

Relationship between Anaerobic Power and Vertical Jump of Selected Female Volleyball Players of Lucknow University

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Abstract

The main purpose of the study was to investigate the relationship between anaerobic power and vertical jump of selected female of volleyball players of Lucknow University, using the RAST TEST and vertical jump test performance. It was hypothesized that there would be no significant difference in relationship between anaerobic power and vertical jump of selected female volleyball players of Lucknow University. The present study was conducted on 15 female volleyball players of University of Lucknow, Lucknow with age ranging 21+ to assess the selected physiological and biomechanical variable anaerobic power and vertical jump. The test for the selected variables namely anaerobic power and vertical jump were chosen by keeping simplicity and administrative feasibility in mind. In addition, tests were also chosen on the basis of review collected where these variables and tests were employed. To assess the anaerobic power "RAST TEST (Running Based Anaerobic Sprint Test)" was used. It was recorded in seconds. Vertical jump was measured from the initial point to final mark on a specific wall. It was measured in cm. To find the significant correlation between anaerobic power and vertical jump Pearson correlation coefficients was used. The level of significance was set at 0.05. The data was analyzed by SPSS (Version 21). Findings of the study revealed that there is significant relationship between anaerobic power and vertical jump of the female volleyball players.

Keywords: Anaerobic Power, RAST TEST, Vertical Jump, and Volleyball

Introduction

Volleyball has become a very popular game throughout the world. It has the world's second most popular sports and it is an international game that requires great skill and complex strategy, but it can be adapted to any level of play and it is always fun (Dumphy & Wilde, 2000). Volleyball is a fun sport to play. From jumping up to block your opponent's attack, to diving to the ground and keeping the ball alive, there's so much enjoyment from getting stuck into a volleyball game. Ball games require a detailed skill, including physical, technical, mental and tactical aspects. Among these, physical fitness components or skills of the

players significantly affect their game intelligence and the tactics of the team because ball games require repeated maximum effort. Due to this reason players should have physical skills to strengthen their aerobic and anaerobic capacities in order to perform fast, quick and hard movements (Hasan Sozen, 2012).

Scientific investigations into performance of sportsman have been playing an increasingly important role in training of athletes in the scientific way to attain excellence in performance in different spheres of sports. Athlete concentrates on

development of speed, flexibility, strength, agility and endurance etc. as a part of preparation in their respective sports. Coaches and physical education teachers must extract maximum achievement from their trainees without much strain. This is only possible when coaches and physical education teachers utilize the most beneficial means of training (Powell, 1983).

Anaerobic power means as the performance of a work with maximal speed. Anaerobic power is the power produced without the requirement for oxygen to be present. Sprinting, mainly at the end of a race, is predominately an anaerobic activity. Anaerobic literally means without oxygen. Volleyball is a sport in which the effort of the players during the game is not constant but includes a variety of interrupted explosive movements. The anaerobic metabolic system plays a significant role given the quick reactions and the combination of high intensity jumps with movements in all directions.

Anaerobic exercise is a type of exercise that breaks down glucose in the body without using oxygen. In practical terms, it means that anaerobic exercise is more intense, but shorter in duration than aerobic exercise. The biochemistry of anaerobic exercise involves a process called glycolysis, in which glucose is converted to adenosine triphosphate (ATP), which is the primary source of energy for cellular reactions. Anaerobic exercise may be used to help build endurance, muscle strength and power. Anaerobic metabolism is a natural part of metabolic energy expenditure. (Scott, Christopher B, June 2005). Fast twitch muscles as compared to slow twitch muscles

operate using anaerobic metabolic systems, such that any use of fast twitch muscle fibers leads to increased anaerobic energy expenditure. Anaerobic exercise also increases an individual's basal metabolic rate (Scott and Steven, 1991).

In order to be acknowledged as a successful performance, it is important to see which of the factors are contributing to that performance. In volleyball spike jump there are many important contributing factors which enable an efficient execution of the skill. In general terms, the height of a jump depends on the interaction between the physical and technical abilities of the jumper. Physical abilities determine the potential of the jumper and the technique is the degree to which the potential is realized (Dusault, 1983).

