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Analysis of the Effect of the Different Types of Tennis Court Training on Physical Fitness

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Abstract

The Purpose of the study was to analysis of the effect of the different types of tennis court training on physical fitness. To achieve this study the investigator has selected twenty school level tennis players from each court and selected courts are Grass, Clay, Carpet and Hard, who have been trained for more than one year they were taken into account. Each court player had one hour playing court practice which does not include skill practice. Subjects are school level tennis players, the age ranges were between 14 and 16. Selected physical fitness variables are speed and agility, endurance and strength. To analyze the data the investigator used one way analysis of variance and table value at 0.05significance level was 2.73, calculated F value was 17.95 among the four courts players Speed and Agility. It revealed that the significant level observed among four court tennis player's were speed and agility. Further the scheffe's test was used as post hoc test to determine which pair mean differ significantly. The result reveals that significant mean differences were between Clay and other court such as Grass, Carpet, Hard. Endurance and strength were not significances.

Keywords: Speed and Agility, Endurance, Strength.

Introduction

Tennis is a one of the competitive sport and played by millions of people all over world. It is played as recreational sports among people to enhance the physical fitness because tennis game improves the fitness quality particularly among children. Tennis game has three and five sets and played more than three hours and demand more physical fitness such as speed, agility, endurance and strength to challenge at competitive level. It is an aerobic and anaerobic sports.

Since ancient time tennis has been playing in various surfaces such as Grass, Clay, Carpet and Hard. Each surface character has influenced on ball speed, ball bouncing, game style and length of game. Grand Slam is one of famous tennis tournament. It is composed the French open, US open, Wimbledon and Australian open. Each court has difference characters. Wimbledon is grass court and fastest surface. Players cannot predict the ball because bouncing the ball is short. Australian Open and U.S. Open are played in Hard court. It is recommended as middle ground between clay and grass, it is also fast court with low bounce but can predict. French open is played on clay surface, it is slowest surface and bouncing the ball is high.

Lacking of fitness leads to inaccuracy, unforced errors, and mental mistakes begin to creep in serve, decline stroke velocity and decrease speed of running to the ball. It is confirmed that the tennis players should prepare fitness level according to surface type, it is ensured in Grand Slam tournament that few players are winners of Grand Slam since early. Daily practice in specific surface which adapt to particular physical and physiological condition such as heart rate, VO_2 max, stroke volume, cardiac output, recovery rate and muscles fiber.

Methodology

To achieve the purpose of the study twenty school level tennis players were selected from each court. Selected courts were Grass, Clay, Carpet and Hard. Who have represented junior county tennis tournament in England. They were taken as subjects. Selected subjects have been playing tennis more than one year in particular surface under the proper coaching and each court players had regular one hour court playing practice. Selected physical fitness variables were speed and agility, endurance and strength. The subject's age range was between 14 and 16. Data was collected by using standard test item such as pull up, 12 minutes run and walk and T test. Strength was measured by pull up, maximum pull up was counted as data, endurance was measured by 12 minutes run and walk (Cooper test), maximum covered distance was measured as data during 12 minutes and, speed and agility were measured by T test, three trial was given in this best minimum timing was considered. Collected data was statically analyzed by using analysis of variance further the scheffe's test was used as a post hoc test to determine which of pair mean differ significantly.

Results and Discussion

Table-1 reveals that the mean and standard deviation of selected physical fitness variables were speed and agility, endurance and strength respectively. Table value at 0.05significance level was

2.73. It reveals that there was significance different in speed and agility among the four types of tennis courts such as Grass, Clay, Carpet and Hard but there were no significant difference in endurance and strength.

From the table-2 it can be seen that the calculated F value was 17.95 among the four types of court players. Speed and agility was greater than the table value (2.73).which is indicated that it was significance (P<0.05) for the degree of freedom (3, 76) at 0.05 level of confidence. Since the F value was significance, further Scheffe's Post-hoc test was computed to find out which pair of group is high among the others and the results are tabulated in the table-3

In table- 3, the scheffe's post – hoc test results are presented. From the table it can be seen that the mean difference between Grass and Clay, Clay and Hard and Clay and carpet were 4.26, 3.67 and 2.87 (P < 0.05) respectively, greater than the confidential interval value (2.54), which was significance at 0.05 level of confidence. The mean differences between Grass and Carpet, Carpet and Hard and Grass and Hard players were 1.39, 0.59 and 0.8, less than confidential interval value (2.54) which was not significant at 0.05 level of confidence. From that it can be clearly noticed that there was significance mean difference in Speed and Agility.

