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RELATIONSHIP OF SELECTED ANTHROPOMETRIC VARIABLES AND FLAT SERVE PERFORMANCE AMONG UNIVERSITY TENNIS PLAYERS

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ABSTRACT

The aim of this study was to relationship of selected anthropometric variables and flat serves performance among university tennis players. They selected subjects of (n= 30) men tennis players represented university were purposively selected from Tamil Nadu, India for this study, the age of the subjects ranged from 18 to 25 years. The subjects had past playing experience of at least five years in tennis. The selected anthropometric variables namely height measured with stadiometer in cm, weight measured with weighing machine in kg, arm length and leg length were measured in measuring tape in cm. Hewitt's tennis skill test was used to measure the flat service performance (speed and accuracy). The collected data was statistically analyzed by using descriptive statistics and Pearson's correlation coefficients. The finding reveals that the significant positive relationship with height and moderate relationship with weight, arm length leg and length.

Keywords: Anthropometric, Height, Weight, Arm length, Leg length, Flat Serve performance.

Introduction

Tennis is one of the most popular sports, a world-class competitive sport attracting millions of players and fans worldwide (USTA, 2002). Tennis is a one of the lifelong sports and the goal is enhance the performance and staying injury free at the professional level (Paul & Mark, 2011).

In tennis technique, there are numerous skills but the serve is an important key to success because the fast and power flat serve is the most intimidating and fearsome weapon of a player (Sgro et al., 2013). In tennis, the serve is a sequence of motion referred to as a kinetic chain that begins with the lower limb action and followed by rotations of the trunk and the upper limb (Elliott et al., 2003). The serve is one of the most important shots in tennis, use power, swing, and placement to create a tennis weapon (Joey & Scott, 2012).

The anthropometric variable is very useful for physical educationists, coaches and trainers are to measure different parts and components of human body (Devinder, 2008). Anthropometry identifies the body composition of the players of different sport, because the specific physical characteristics essential in

many sports that indicate whether the player would be suitable to compete the highest level in specific sports (Reilly et al. 2001). Taller players had an advantage in playing ability over their peers in tennis (Yixiong et al. 2019). Height of the players associated with better ranking (Kumar, 2017).

IMPORTANCE OF SKILL RELATED FITNESS IN TENNIS SERVE

The sport of tennis requires strength, flexibility, power, endurance and speed. Tennis matches can last several hours require aerobic fitness, but the short sprints, explosive movements, and directional changes are clearly anaerobic. Tennis players need both the cardio respiratory and muscular systems should be trained (Roetert & Kovacs, 2011). A total tennis fitness program must therefore include tennis serve exercises that promote the development of muscular power. The service motion in tennis involves almost all the major muscle groups from the ground up. Coordination is vital for tennis players in learning and mastering tennis skills (Zeotu et al. 2012). Strength not being the only factor involved in producing ball speed during the tennis serve (Pugh et al. 2003).

skill related fitness variables namely, grip strength, dynamic balance, co-ordination, arm power and leg power,

Similarly, the skill related fitness variables namely, grip strength (grip dynamometer), dynamic balance (bass dynamic balance test), co-ordination (wall pass test), arm power (medicine ball throw) and leg power (sergeant vertical jump test) were measured using standardized tests

METHODOLOGY

The purpose of the study was to find out the relationship between selected anthropometric variables with flat serve performance (speed and accuracy) among tennis players. Thirty (N=30) male university tennis players who had represented state and interuniversity competitions were selected from Chennai as the subjects of the study. They were selected at random from various universities from Chennai. All the selected players were right hand players for the purpose of homogeneity. The age of the subjects ranged from 18 to 25 years.

Hewitt's tennis skill test was used to measure the flat service performance (speed and accuracy). The independent variables such as anthropometric variables namely height (stadiometer), weight (weighing scale), arm length and leg length (metal tape) were measured using standardized tests.

The collected data were analyzed using following statistical techniques such as descriptive statistics was used to find out the mean and standard deviation of selected variables. Pearson's product moment correlation was used to determine the significant relationship between the flat serve performance (speed and accuracy) and the selected independent variables.

