Turkish Journal of Sport and Exercise
http://dergipark.ulakbim.gov.tr/tsed/index
Year: 2015 - Volume: 17 - Issue: 2 - Pages: 22-25
DOI: 10.15314/tjse.68533

ISSN: 2147-5652

Comparison of selected physical fitness components among male football players of different playing positions

Vishaw GAURAV[1], Amandeep SINGH[2], Sukhdev SINGH[2]

[1] *Department of Education, Government of Punjab, India.*
[2] *Department of Physical Education (T), Guru Nanak Dev University, Amritsar, India.*
Address Correspondence to Amandeep Singh, prof_aman@yahoo.com

Abstract

The purpose of this study was to examine the level of physical fitness among male football players in relation to their different playing positions i.e. goalkeepers, defenders, midfielders and attackers. A sample of forty (N = 40) male football players (mean ± SD: age 20.45 ± 1.70 years, height 1.84 ± 4.07 m, weight 81.62 ± 5.45 kg, BMI 23.99 ± 1.66m), which includes ten each goalkeepers, defenders, midfielders and attackers, who participated in inter-college competitions of Guru Nanak Dev University, Amritsar, India, was selected. All the participants were informed about aim and methodology of the study and they volunteered to participate in this study. The study was conducted on selected physical fitness variables i.e. power, speed and agility. One way Analysis of Variance (ANOVA) was applied to find out the significance of differences with regard to selected physical fitness variables among football players of different playing positions. Scheffe's post-hoc test was applied to see the direction and significance of differences where 'F' value found statistically significant. The level of significance was set at 0.05. While comparing the means, it is revealed that midfielders and attackers had almost the same power, speed and agility. However, midfielders and attackers had shown better power and agility than their counterparts; goalkeepers and defenders. Further, significant differences were found between football players of different playing positions with regard to the variables power ($p<0.05$) and agility ($p<0.05$), but insignificant differences were found on the variable speed respectively ($p>0.05$).

Keywords: Agility, attackers, defenders, goalkeepers, midfielders, power, speed.

INTRODUCTION

Football is the most popular sport in the world (24, 25). Physical and Physiological characteristics that have been reported as essential for football players are aerobic fitness, muscle strength, high level of speed, explosive jumping power and agility (2,4,16). Generally football players are divided into four categories regarding playing position. There are goalkeepers, defenders, midfielders and attackers, and each has its own characteristics. Attackers appear to be the fastest players in the team. The greatest overall distances appear to be covered by midfield players who act as links between defense and attack (18.19). In a football game defenders perform more backward movement than attackers (19). Furthermore, different football related activities (i.e.tackling, heading and passing) provide an extra physiological stress to the player (4) with different playing positions having to perform specific activities. Positional differences have been the subject of interest of sport scientists for years (1, 4, 10, 17). The physical fitness of a player however can be a decisive determinant of success during competition (22). Previous studies have reported that each specific playing position may have unique physical and physiological requirements (6, 8, 9). Thus, the purpose of this study was to compare the physical fitness characteristics of football players among different playing positions.

MATERIALS & METHODS

Subjects

A sample of forty (N = 40) football players (mean ± SD: age 20.45 ± 1.70 years, height 1.84 ± 4.07 m, weight 81.62 ± 5.45 kg, BMI 23.99 ± 1.66m), which includes ten each goalkeepers, defenders, midfielders

and attackers, who participated in inter-college competitions of Guru Nanak Dev University, Amritsar, India, was selected. All the participants were informed about aim and methodology of the study and they volunteered to participate in this study.

Methodology

Height measurements were taken by using the standard anthropometric rod to the nearest 0.5 cm. Taken values were recorded in 'cm'. The subject's weight was measured with portable weighing machine to the nearest 0.5 kg. Measurements were recorded in 'kg'. BMI was calculated by the formula of; Body Mass Index = Weight/Height^2.The vertical jump test (12) was used to measure explosive power of the legs whereas 50 meters dash test was used to determine speed (13). Illinois agility test was used to measure agility (15).

Statistical Analyses

The Statistical Package for the Social Sciences (SPSS) version 16.0 was used for all the analyses. One way Analysis of Variance (ANOVA) was applied to find out the significance of differences with regard to physical fitness variables among goalkeepers, defenders, midfielders and attackers in football. Scheffe's post-hoc test (SPHT) was applied to see the direction and significance of differences where 'F' value found statistically significant. The level of significance was set at 0.05.

RESULTS

Table 1 shows the mean values and standard deviations of male football players of different playing positions i.e. goalkeepers, defenders, midfielders and attackers with regard to the selected physical fitness variables i.e. power, speed and agility. While comparing the means, it is revealed that midfielders and attackers had almost the same power, speed and agility. Moreover, both had shown better power and agility than their counterparts; goalkeepers and defenders. It is also observed that goalkeepers had little bit lesser speed than their counterparts; defenders, midfielders and attackers.

