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Correlations in Soccer Kicking Performance and Anthropometric Facet of University's Sports Science Players

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Abstract – Beside physiological, psychological, social, nutrition, training method and, anthropometric characteristics plays a significant role in sports performance. Specific physical characteristic is the prerequisite for better performance in some particular sports. Twenty five sports science male soccer players were recruited for this study. The characteristics of the players are as: Age = 20.24 ± 1.20 years, height = 172 ± .5 cm., weight = 63.36 ± 5.02 kg., and BMI = 21.54 ± 1.71 kg/m2. All the anthropometric measurements were obtained using standardized procedure. The variables selected for the study under anthropometric measurements were foot length, calf girth, thigh girth, lower leg length, upper leg length, total leg length, and standing height. Two video cameras were used for data collection. Participants execute instep and inside kick with their dominant foot in complete style of kick. Each participant executed two in-step and two in-sidekicks of a stationary ball. Kinovea 0.8.15 software was used to determine the ball velocity and distance. The Pearson correlation and t-test (2-tailed) was applied amongst the anthropometric characteristics and soccer kicks performance of sports science male soccer players. The results of this study revealed that the anthropometric characteristic of lower limb have little effect on determining the instep and inside kick performance of the players. The result also reveals that there is no significant correlation amongst any anthropometric characteristic of instep and inside kick. This evidence should be used by the physical educators, sports scientist, and coaches to mold the players for higher competition.

Keyword: Soccer, Anthropometry, Lower Leg, Instep Kick, Inside Kick.

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INTRODUCTION

Soccer is a game in which physical characteristic of an individual influence on the sports performance. Kicking a ball is the most important skill in soccer, which has resulted to score a goal by this action. In soccer game instep and inside of the foot kicks are used frequently. There are number of findings on soccer kick which established the significance of utmost strength of lower limb (Isokawa & Lees, 1988; Lees & Noland, 1998). The success of a soccer kick based upon various factors i.e. technique, environment, type of kick and distance (long or short shots) of the kick from the goal (kellis & Katis, 2007). Reilly et al. (2000) state that frequent involvement with the ball and successful performances in skill-related activities are important determinants of success in soccer. Soccer is a kind of sports-where strength, endurance, fitness and anthropometrics characteristic are indisputably features for better performance. Anthropometric characteristics play a significant role on sports performance beside physiological, psychological, social, nutrition, training methods, technology and other well-known factors. Tanaka and Masuura (1982) conclude that anthropometric factors have the same degree of influence on performance as physiological factors. Studies on the anthropometric characteristic of the human body indicate the athletes who play in a specific sport differ in somatic characteristic from general population (Gaurav et al. 2010). Body composition and physical characteristics have been known to be fundamental excellence in sports performance (Mathur & salokun, 1985).

Many researchers in physical education and sports science believe that the success of any games and sports would be associated with anthropometric characteristic of players. Many investigations have been determined the relationship between anthropometric characteristic of the players and their sports. Only a small amount of anthropometric

factors were found worthwhile for talent identification and development programmes in numerous physical education and sports science field. Due to all these essential elements, the researches in soccer kicking have increases the interest to do more established studies from the point of anthropometric characteristics.

METHODOLOGY

Twenty five sports science male soccer players were recruited for this study. All the soccer players had a minimum of 2.5 years playing experience at this level. The characteristics of the soccer players are as: Age = 20.24 ± 1.20 years, height = 172 ± .5 cm., weight = 63.36 ± 5.02 kg., and BMI = 21.54 ± 1.71 kg/m2. All the players were agreed to be volunteer for this study. All the anthropometric measurements were obtained using standardized procedure. The variables selected for the study under anthropometric measurements were foot length, calf girth, thigh girth, lower leg length, upper leg length, total leg length, and standing height. The BMI determine by body weight and height. The body weight of each subject was measured in kilogram (kg) using a simple weighing machine. Height was measured by a vertical ruler. The segmental length as foot length, lower leg length, upper leg length, total leg length, and calf girth, thigh girth was measured with the help of measuring tape in centimeters. Two video cameras were set-up on a rigid tripod and secured to the floor in the location. In order to get maximum precision in the reestablishment of the two-dimensional (2D) co-ordinates, the cameras was positioned perpendicular to the sagittal plane and parallel to the mediolateral axis (camera optical axes perpendicular on the sigittal plane) as their kicking leg giving approximately a 90o between their respective optical axes (Ahsan & Shamim, 2010). The cameras were focused on the distance that was covered by the ball. After the 10 minutes of warmup, participants execute instep and inside kick with their dominant foot in complete soccer kick. Each participant executed two instep and two inside kicks of a stationary ball. The length of the approach was self-selected by the participant. Kinovea 0.8.15 software was used to determine the ball velocity and distance. In order to test the objective of the study, descriptive analysis statistics of all anthropometric parameters was used. The Pearson correlation and t-test (2-tailed) was applied amongst the anthropometric characteristics and soccer kicks performance of sports science male soccer players.

