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## A study of physical parameters as predictors of performance in volleyball players

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### Abstract

This research was entitled as “A Study of Physical Parameters as Predictors of Performance in Volleyball Players”. The subjects for the present study were hundred (50-male and 50-female) inter-college level volleyball players from the affiliated colleges of Panjab University, Chandigarh. The data pertaining to the anthropometrical, physical and physiological variables was collected in the track and laboratory of Physical Education Department, Panjab University. The performance was assessed by the panel of three judges rating of skills during the inter-college tournament of Panjab University. In order to correlate the performance in playing ability on the basis of the anthropometrical, physical and physiological variables, Pearson’s Product Moment Correlation and Multiple Correlations was employed. The analysis of data of men volleyball player’s reveals that Physical variables of agility, power and, endurance showed a positive relationship to volleyball playing ability. In case of women volleyball players the physical variables of speed, grip strength (right), and power as measured through vertical jump showed a significant positive relationship to volleyball playing ability.

**Keywords:** Yoga, pranayama, aged women, breath holding capacity, vital capacity

### Introduction

Since the advent of modern Olympic movement sports training has gradually evolved into a recognized discipline of careful investigation on perfect scientific lines. This trend is the natural outcome of the competitiveness, which is aroused by Olympic Games, not only among the elite sports persons of the world but the way prestige of participating nations is set at stake. The erstwhile eastern block was a trend setter in conducting very conclusive research to ensure that their sportspersons won laurels and thus strived to achieve their superiority through sport and to prove that country’s socio political system is the best and most organized system for individual and collective opportunities for achieving excellence, not only in sports, but in every sphere of life. Along this line of thought tremendous shift in focus took place in scientific endeavours. Research in abundance has taken place and focus shifted from general training strategies to more and more specific training techniques that concentrate on the whole ambit of physical, psychological, physiological, anthropological and economic factors that determine excellence in sports performance and the way individual sports persons can be prepared to accomplish their maximum potential. The science of Sports' training has resulted in the preparation of the sports person under near perfect conditions exploiting the anthropological, physical, physiological, psychological, nutritional and other related issues, combined with technical, tactical, and strategic advancements, to its optimal level to the advantage of the sports person. Thus, Games and sports have assumed multi-dimensional approach. The science of sports training has entered into a new era of historical importance by embracing into its fold several other disciplines like preventive medicine, sports medicines, physiotherapy, manufacturing of equipments, dresses, and protective equipments. Therefore, a great prestige in today’s society is attached to winning and achieving highest possible performance by individuals, teams, cultural and ethnic groups, and nations alike. The tremendous technical development that has taken place in every sport along with rule changes, have compelled players and coaches to modify their training strategies in order to meet the performance demands of the given sport. Thus, today the technical and strategic development is not simply dependent upon the physical, physiological and technical perfection considered

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in a vacuum, but rather the ability of the players to combine all these qualities in an effective manner. All these efforts have undoubtedly resulted in greater aspirations and supremacy in winning. The athletes are rigorously trained by expert coaches and sports scientists to do better than their rivals. The main goal of training is to realize their dream of winning the game there is ample evidence of ever-increasing performance levels making the victory more challenging each day.

### Physical variables and performance in volleyball

Motto (1977) [3] also suggests performance depends upon speed power etc. and that there is an optimal age for testing of various physical characteristics, as there are certain stages when development reaches at a point where trend is predictable e.g. adult level agility is reached around 12-14 years with little development after that, speed of movements which depends on central nervous system functions mature at around fourteen years, but running speed can still be improved, especially by change in stride length, with limbs growth. Testing for running speed should be continued up to 16 to 17 years. Power development is largely dependent up to third decades of life, but strength touches about 80% at 17 years for girls and 16 years for boys. The control of the training process of volleyball players includes the evaluation of general and specific fitness. The means of control include the observation of the players during the game and the application of different kinds of fitness tests. The latest studies on human motor structure allowed developing more reliable and more valid evaluation methods of motor preparation