A vertical jump or vertical leap is the act of raising one's center of gravity higher in the vertical plane solely with the use of one's own muscles; it is a measure of how high an individual or athlete can elevate off the ground (jump) from a standstill. The ability to rapidly generate force is of obvious importance in jumping performance. The relationship between the rate of force development and athletic performance has received equivocal support from researchers. Therefore, the aim of the present study was to examine the relationship between anaerobic power and vertical jump of selected female of volleyball players of Lucknow University.

Research Methodology

The present study was conducted on 15 female volleyball players of University of Lucknow, Lucknow with age ranging 21+ to assess the selected physiological and

biomechanical variable anaerobic power and vertical jump. The test for the selected variables namely anaerobic power and vertical jump were chosen by keeping simplicity and administrative feasibility in mind. In addition, tests were also chosen on the basis of review collected where these variables and tests were employed. To assess the anaerobic power “RAST TEST (Running Based Anaerobic Sprint Test)” was used. It was recorded in seconds. Vertical jump was measured from the initial point to final mark on a specific wall. It was measured in cm. To find the significant correlation between anaerobic power and vertical jump Pearson correlation coefficients was used. The level of significance was set at 0.05. The data was analyzed by SPSS (Version 21).

Results

Table No. 1

Descriptive Analysis of Anaerobic Power and Vertical Jump of Female Players of Lucknow University

	N	Minimum	Maximum	Mean	Std. Deviation
Vertical Jump	15	27.00	51.00	41.53	9.10
Anaerobic Power	15	470.00	794.35	642.95	118.02

A descriptive analysis of table 1 depicts the mean value with standard deviation of Vertical Jump is 41.53 ± 9.10 . The minimum vertical jump value is 27.00 and maximum value is 51.00. Similarly, the mean value with standard deviation of

Anaerobic Power is 642.95 ± 118.02 . The minimum Anaerobic Power value is 470.00 and maximum value is 794.35.

Table No. 2

Correlation of Anaerobic Power and Vertical Jump of Female Players of Lucknow University

Correlations			
		Vertical Jump	Anaerobic Power
Vertical Jump	Pearson Correlation	1	.654*
	Sig. (2-tailed)		.033
	N	15	15
Anaerobic Power	Pearson Correlation	.654	1
	Sig. (2-tailed)		
	N		15

*Correlation is significant at the 0.05 level (2-tailed).

Table 2 shows that there was a positive and significant correlation between the two variables i.e., anaerobic power and vertical jump ($r = .654$, $p < 0.05$, 0.33) of Rast Test and Vertical Jump demonstrating the validity of the vertical jump test as a field test of anaerobic power in female volleyball players of Lucknow University.

Discussion and Findings

The results of the study indicated that there was a positive and significant correlation between the two variables i.e., anaerobic power and vertical jump ($r = .654$, $p < 0.05$, 0.33) of Rast Test and Vertical Jump demonstrating the validity of the vertical

jump test as a field test of anaerobic power in female volleyball players of Lucknow University. This study has shown that the maximum anaerobic power is most important factor in performing higher vertical jumps. It is clearly shown here that high reserves of phosphocreatine and ATP in leg muscles will aid the players in performing high vertical jumps. The biochemistry of anaerobic exercise involves a process called glycolysis, in which glucose is converted to adenosine triphosphate (ATP), which is the primary source of energy for cellular reactions. Anaerobic exercise may be used to help build endurance, muscle strength and power.

The result may be due to the fact that anaerobic capacity is the total amount of energy from the anaerobic (without oxygen) energy systems that is the combined amount of output for the ATP, phospho-creatine and lactic acid systems. The anaerobic system is maximally stressed out in short duration high intensity activities like sprints, weightlifting, spiking in volleyball etc. (generally between 30 seconds and several minutes), and most of the following tests are over this time period.

Conclusions

We can conclude from the above analysis that there is a significant relationship between anaerobic power and vertical jump of the female volleyball players. The result has proven that the maximum anaerobic power is most important factor in performing higher vertical jumps and could be applied by the trainers or coaches on the field for talent identifications and skills improvement.

Recommendations

On the basis of findings and in the light of conclusion drawn from the study, the following recommendations are made:

- A similar study can be conducted on senior and junior female volleyball players.
- A similar study may be conducted with male players participating in different games and sports.
- A similar study can be conducted on the subjects of different age groups.
- A similar study may be conducted with larger sample size.

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