



ASSESSMENT OF AEROBIC PERFORMANCE OF HOCKEY PLAYERS

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ABSTRACT The primary purpose of the study was to examine the aerobic performance of proficient field hockey players according to their playing position. For the purpose of the study, Seventy (N=70) male elite hockey players with age 23 ± 5 years were categorized as goalkeepers, fullbacks, halfback and forwards. Queen College Step test was administered to assess VO₂ max (aerobic performance) among different positional field Hockey Players. In order to ascertain significant mean differences among different sports and games in relation to maximum oxygen consumption ANOVA Test was employed. For further analysis Post-Hoc Test (Scheffe's Test) is applied. To find out the characteristics and means difference among the four groups, descriptive analysis and ANOVA were employed and tested at 0.05 level of confidence. For analysis of data, IBM SPSS (version 20) software was used. The results of the study revealed that there were insignificant differences in the means comparison among goalkeeper, fullback, halfback and forward as the obtained value of $F=2.37$, is less than the table value $F=2.74$ at 0.05 level of confidence.

KEYWORDS : Aerobic Performance, VO₂ max, Field Hockey

INTRODUCTION

Modern competitive hockey is dynamic, quick and comprehensive team game with various natures of athletic movements, requiring high level of abilities and rigid training for elite performance. Modern hockey is fast vigorous game and required a high level of proficiency of motor and physiological fitness. A game of hockey demands that players have an adequate aerobic power capacity to be able to play continuously for the duration of the game.

The characteristics of modern hockey have been described as short duration attacks with fast crossing in the middle field, continuous free running of those players who are not in possession of the ball; constant changing of positions during attacks and very good physical fitness in speed, endurance, stamina and agility – the basis of modern hockey. Field hockey is a team sport with heavy demands on the player's physiology (Reilly and Borrie, 1992; Spencer et al., 2004).

High level of performance in sports and games might be dependent upon the physiological make up and it was recognized that physiological proficiency was needed for the high level performance. The degree to which the cardio-vascular fitness contributes to a particular games or sports depends upon the type and variety of movements involved in them (Samia HAA., 1966). Hockey is a team sport in which positional play has a considerable importance. Field positions in any game are related to the structure and pattern of the game. All players should be aware of both the attacking and defensive principles of game and a player must learn from his own observations and mistakes.

METHOLOGY

Seventy (N=70) male elite hockey players with age 23 ± 5 years were categorized as Goalkeepers (10), Fullbacks (15), Halfbacks (20) and Forwards (25) were randomly selected. These subjects were belonging to different affiliated State Unit of Hockey India. Queen College Step test was administered to assess VO₂ max (aerobic performance) among different positional field Hockey Players.

Statistical Analysis

Descriptive analysis was used to find out the characteristics of different positional hockey players. In order to ascertain significant mean differences among four different positional hockey players in relation to maximum oxygen consumption (VO₂ max), ANOVA Test was employed and tested at 0.05 level of confidence. For further analysis Post-Hoc Test (Scheffe's Test) is applied. For analysis of data, IBM SPSS (version 20) software was used.

RESULTS

Table 1: Descriptive Analysis of VO₂ max of Positional Hockey Players

Playing Position	N	Mean	S.E	S.D	Max	Min	Range	Variance
Goalkeeper	10	57.90	1.68	5.30	64.29	47.49	16.80	28.10
Fullback	15	58.91	1.61	6.23	65.97	45.81	20.16	38.79
Halfback	20	62.53	0.91	4.06	67.65	52.53	15.12	16.48

Forward	25	60.80	1.04	5.20	65.97	47.49	18.48	27.03
Overall	70	60.47	0.63	5.31	67.65	45.81	21.84	28.22

Table 1 shows the descriptive analysis of VO₂ max in relation to four different positional hockey players. In the table, it is reveals that maximum VO₂ max was exhibit by halfback player and followed by forward, fullback and goalkeeper respectively. The average mean of the positional hockey players i.e. goalkeeper (10), fullbacks (15), halfbacks (20) and forwards (25) were: 57.90 ± 5.30 , 58.91 ± 6.23 , 62.53 ± 4.06 and 60.80 ± 5.31 ml.kg⁻¹.min⁻¹ respectively; standard error of mean (S.E) were 1.68, 1.61, 0.91 and 1.04 respectively; range were 16.80, 20.16, 15.12 and 21.84 respectively.