RESULTS AND DISCUSSION

TABLE I

DESCRIPTIVE ANALYSIS ON THE SELECTED VARIABLES

Variables	N	Minimum	Maximum	Mean	Std Deviation (±)
DEPENDENT VARIABLE					
Flat service performance (Score)	30	67.00	88.00	78.33	5.82
ANTHROPOMETRIC VARIABLES (INDEPENDENT VARIABLES)					
Height (cm)	30	168.00	184.00	176.3	5.25
Weight (Kg)		65.00	76.00	70.70	3.17
Arm length (cm)		72.00	87.00	79.00	4.45
Leg length (cm)		85.00	103.00	91.86	5.05

Variables	N	Minimum	Maximum	Mean	Std Deviation (±)
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Flat service performance (Score)	30	67.00	88.00	78.33	5.82
ANTHROPOMETRIC VARIABLES (INDEPENDENT VARIABLES)					
Height (cm)	30	168.00	184.00	176.3	5.25
Weight (Kg)		65.00	76.00	70.70	3.17
Arm length (cm)		72.00	87.00	79.00	4.45
Leg length (cm)		85.00	103.00	91.86	5.05
SKILL RELATED FITNESS VARIABLES (INDEPENDENT VARIABLES)					
Grip strength(Kg)	30	58.00	68.00	62.00	3.72
Dynamic balance(Score)		62.00	89.00	74.13	9.24
Co-ordination(Score)		29.00	40.00	33.00	2.72
Arm power (Meters)		5.60	7.40	6.47	.551
Leg power (cm)		50.00	66.00	56.40	4.74
BIOMECHANICAL ANALYSIS (INDEPENDENT VARIABLES)					
Ball release height (m)	30	1.71	2.28	2.01	0.137
Ball toss peak height(m)		2.62	3.14	2.96	0.204
Racket lowest point (cm)		0.74	0.96	0.851	0.054
Relative height of contact (m)		1.82	2.40	2.09	0.180

TABLE-II

RESULTS OF PEARSON CORRELATION BETWEEN FLAT SERVICE PERFORMANCE AND SELECTED INDEPENDENT VARIABLES

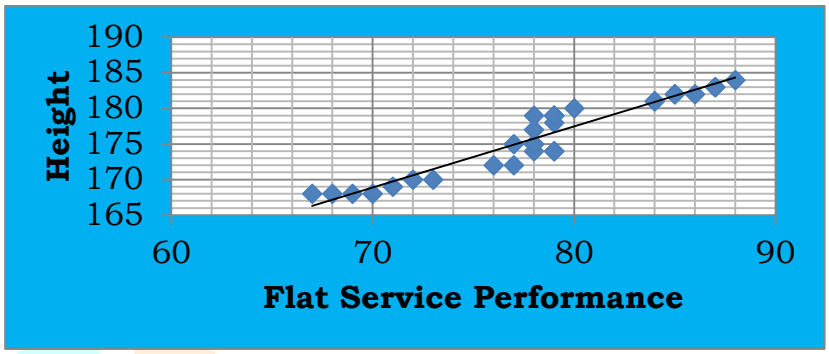
Variables	FS	Height	Weight	Arm length	Leg length
DEPENDENT VARIABLE					
Flat service performance (Score)	1	.951**	.854**	.929**	.891**
Height (cm)		1	.902**	.967**	.925**
Weight (Kg)			1	909**	865**
Arm length (cm)				1	952**
Leg length (cm)					1

