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STUDY ON VO2 MAX IN DIFFERENT PLAYING POSITION OF SOCCER PLAYERS[p.p:116-121]

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ABSTRACT

Aerobic capacity represents the maximal volume of oxygen consumed during peak exertion in activities involving large muscle groups. Athletes with high aerobic efficiency exhibit superior performance, rapid recovery under normal conditions, and a high tolerance for fatigue. This parameter is critically important in soccer, where players must endure the sport's high physiological demands.The objective of this study was to investigate the significant differences in VO2max among soccer players occupying different positions. A total of 45 players, comprising 15 defenders, 15 midfielders, and 15 forwards aged between 18 and 30 years, all of whom had participated in at least intercollegiate tournaments, were selected through random sampling. The Yo-Yo Intermittent Recovery Test Level-1 was administered to gather data. Descriptive analysis and ANOVA were employed to examine the characteristics and mean differences among the three groups, with tests conducted at a 0.05 confidence level.The findings indicated that there were no significant differences in VO2max among defenders, midfielders, and forwards, as the obtained F-value of 2.22 was less than the critical F-value of 3.22 at the 0.05 confidence level. VO2max is recognized as the best indicator of aerobic capacity.

Keyword: VO2max, Soccer, Yo-Yo intermittent, Defender, Midfielder & Forward.

INTRODUCTION

Soccer is an intermittent high-intensity physical activity that demands well-developed aerobic fitness and the ability to sustain long-duration endurance. This sport requires exceptional physical and physiological efficiency. During competitive match play, elite soccer players cover distances of approximately 10 to 12 kilometres (Withers, 1982; Bangsbo, 1991). The aerobic base of these players is interspersed with high-intensity activities, including accelerations, sprints, changes in direction, jumping, side-

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stepping, tackling, and executing game-specific technical skills (Ekblom, 1986; Reilly, 1976).

VO2max, or maximal oxygen uptake, is a critical factor in soccer performance. Players require maximum aerobic capacity to maintain high performance over extended periods. A higher VO2max enables players to run longer and faster and to be more involved in various game actions (Stolen et al., 2005). High aerobic capacity also facilitates better recovery from high-intensity actions and intermittent exercise, which are typical in soccer matches (Reilly, 1997). During matches, players engage in various activities and must continuously adapt to maintain or alter strategies, both individually and as a team. The intermittent nature of soccer, with activity changes every 3–5 seconds, results in repeated high-intensity bursts of play (Krustrup et al., 2006). Specific positional roles within the team may demand unique physiological attributes (Reilly et al., 1990).

These requirements are reflected in the physical and physiological fitness of soccer players (Reeves et al., 1999). Consequently, modern elite soccer players exhibit high aerobic endurance fitness. An individual with maximum aerobic endurance can maintain their fitness level over extended periods. VO2max is considered the most essential component of endurance performance (Astrand et al., 1986; Hoff et al., 2004). The mean VO2max of elite soccer players is typically reported to be between 55 and 68 ml kg−1 min−1 (Astrand et al., 1986; Williams et al., 1973).

OBJECTIVE OF THE STUDY

The objective of the study was to find out the significant differences of VO2max among the different playing positions of soccer players.

DESIGN OF THE STUDY

For this study, forty-five (N=45) players between the ages of 18 and 30 were randomly recruited, with fifteen (15) each for defender, midfielder, and forward who had participated in at least one college competition. The Yo-Yo intermittent recovery test level-1 (YYIRT-1) was used to obtain data on VO2max. Descriptive and analysis of variance (ANOVA) statistical approaches were used to identify data characteristics and significant differences in VO2 across defenders, midfielders, and forwards. The criterion of significance was fixed at $P < 0.05$.

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RESULTS

The pertaining data of VO2 using the descriptive analysis to find out the range (R), means (M), standard deviations (SD), standard errors (SE), and variance (Var)shown in table 1.

Table 1: Descriptive analysis of VO2 max in different Playing positions

Variable	N	R	Min	Max	Mean	SE	SD	Var
Defend	15	15.80	49.50	65.30	55.64	1.21	4.67	21.81
Mid	15	14.11	51.52	65.63	58.24	0.94	3.66	13.39
Forward	15	9.41	52.86	62.27	58.08	0.72	2.81	7.87

Table 1 show that the mean (M) and standard deviation (SD) of VO2max for defender, midfielder and forward players were55.64±4.67, 58.24±3.66 and 58.08±2.81respectively; range were 15.80, 14.11 and 9.41respectively; standard errors were 1.21, 0.94and 0.72 respectively and the variance were21.81, 13.39 and 7.87 respect. The analysis of variance (ANOVA) was employed to find out the significant mean differences of VO2max among the three different playing positions soccer players and shown in table 2

Table 2 Significant mean difference among playing position

Group	mean	SD	F	Sig.
Defender	55.64	4.67	2.22	0.12
Midfielder	58.24	3.66		
Forward	58.08	2.18		

*Insignificant at 0.05 level of confidence, where, F(0.05)(2,42)=3.22

Table 2 reveals that there were no significant differences among the three different playing positions viz: defender, midfielder and forward players as the obtained calculated F=2.22 was lesser than the tabulated F=3.22 at 0.05 level of confidence (p>0.05).The graphical representation of means comparison among the three playing position is shown at figure 1.