Barrow and Me Gee (1979) [2] argue that motor abilities play an important role in physical activities, and their importance is revealed to a great extent in sports and games involving efficient footwork and quick change in body position. Thus Motor fitness and competitive performance go hand in hand with athleticism. Superb fitness level is a pre requisite in training for competitive sports. Apart from these factors, most of the sports activities require greater amount of speed, strength, endurance, flexibility, agility, coordination and appropriate total fitness of the organism at the higher skill levels, technical performance may be limited by physical characteristics as well as physical fitness, and performance characteristics such as speed and vertical jump. According to them that either years of specific physical conditioning and playing or the selection of individuals for the national team

who possess more desirable characteristics as a consequence of genetic endowment, plays a significant role in the preparation of international Caliber volleyball players.

### Selection of the subjects

The subjects for the present study were hundred (50-male and 50-female) inter-college level volleyball players from the affiliated colleges of Panjab University, Chandigarh.

### Selection of variables

The following anthropometric, physical and physiological variables were selected because these variables are considered to be important for better volleyball performance in male and female players.

#### a. Dependent variables

Performance of Volleyball Players

#### b. Independent variables

Physical Variables

1. Speed
2. Power
3. Flexibility
4. Agility
5. Reaction time
6. Endurance
7. Muscular Strength

### Collection of data

The data pertaining to the anthropometrical, physical and physiological variables was collected in the track and laboratory of Physical Education Department, Panjab University. The performance was assessed by the panel of three judges rating of skills during the inter-college tournament of Panjab University.

### Statistical procedure

In order to correlate the performance in playing ability on the basis of the anthropometrical, physical and physiological variables, Pearson's Product Moment Correlation and Multiple Correlations will be employed.

### Analysis of data and results of the study

**Table 1:** Descriptive Analysis of Physical Variables for Men and Women Volleyball Players

Variable	Mean		SD		Range		Skewness		Kurtosis	
	Men	Women	Men	Women	Max. Men	Min. Women	Men	Women	Men	Women
Speed	7.30	8.8	.37	.74	6.82	8.87	1.92	1.17	5.58	2.33
					7.58	11.11				
agility	10.43	11.64	.57	.75	9.2	11.7	.50	.385	.150	-.74
					9.8	12.7				
Flexibility	10.0	8.94	4.98	4.02	0	22	-.14	1.15	-.167	1.62
					3	22				
Grip Str.(R)	17.46	15.9	5.17	3.25	6	25	.355	.237	1.14	-.62
					11	24				
Grip Str.(L)	17.44	13.74	5.41	3.3	2	40	.633	-.058	1.863	-.32
					6	21				
SBJ	3.46	2.42	.91	.21	1.75	2.9	1.65	.98	5.3	1.63
					1.00	2.05				
VJ	46.54	32.68	9.35	6.25	29	76	.74	.158	.41	.43
					20	45				
End.	2238	2137	358.6	218	1500	2900	-.09	.669	.74	.37
					1800	2800				
RT	22.37	31.8	4.97	6.47	13	37	.738	.018	.434	.538
					16	45				

The mean, standard deviation, range, skewness and kurtosis for the physical variables of speed, agility flexibility, grip strength standing broad jump, vertical jump, endurance and reaction time have been presented in Table 3.

It is evident from this table that means for speed (50 m Run test) were 7.3sec (SD=.37) and 8.8sec (SD=.74) for men and women players respectively, and for agility(4x10 m Shuttle Run) the mean value were 10.43sec (SD=.57) and 11.64 sec (SD=.75) for men and women respectively. Grip strength (right) means were 17.46 Kgs (SD=5.17) for men and 15.9 Kgs (SD=3.25) for women players, and means for grip strength (left) were 17.44 Kgs (SD=5.14) and 13.74 Kgs (SD=3.3) for men and women respectively. Means for Leg power (Standing Broad Jump) were 3.46 m (SD=.91) and 2.42 m (SD=.21) for men and women players respectively, and for Leg power (Vertical Jump) the mean value were 46.54 cm (SD=9.35) and 32.68 cm (SD=6.25) for men and women respectively. Endurance means (12 min Run /walk Test) were 2238 m (SD= 358.6) for men and 2137 m (218.0) m for women players. Reaction time Nelson’s Test) means for men were 22.37cm (SD=4.97) and 31.8 cm (SD=6.47) for men and women players respectively.