Table–4, results of one way analysis of variance on endurance among Grass, Clay, Carpet and Hard Courts school level tennis players were presented. From the table it can be seen that the calculated F value (0.91) among the four groups was less than the table value (2.73)which is indicated that it was not significance (P<0.05) for the degree of freedom (3, 76) at 0.05 level of confidence.

Table-1
Descriptive Statistics of Grass, Clay, Carpet and Hard Court Tennis Players Physical Fitness

Variable	Grass Court		Clay Court		Carpet Court		Hard Court	
	Mean	SD (±)	Mean	SD (±)	Mean	SD (±)	Mean	SD (±)
Speed and Agility	11.62	2.69	15.88	0.94	13.01	1.16	12.21	2.52
Endurance	1498.75	282.54	1557.50	210.12	1490.00	227.6	1428.75	260.47
Strength	6.5	2.30	5.6	2.13	4.9	2.07	5.95	2.03

Table–2
Analysis of Variance among the Grass, Clay, Carpet and Hard Courts Tennis Players Speed and Agility

Variable	Source of Variance	Sum of Square	df	Mean Square	F
Speed and Agility	Between	213.89	3	71.29	17.95*
	Within	301.86	76	3.97	

* P < 0.05 Table F, df (3, 76) (0.05) = 2.73

Table-3
Scheffe's Post-hoc for Mean Differences between Grass, Clay, Carpet and Hard courts Tennis Players Speed and Agility

Grass	Clay	Carpet	Hard	Mean difference	CI
11.62	15.88			*4.26	2.54
11.62		13.01		1.39	
	15.88	13.01		*2.87	
11.62			12.21	0.59	
		13.01	12.21	0.8	
	15.88		12.21	*3.67	

*P < 0.05, confidential interval value (0.05) =2.54

Table-4
Analysis of Variance among the Grass, Clay, Carpet and Hard Courts Endurance of School Level Tennis Players

Variable	Source of Variance	Sum of Square	df	Mean Square	F
Endurance	Between	166562	3	55520	0.91
	Within	4625313	76	60859	

* P < 0.05 Table F, df (3, 76) (0.05) = 2.73

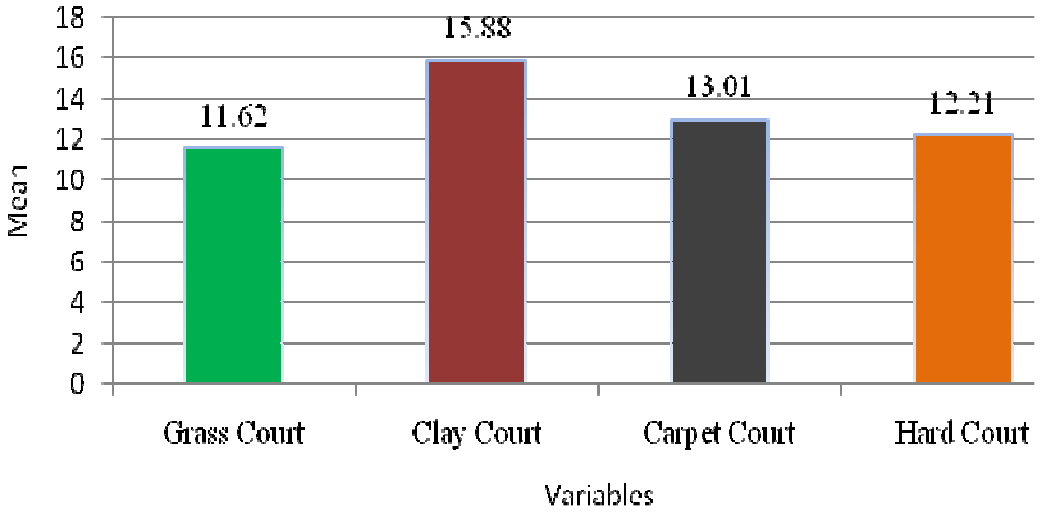


Figure-1
Bar Diagram Showing the Mean Value of Grass, Clay, Carpet and Hard courts Tennis Players Speed and Agility