RESULT

Table – 1

Descriptive analysis of anthropometric characteristics of lower limb and kick performance

	N	Age	Weight	Height	BMI	Leg Length	Upper Leg	Lower Leg	Foot	Thigh Girth	Calf Girth	instep	inside
M	25	20.24	63.36	1.72	21.54	0.87	0.44	0.43	0.27	0.55	0.36	265.76	206.84
SD	25	1.20	5.02	0.05	1.71	0.08	0.03	0.02	0.01	0.05	0.03	31.08	31.56

Descriptive {means (M) and standard deviation (SD)} anthropometric characteristic of the lower limb for the sports science male soccer players were measured. These measures are presented in table-1.

Table – 2

Correlation between kick performance and anthropometric characteristics of lower limb

		Age	Weight	Height	BMI	Leg Length	Upp. Leg	Low. Leg	Foot	Thigh Girth	Calf Girth
Instep Kick	Pearson Correlation	-.279	.207	.311	-.033	.651**	.935**	.899**	-.052	.189	.209
	Sig. (2-tailed)	.177	.320	.130	.875	.000	.000	.000	.807	.366	.315
Inside Kick	Pearson Correlation	-.262	-.055	-.002	-.050	.172	.370	.410*	-.174	.071	-.015
	Sig. (2-tailed)	.206	.795	.991	.812	.412	.069	.042	.406	.737	.943

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Table – 3

Descriptive analysis of soccer kicks performance

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Instep Kick	265.759	25	31.078	6.216
	Inside Kick	206.837	25	31.559	6.312

The table-3 (Paired Sample Statistic) indicates that the mean of instep kick and inside kick of male soccer players have been reported 265.759, 206.837 and standard deviation 31.078, 31.559 respectively.

Table - 4

Correlation between soccer instep and inside kick performance

Pearson Correlations (2-tailed)			
	N	Correlation	Sig.
Instep Kick & Inside Kick	25	.430	.032

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

To test the relationship between instep kick and inside kick 'Pearson correlation (2-tailed)' test was

applied. The above table - 4 indicates that the obtained 'r' values for instep kick and inside kick have been reported 0.430 which means there is a positive relationship between each kick with the significance of .032 values. Thus, it reveals that there is a positive significant relationship between instep kick and inside kick of male soccer players at 0.05 level of significance with 2-tail.

Table – 5

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Instep Kick – Inside Kick	58.922	33.437	6.687	45.120	72.724	8.811	24	.000

Significant level 0.05 (2-tailed)

To find the differences between instep kick and inside kick t-test (2-tailed) was applied. The table - 5 indicates that the obtained 't' values for instep kick and inside kick have been reported 8.811 which means there is a significant difference between each kick. Thus, it indicates that there is a significant difference between instep kick and inside kick of sports science male soccer players at 0.05 level of significance.

DISCUSSION

Anthropometric characteristic may possible to identify potential success of sports persons in distinguished games and sports. The results of this study revealed that the anthropometric characteristic of lower limb have little effect on determining the instep and inside kick performance of sports science's male players.

The result in table - 2 indicate that the obtained 'r' value for the total leg length, upper leg length and lower leg length for instep soccer kick have been reported .651, .935 and .899 which are significantly correlated at .01 level and for the inside kick only lower leg is significant at 0.05 level with 2-tail test. Table also reveals that there is no significant correlation amongst any other anthropometric characteristic of instep and inside kick at 0.05 and 0.01level of significance. Up to date there is little studies that does not detect anthropometric parameters with a significant influence on sports performance (Knechtle B. et al., 2007). A study of Avlonitou demonstrate significant correlation between performance and lower limb lengths in pre-adolescent swimmers (Avlonitou E.,1994). The effects of BMI on performance have been examined in some prior studies, but less on soccer kick performance. The finding of the study is consistent with the earlier study of B. Knechtle et al (2009) that there was no relationship indicates between skinfold thickness and sports performance. Naumani and Akhter (2014) has been found thigh and calf circumference was significant of tennis players with functional players. Moghadam M.M. et al. (2017) find in his studies that the foot sole length have significant difference between soccer players at various position as amongst goalkeeper, halfback and strikers.

Regarding the instep and inside soccer kick ball performance results of the study revealed its significance. Sakamoto K. et al. (2010) conduct a study and reveals that there is a significant difference between instep kicks and inside kicks for male players. They also mention that the average ball velocities for instep and inside kicks were lower for female players than for male players, the coefficient of reinstitution for inside kicks was higher and the difference was statically significant. Nunome et al. (2002) reported that the average ball velocity for the inside foot kick (23.4±1.7 ms-1) and instep kick (28.0±2.1 ms-1), initial velocity of the instep kick was significantly faster than the inside kick. Sakamoto K. et al. (2016) the result showed that the average ball velocity for the instep kick and inside kicks in female players were significantly lower than the male players.

CONCLUSION

In order to test the objective of the study Pearson correlation was applied. The result indicate that the total leg length, upper leg length and lower leg length for instep soccer kick and inside kick is significant with lower leg. Whereas, there is a positive significant relationship between instep kick and inside kick of sports science male soccer players. This conclusion is based upon the statistic that the anthropometric characteristics of lower limb have little effect on determining the instep and inside kick performance of sports science male players. This study indicates that performance predictor is the length of lower and upper leg not the age, weight, height, and girth of lower limb. This evidence should be used by the physical educators, sports scientist, and coaches to mold the players for higher competition.

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