	± 0.439	0.100	9.06	0.000*	S
	Control Group	14.760	± 1.089	0.250			
Flexibility	Study Group	21.947	± 3.922	0.899	5.96	0.000*	S
	Control Group	15.157	± 3.041	0.697			
Muscular Endurance	Study Group	23.210	± 4.491	1.030	7.50	0.000*	S
	Control Group	15.315	± 3.590	0.823			

Speed:

Table 1 reveals that there was a significant difference between the mean scores of Study group and Control group in speed, since the calculated t-value 9.37 was higher than the tabulated t-value 2.02 which was required to be significant at 36 degree of freedom with 0.05 level of confidence. It shows that Study group i.e. Indian junior female Basketball players have performed significantly better in speed than that of their Control group. Yavuz, S.C. (2015) conducted a study on 'Somatic and Physical Characteristics of Adolescent Female Basketball Teams at Different Success Levels'. The researcher found that the 1st and 2nd success groups of Basketball players scored in 20 meter run 3.36 and 3.73 second respectively. But in this study Indian junior female Basketball players obtained 4.048 second, which indicated that Study group i.e. Indian junior female Basketball players are slower in speed component than that of International standard.

Power:

Power may be defined as the ability to release maximum force in the fastest possible time as in jumping and throwing activities. The game of Basketball is a game of power. For peak performance in Basketball, the muscles which are the source of power must be strong. It is important for a Basketball player to have explosive power in legs because he has to jump hundreds of times during the match or tournament for executing spiking skill or blocking skill. Thus, a good vertical jump during the spike, block and jump service depends on strength, speed and technique. Table 1 depicts that there was a significant difference between the mean scores of Study group and Control group in power of legs, since the calculated t-value 7.89 was higher than the tabulated t-value 2.02 which was required to be significant at 36 degree of freedom with 0.05 level of confidence. It shows that Study group i.e. Indian junior female Basketball players have performed significantly superior in power of legs component than that of Control group. Smith, D. J. et al.,

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ISSN: 2457-0362

(1992) observed that, vertical jumping scores of Canada junior national and Chinese female national Basketball players have 58.00 and 62.00 centimeter respectively, whereas the Indian junior female Basketball players the same has 48.578 centimeter. Kasabalis, A. et al., (2005) [9] have found a significant correlation between anaerobic power and jumping performance in Basketball players and they have suggested that vertical jump may predict maximum anaerobic power and could be used by the coaches as a practical and easy to apply field screening test for evaluation in Basketball training.

Sheppard, J.M. (2012) has shown that to progress from junior to senior national team, Basketball players must increase their vertical jump ability for counter movement and spike. Thus, from the findings and suggestions of various researchers it may conclude that, power is one of the most important physical fitness component determining the performance level of Basketball players at highest level. Exercises like isotonic and isometric weight training, rope skipping, ankle strengthening exercise; ballistic resistance training, hip flexibility exercises, sprinting and most of all plyometric exercises help in improvement of vertical jumping ability for spiking and block skills development in the game of Basketball.

Agility:

The game Basketball requires a high degree of running maneuverability and total body agility so that the player may able to gain better court position and compete with her opponents on both offensive and defensive maneuvers. Fast acceleration is also requires to be able to sprint to advantageous positions while attacking and counter attacking. Agility is even more important to leave the spiked ball and makes drops by diving and rolling as well as maintaining again good court positions for further defense. With the agility component the Basketball player has to change their body position quickly and accurately to receive the ball. Table 1 reveals that there was a significant difference between the mean scores of Study group and Control group in agility, since the calculated t-value 9.06 was higher than the tabulated t-value 2.02 which was required to be significant at 36 degree of freedom with 0.05 level of confidence. It shows that Study group i.e. Indian junior female Basketball players have performed significantly better in agility component than Control group. Sijel, E. (2015) conducted a study 'on power, agility and speed (PAS) among junior female team games players'. Among the games, female junior Basketball players obtained agility (4x10 meter) in pre-test and post test scores of 10.70 second and 10.32 second respectively. This literature indicates that in agility our Indian junior female Basketball players also lacking behind as compared to international level.

Flexibility:

Flexibility is the ability of an individual to move the body and its parts through as wide range of motion as possible without undue strain to the articulations and muscular attachments. Flexibility provides another dimension in performance that allows a higher degree of freedom and ease of movement coupled with some important implications for greater safety from injury.

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ISSN: 2457-0362

In Basketball, the players have to move suddenly in forward direction, sideways or downward directions, so flexibility of hip and back is of utmost importance. So, the research scholar has decided to go with Sit and Reach test. In our study, the mean trunk flexibility of Study group i.e. Indian junior female Basketball players and Control group has been 21.947 and 15.157 respectively and the difference has been found to be statistically significant at 0.05 level of confidence. Duncan, M.J. et al., (2006) have found mean values for Sit and Reach test in national level female Basketball players to be 23.50, which has been more than our Indian junior female Basketball players. Lee, E.J. et al., (1989) have found significant and positive correlation between vertical jump and hip flexion. His findings have supported the assumption that greater flexibility is related to greater skilled performance. Thus, he has concluded that greater hip flexibility may benefit the jumping ability. So that, the researcher may conclude that Indian junior female Basketball players in this study have good in flexibility component when compared to Control subjects. But the available of literature indicates that in agility, Indian junior female Basketball players lacking behind as compared to international counterpart. For improving flexibility of trunk, various lower back and hamstring stretching exercises are advised which are to be done regularly and executed properly and gradually.

Muscular Endurance:

Muscular endurance is the ability to repeat a series of muscle contractions without fatigue. Basketball has been described as interval sport with both anaerobic as well as aerobic component. In long matches or tournament play, the players have to bend, jump and move thousands of times which need good muscular endurance. It is one of the required qualities for excelling in Basketball game. In this study, muscular endurance of abdomen has been assessed by number of maximum bent knees sit ups executed correctly by the Study group and Control group. The average number of maximum sit ups for Study group has been 23.210 and for Control group 15.315, the difference being statistically significant. Yavuz, S.C. (2015) observed that the sit up score of muscular endurance of adolescent female national Basketball team of Turkey to be 25.40. So, when compared with international level Indian junior female Basketball players still it lags behind when compared to national/international standards.

CONCLUSION

From the above discussion of physical fitness components it may be safely be concluded that the Study group i.e. Indian junior female Basketball players are better in strength, speed, power, agility, flexibility and muscular endurance components of physical fitness when compared with ages matched Control group. In respect of availability of literatures when researcher compared the different components of physical fitness of Indian junior female Basketball players are lagging behind compared to that of national/international counterparts. From the discussion it may also be concluded that Basketball coaches, physical educationists and sports scientists should examine the components of physical

fitness of their players and use this information when planning the training and conditioning programmes. It is recommended that physical fitness testing be carried out throughout the season to assess the strengths and weaknesses of each team/player. The result of this study helps to the Basketball coaches, physical educationists and sports scientists for selection of their female junior team.

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