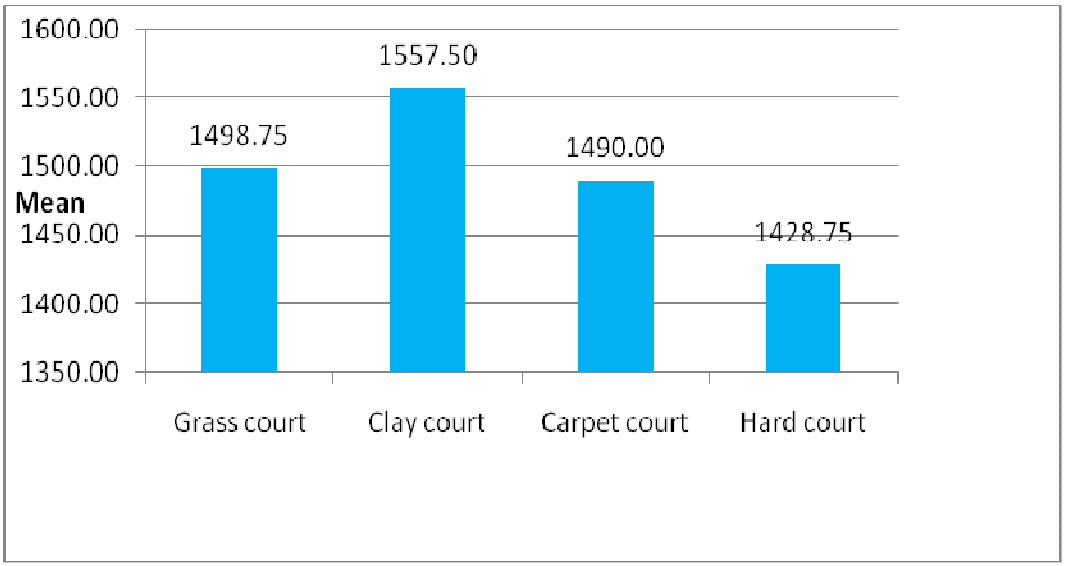


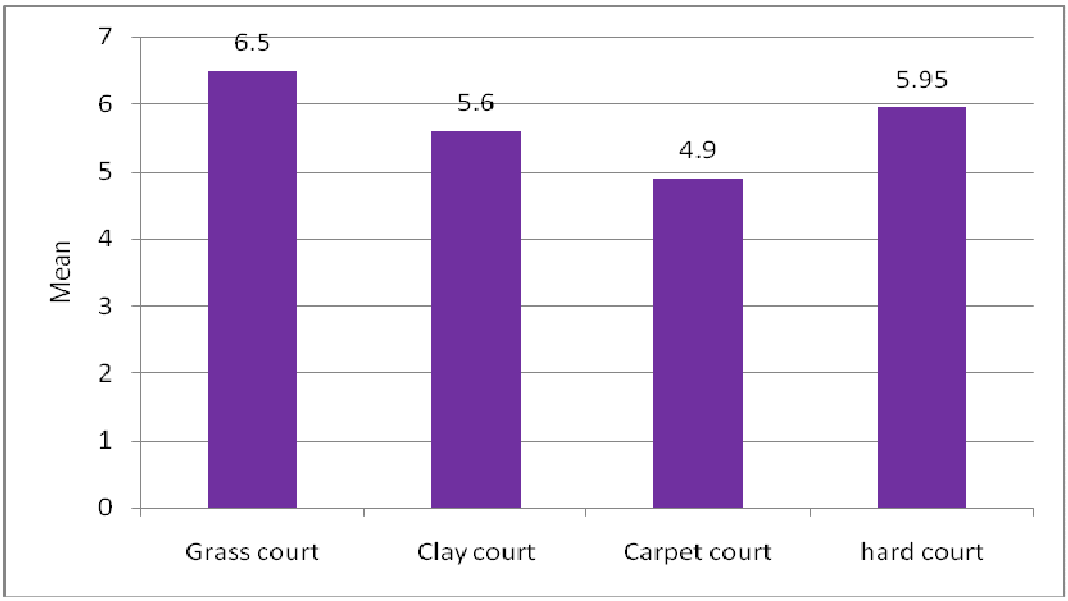
Figure-2
Bar Diagram Showing the Mean Value of Grass, Clay, Carpet and Hard Courts Tennis Players Endurance