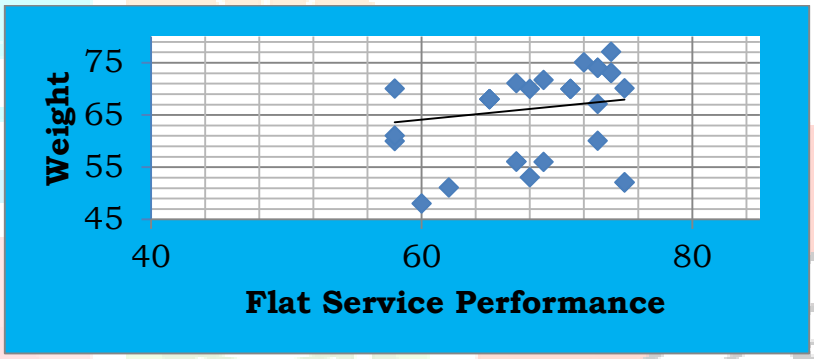
Table value with df 28 at 0.05 level of significance was 0.361. *Significant at 5%. **Significant at 1 %.

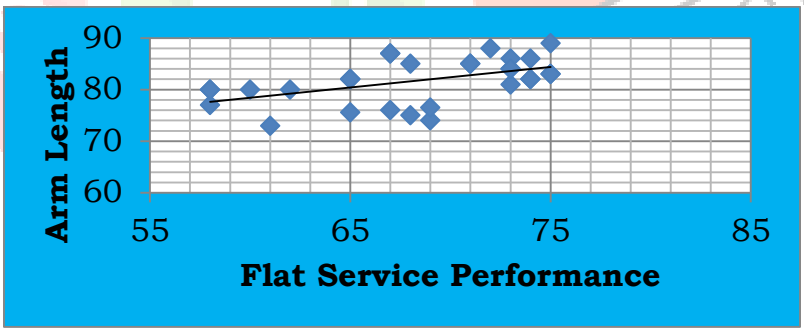
From the table II, it is noted that the flat service performance had strong positive correlation with height (.951), weight (.854), arm length (.929) and leg length (.891).

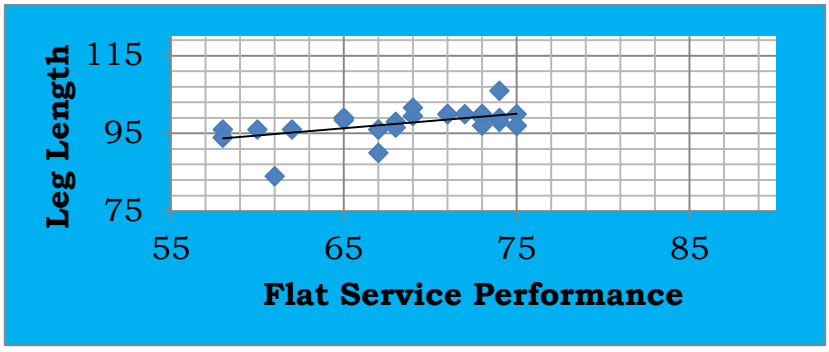
FIGURE - I

SCATTER PLOT SHOWING THE RELATIONSHIP BETWEEN FLAT SERVICE PERFORMANCE AND ANTHROPOMETRIC VARIABLES









Discussion on the findings of flat service performance and anthropometric variables

The findings of linear correlation revealed that height, weight, arm length and leg length are directly proportional to flat service performance. The findings of the partial correlation revealed that height had a strong positive correlation around 76.7% with tennis serve performance after partialling out the influence of other independent variables. Bonato et al. (2015) found that height was confirmed to be the main anthropometric determinant of serves speed in professional tennis players. Body height positively influenced the direction of the flight of the ball and the speed of the serve (Vaverka et al. 2005). Body height of the both men and women tennis players is an important factor influencing the serve speed and the taller players possibly having a significant biomechanical advantage of the tennis serve (Vaverka and Cernosek, 2013). The findings of the present study are in line with the results of Bonato et al. (2015); Meckel et al. (2015); Vaverka and Cernosek (2013); Vaverka et al. (2005). Hence, the tennis coaches may identify the players with good height which will facilitate the speed and accuracy of flat serve in tennis.

CONCLUSIONS

Based on the limitations and findings, following conclusion was drawn. It was concluded that anthropometric variables namely, height, weight, arm length and leg length had significant strong positive correlation with flat service performance (speed and accuracy) among university men tennis players.

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