Analysis of variance was employed in order to ascertain significant mean differences among four different positional hockey players in relation to maximum oxygen consumption (VO₂ max) were shown in table 2

Table 2: Mean Differences among Positional Hockey Players

Playing Position	Mean	SD	F-Value	Sig.
Goalkeeper	57.90	5.30		
Fullback	58.91	6.23		
Halfback	62.53	4.06	2.37	0.08
Forward	60.80	5.20		
Overall	60.47	5.31		

0.05 level of significance ($3, 66 = 2.74$) Table 2 showed that no significant differences were found in maximum oxygen consumption (VO₂ max) among four different positional hockey players i.e. goalkeeper, fullback, halfback and forward hockey players as the obtained F values ($F = 2.37$) were found lesser than the tabulated F value ($F = 2.74$) at .05 level of confidence.

A means comparison of maximum oxygen consumption (VO₂ max) of goalkeeper, fullback, halfback and forward hockey players is presented graphically in Figure I.

DISCUSSION OF FINDING

Field hockey is a game with a long history that has experience very quick and exceptional change inside the previous decade. Field hockey being an old sport, has undergone changes from game rules to the equipment and the surface that the game is played on in order to make the game faster, more entertaining, and safer (Rishira et al., 2009).

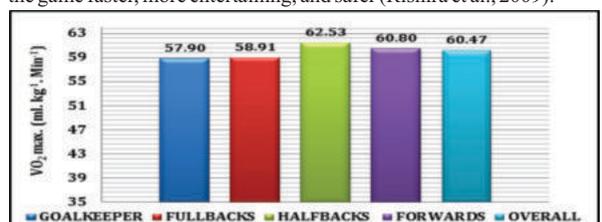


Figure I Mean Comparison of VO₂ max among Positional Hockey Players

The introduction of the synthetic playing surface has changed the technical, tactical, physical and physiological requirements of the game at all levels, but in particular at the elite level. In order to cope with the technological progression within the game, the hockey player has also had to develop physically and physiologically to meet the standards required at elite levels. Physiologically, field hockey is much like soccer and is best described as a repeated-sprint sport, requiring high levels of aerobic capacity. Field hockey is an intermittent endurance sport involving short sprinting as well as movement with and without ball (Manna et al., 2009). Successful performance in field hockey is influenced by physiological and anthropometric characteristics such as body size and composition, functional parameters (physical capacity) (Scott, 1991; Singh et al., 2010) and fitness (strength, speed, anaerobic and aerobic capacity, agility) (Nikitushkin & Guba, 1998).

In this study, it is evident from the statistical analysis and result that the VO_2 max showed insignificant mean differences between the positional field hockey players. This may be because of the selected players for this study were the national level players and trained in various similar training programmes. The nature of the game, energy demands, similar training program and adaptation level to the training provided etc. might be the reason of insignificant differences in terms of aerobic capacity among different playing positions of soccer players.

In the modern field hockey, it is adopted the concept of total hockey in order to justify the best meet of the demands of the sports. So, all the players have the similar prime responsibility in every moments of game and involved in either actively or passively in every offensive and defensive situation of the game. Thus, all the players were engaged in the similar types of planned training programme for the overall developments. Therefore, there is similar VO_2 max performance among the hockey players of different playing positions as goalkeepers, fullbacks, halfback and forwards.

In the present study attacking players demonstrated better in VO_2 max, than the defensive players. Among the positional player, halfback possess significantly higher VO_2 max followed by forwards, fullbacks and goalkeeper. In the finding of previous studies, Bandyopadhyay, A, et al. (2019) and Ready and van der Merwe (1986) found that forwards players exhibits higher level of Maximal oxygen consumption (VO_2 max) than other positional players.

Literature addressing aerobic capacity of hockey players according playing position is extremely limited. Although the finding of the present study, average VO_2 max value 60.47 ml kg⁻¹ min⁻¹ were lower in compared with West Germany national players and English players (63.5 ml kg⁻¹ min⁻¹ and 62.2 ml kg⁻¹ min⁻¹ respectively; Reilly and Borrie, 1992), however, it was higher than that of Spanish national hockey players (59.7 ml kg⁻¹ min⁻¹; Reilly and Borrie, 1992) and Canadian elite field hockey players (59.2 ml kg⁻¹ min⁻¹; Montgomery, 2006).

CONCLUSION

The researcher compared motor fitness and physiological variables among four different positional professional hockey players, within the limitations of the present study and on the basis of the finding results, it is concluded that there is no significant differences in Aerobic Performance (VO_2 max) different positional hockey players i.e. goalkeeper, fullback, halfback and forward. The final result of the study shows that all the different positional hockey players were achieved similar aerobic performances.

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