Further it is evident from table -2 that significant differences were found between football players of different playing positions with regard to the variables power ($p<0.05$) and agility ($p<0.05$), but insignificant differences were found on the variable speed ($p>0.05$) respectively.

Table 1. Mean and standard deviation of selected physical fitness components of male football players of different playing positions.

Variables	Playing Positions							
	Goalkeepers (N=10)		Defenders (N=10)		Midfielders (N=10)		Attackers (N=10)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Power (cm)	46.40	4.50	55.60	7.88	59.60	10.35	59.60	10.35
Speed (sec)	6.84	0.34	6.53	0.48	6.55	0.20	6.55	0.20
Agility (sec)	18.64	1.34	16.74	0.32	16.70	0.77	16.70	0.77

Table 2. Analysis of variance (ANOVA) of selected physical fitness components of male football players of different playing positions.

Variables	Source of variance	Sum of Squares	df	Mean Square	F-value	Sig.
Power	Between Groups	1162.800	3	387.600	5.227*	0.004
	Within Groups	2669.600	36	74.156		
	Total	3832.400	39			
Speed	Between Groups	0.663	3	0.221	2.069	0.122
	Within Groups	3.844	36	0.107		
	Total	4.507	39			
Agility	Between Groups	27.792	3	9.264	12.097*	0.000
	Within Groups	27.569	36	0.766		
	Total	55.361	39			

*Significant at .05 level of Confidence; $F_{.05}\ (2, 39) = 3.24$

Table 3. Comparison of mean values of Post-hoc Test (Scheffe's) of male football players of different playing positions with regard to selected physical fitness variables.

Variable	Playing Positions				Mean Difference	p
	Goalkeepers	Defenders	Midfielders	Attackers		
Power	46.40	55.60			9.20	0.15
	46.40		59.60		13.20*	0.01
	46.40			59.60	13.20*	0.01
		55.60	59.60		4.00	0.78
		55.60		59.60	4.00	0.78
			59.60	59.60	0.00	1.00
Agility	18.64	16.74			1.90*	0.00
	18.64		16.70		1.94*	0.00
	18.64			16.70	1.94*	0.00
		16.74	16.70		0.04	1.00
		16.74		16.70	0.04	1.00
			16.70	16.70	0.00	1.00

*Significant at .05 level of Confidence

Table 3 showed paired means of different playing positions in football; it revealed statistically significant differences ($p < 0.05$) of goalkeepers with midfielders & attackers, however, insignificant differences ($p > 0.05$) of defenders with goalkeepers, midfielders & attackers and also of midfielders with attackers, with regards to the variable power. Further, it revealed statistically significant differences ($p<0.05$) of goalkeepers with defenders, midfielders & attackers but insignificant differences ($p>0.05$) of defenders with midfielders & attackers and also of midfielders with attackers, with regard to the variable agility.

DISCUSSION

Physical fitness is defined as the individual's capacity for optional work and motor and sport performance (3). The findings of present study revealed that midfielders and attackers had almost the same power, speed and agility. Moreover, both had shown better power and agility than their counterparts; goalkeepers and defenders. The results of present study are dis-agree with Gil et al. (14) who showed that attackers were faster than defenders and midfielders at the 30 m sprint test. It is also observed that goalkeepers had little bit lesser speed than their counterparts; defenders, midfielders & attackers. Sporis et al.(23) evaluate the physical and physiological characteristics of elite players in various positions and concluded that the goalkeeper in tests of 10 and 20 meters are slower than other players. Boone et al. (7) in the study on the Belgian elite players showed that attackers had more speed than other players. Significant differences have been found among football players of different playing positions with regard to the variables power and agility, but insignificant differences were found on the variable speed respectively. While comparing paired means of different playing positions in football; goalkeepers have shown statistically significant differences with midfielders & attackers, however, defenders have shown insignificant differences with goalkeepers, midfielders & attackers and also of midfielders with attackers, with regards to the variable power. However, the higher power was found among midfielders & attackers as compared to their counterparts; differences and goalkeepers. A football player who is agile is able to change direction abruptly without losing balance. Agility helps a player's ability to get and hold onto the ball (21). In our study, we found that there is a significant difference between the various positions of the football players. Indeed, midfielders & attackers present the best performance in agility test, on the other hand the defenders are faster than the goalkeepers. These results confirm the fact that midfielders & attackers are technically more developed than the defenders and the goalkeepers in football. It was found that there were differences in the physical fitness level associated with playing positions. This was supported by Reeves et al. (20) who found that there were differences in the

anthropometric characteristics and body composition associated with playing position.

CONCLUSION

It is concluded that midfielders and attackers had almost the same power, speed and agility. Moreover, midfielders and attackers had also shown better power and agility than their counterparts; goalkeepers and defenders.

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