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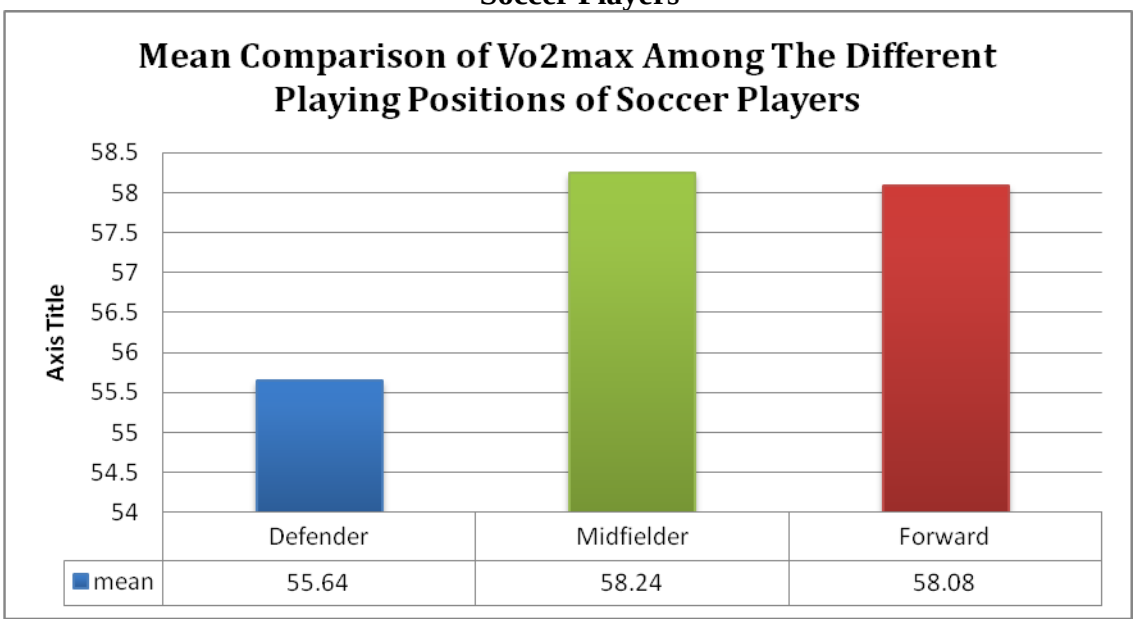
Figure 1: Mean Comparison of Vo2max among the Different Playing Positions of Soccer Players



DISCUSSION

A soccer match involves a variety of movements, including walking, sprinting, jogging, jumping, and throwing, executed in multiple directions with or without the ball. The match entails numerous accelerations and decelerations, along with frequent changes in the direction of play, which place substantial loads on the muscles. The intermittent high-intensity pattern of activity during a match necessitates the high functioning of both aerobic and anaerobic energy delivery pathways (Chittibabu & Chandrasekar, 2014). The distance covered during a game significantly contributes to the higher VO2max observed in football players, indicating that soccer is more demanding in terms of workload intensity, total miles covered, and duration of training and play compared to many other sports (Ibikunle & Enumah, 2016).

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In modern soccer, the concept of total football justifies the active involvement of all players in both offensive and defensive situations. Defenders, midfielders, and forwards share the primary responsibility during every moment of the game. Consequently, players in different positions exhibit similar levels of physical and physiological fitness. The statistical analysis in the present study reveals no significant differences in VO2max among soccer players in the positions of defender, midfielder, and forward.

This finding can be attributed to the selection of subjects from similar levels of regular soccer practice groups, reducing the likelihood of significant fitness differences among positional groups. Factors such as the nature of the game, energy demands, uniform training routines, consistent environmental conditions, and similar adaptation levels to the provided training may explain the insignificant differences in aerobic capacity among different playing positions. Therefore, soccer players in different positions, including defenders, midfielders, and forwards, exhibit similar VO2max performance. This supports the notion that, in total football, players across various positions possess equivalent aerobic capacities.

CONCLUSION

The finding of the study revealed that no significant differences were found in mean comparisons of VO2max among the soccer players of different playing positions. The result of the study had shown that the soccer players of different playing positions achieved similar level of VO2max.AcknowledgementThe authors would like to thank the authorities ‘of different football club and players for sincerely cooperation of conducted data collection. And author would like to thank the supervisor for helping in completion of this study.

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