Table – 5
Analysis of Variance among the Grass, Clay, Carpet and Hard Courts Tennis Players Strength

Variable	Source of Variance	Sum of Square	df	Mean Square	F
Strength	Between	26.93	3	8.97	1.95
	Within	348.55	76	4.48	

* P < 0.05 Table F, df (3, 76) (0.05) = 2.73

In table–5, results of one way analysis of variance on strength among Grass, Clay, Carpet and Hard Courts school level tennis players were presented. From the table it can be seen that the calculated F value (1.95) among the four groups were less than the table value (2.73), which is indicated that it was not significance (P<0.05) for the degree of freedom (3, 76) at 0.05 level of confidence.



Figure–3
Bar Diagram showing Mean Values of Grass, Clay, Carpet and Hard Courts Tennis Players Strength

Discussion and Finding: Tennis is a repetitive sprint sport, with medium to high aerobic and anaerobic demands and since several decades ago it has been playing in various surface such as Grass, Clay, Carpet and Hard, each tennis court players have difference level of physical fitness particularly in speed and agility because of court type, there are three types of balls are used in each court, each ball has difference speed and bounce. Different ball types (type 1, 2 and 3) are relation to the court surface, regulating the speed of the game according to the surface. Grass is fast surface used at Wimbledon and ball bounce is low so rallies are significantly shorter than on other Grand Slam surfaces so it produce executive quick direction of movement, quick starts, stops, repetitive overhead motions than other surfaces which work out lead to good physical fitness like speed and agility without controversial. The investigator found in this study that grass surface tennis players had good speed and agility followed hard surface, carpet and clay, there were significance mean differences between clay and other surfaces only because clay surface ball bounce is high and slow so players may move as slow to face the ball and playing rally is longer than other. Grass and hard surface mean value were not significances in speed and agility because both are having low bounce with high speed so direction of movement is very fast but grass is high than hard surface but not significance so it was ensured that regular game playing on this surface had good impact on speed and agility. Each tennis court was made by different material which plays role on the ball bouncing, ball speed, ball movements. Every court does not possess similar those characters so it differ according to court type. According to court type and court characters, player's fitness level is differing because courts surface influence on players speed and agility.

Tennis is an endurance game. It is confirmed that players play one hour and thirty minutes for a match played to three sets has been established[1,2] , during the time players make movement in difference intensity to reach the ball. about 10 second is playing time, 20 second rest for each point, 90 second rest for set and 120 second for change over so investigator could observe in this study that Grass, Clay, Carpet and Hard surface players were not significance difference in endurance due to each court players have played one hour but it has been done in various intensity due to court surface. It is confirmed in this study that Clay surface players had good endurance ability than other surfaces because clay is high bounce and slow ball, playing time is longer, which had good impact on endurance further Grass surface players are having low level endurance ability than other due to low bounce ball and ball are very fast to reach the surface so playing rallies are less than other surfaces however players can challenges if they selected to play other courts because each court players have played more than one and half hour.

Strength is basic fitness for tennis players to make correct stroke, powerful serve, hit the ball with maximum power shot, executive rally, cut the ball, to make power shot in place, meet the ball in correct angle and quick movement. For each court players, muscular strength is necessary to make a competitive tennis player. One of the most dominating parts of the game has become the serve. This action transfers force from the lower extremity to the upper extremity. To be competitive, a player must have the ability to serve with strength, speed and accuracy. The serve can be improved in numerous ways, including the selection of rackets or balls, but the musculature is also an important component in the service game. According to this study that investigator could observe the movement is done in each court so player's strength was not significance.

Conclusion

According to static analysis the investigator found that significant level were in speed and agility among four type of courts further significant mean different were observed between Clay and other courts such as Grass, Carpet, Hard but strength and endurance were not significant in this study.

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