**Table 2:** Co-Efficient of Correlations between Selected Physical Variables and Volleyball Playing Ability (Men)

Variable	r value
Speed (50 m run)	-0.145
Agility (4x10 m shuttle run)	-0.370*
Flexibility (Sit and reach)	0.113
Grip Strength(R)	0.154
Grip Strength (L)	0.115
Power (SBJ)	0.264
Power (vertical Jump)	0.353*
12 min Run/walk	0.320*
Reaction time	0.094

\*significant at .05 level of confidence

Table 2 shows that the coefficients of correlation between Speed (50 m run), Agility (4x10 m shuttle run), Flexibility (Sit and reach),Grip Strength (R), Grip Strength (L), Power (SBJ),Power (vertical Jump),12 min Run/walk, and Reaction time were -0.145, -0.370\*, 0.113, 0.154, 0.115,0.264, 0.353\*,0.32\*, and 0.094 respectively.). Agility (-037), power (0.353), and Endurance (0.520) as measured through vertical jump, showed a significant relationship with volleyball playing ability.

**Table 3:** Co-Efficient of Correlations between Selected Physical Variables and Volleyball Playing Ability (Women)

Variable	r Value
Speed 50 m run	0.312*
Agility 4x10 m	0.125
Flexibility (Sit and reach)	0.15
Grip Strength(R)	0.471*
Grip Strength (L)	0.045
Power (SBJ)	0.221
Power (VJ)	0.314*
Endurance (12 min Run/Walk)	0.287
Reaction Time	0.092

\*Significant at.05 level of confidence

The coefficients of correlation between volleyball playing ability and selected physical variables for women have been given in Table 3

It is evident form table 3 that The Coefficients of correlation were 0.312\*, 0.125, 0.15, 0.471\*, 0.045, 0.221, 0.314\*, 0.287,

0.092 for Speed (50 m run), Agility (4x10 m), Flexibility (Sit and reach), Grip Strength(R), Grip Strength (L), Power (SBJ), Power (VJ), Endurance (12 min Run/Walk) Reaction Time. There was a significant posit relationship of variables of speed (0.312), Grip Strength(R) (0.471), and power (0.314) as measure by vertical jump to volleyball playing ability.

**Discussion of results**

The analysis of data of men volleyball player’s reveals that Physical variables of agility, power and, endurance showed a positive relationship to volleyball playing ability. In case of women volleyball players the physical variables of speed, grip strength (right), and power as measured through vertical jump showed a significant positive relationship to volleyball playing ability. Means for speed (50 m Run test) were 7.3sec (SD=.37) and 8.8sec (SD=.74) for men and women players respectively, and for agility (4x10 m Shuttle Run) the mean value were 10.43sec (SD=.57) and 11.64 sec (SD=.75) for men and women respectively. Grip strength (right) means were 17.46 Kgs (SD=5.17) for men and 15.9 Kgs (SD=3.25) for women players, and means for grip strength (left) were 17.44 Kgs (SD=5.14) and 13.74 Kgs (SD=3.3) for men and women respectively. Means for Leg power (Standing Broad Jump) were 3.46 m (SD=.91) and 2.42 m (SD=.21) for men and women players respectively, and for Leg power (Vertical Jump) the mean value were 46.54 cm (SD=9.35) and 32.68 cm (SD=6.25) for men and women respectively. Endurance means (12 min Run /walk Test) were 2238 m (SD= 358.6) for men and 2137 m (218.0) m for women players. Reaction time Nelson’s Test) means for men were 22.37cm (SD=4.97) and 31.8 cm (SD=6.47) for men and women players respectively. There was a significant positive relationship of variables of speed (0.312), Grip Strength(R) (0.471), and power (0.314) as measure by vertical jump to volleyball playing ability. Physical variables of Speed (50 m run), Flexibility (Sit and reach), Grip Strength (R), Grip Strength (L), Power (SBJ), Power (vertical Jump), 12 min Run/walk, did not have any significant relationship to volleyball playing ability for men.

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