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Comparison of reaction ability between soccer and hockey players

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Abstract

The objective of the study was to compare the reaction ability between soccer players and hockey players. Forty (40) male players, twenty (20) each from soccer and hockey games who had participated at the university level, age ranging from 18 to 25 years were randomly selected as the subject. To determine the reaction ability, Audio Visual Reaction Timer (Medi system) was used. Ten (10) trials of both Hand Reaction Time (HRT) and Foot Reaction Time (FRT) were given to each participant. Descriptive, t-test and ANOVA statistical techniques were employed and tested at 0.05 level of confidence. Significant differences were found between soccer and hockey players in HRT and FRT on audio and visual signals respectively reaction ability. However, no significant difference was found in HRT and FRT on visual and audio signals respectively. Significant differences among the group means were found and followed by post-hoc test to find out the paired means differences.

Keywords: Soccer, hockey, reaction ability

Introduction

Reaction time is the interval of time between the presentation of the stimulus and the initiation of the response (Johnson and Nelson, 1988) ^[1]. Reaction time involves the central nervous system recognizing a stimulus and then directing the muscles to take some kind of action. Sensory neurons detect a stimulus and transmit the message about the stimulus to the brain or spinal cord, which interprets the information and decides on some types of action. Reaction time in sports is to develop fine motor skills for athletes in specific movements (Proctor and Dutta, 1996) ^[2].

In sports, reaction ability plays a vital role in reacting quickly and effectively to various signals and changing situations. Speed of movement (i.e. response) is an important part of the total reaction in sports. Reaction ability can be divided into various types according to the type of signal or according to the nature of the response. Based on the nature of the response the reaction ability can further be divided into two types i.e. simple and complex reaction ability. According to Vilknor, simple reaction ability is involved when only part body movements are to be done on a signal whereas complex reaction ability involves the movement of the whole body. The sportsman during the match does not know on which signal he should act and in what manner he should respond to the situation. So, complex reaction ability is needed when there is uncertainty about the signal or response or both in team games and combat sports (Singh, 1991) ^[3].

Soccer is close contact and a fast game. It requires fitness and decisive movement to overcome the obstacle in any situations during the game. A quick response time is one of the main components that play an important role during the game. A player with a quick reaction will be able to make a wise decision in taking action, which may be in passing, dribbling, tackling, shooting, defending, or attacking. It will also help in preventing injuries. Likewise, hockey players also need a quick response to a stimulus to prevent themselves from being hit by the ball or the bat. It requires coordination in handling the bat and a lot of movement in possessing and controlling the ball during the play. The goalie of hockey is one of the players that need a quick reaction in blocking and hitting the ball away from the goal. Therefore, reaction time

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plays a vital role in performing the activities on both the players of soccer and hockey. Since both games are fast and involve a lot of movement, the researchers decided to compare the reaction ability of hand and foot between the soccer players and hockey players.

Objective

The objective of the study was to compare the reaction ability between soccer players and hockey players.

Hypothesis

It was hypothesized that there might be significant differences of hand and foot reaction ability between soccer and hockey players.

Methods

For this study, forty male players (N=40), 20 each from soccer and hockey between the 18 to 25 years of age who had participated at the university level were randomly selected as

the subject. To determine the reaction ability, Audio Visual Reaction Timer (Medisystem) was used. It consists of three different types of light (Red, Blue, and Green) and sound (Low, Medium, and High) for visual and audio response time respectively. The players were made familiar with the instrument before the actual trials began. The players performed Ten (10) trials Hand Reaction Time (HRT) and Foot Reaction Time (FRT) on each visual and audio signal. The best (minimum) time out of the ten trials was the score of the test. To determine the significant differences of hand and foot reaction time between soccer and hockey players, a descriptive analysis, independent t-test was employed and the mean differences between the groups were analyzed by employing the analysis of variance (ANOVA). The level of significance was set at 0.05.

Findings

The descriptive analyses of the hand and foot reaction ability of soccer and hockey players are presented in table 1.

Table 1: Descriptive analysis of hand and foot reaction ability for soccer and hockey players

Groups	N	Variables	M	SD	SE
Soccer Players HRT	20	Visual	0.29	0.05	0.01
		Audio	0.38	0.10	0.02
Soccer Players FRT		Visual	0.24	0.03	0.01
		Audio	0.29	0.06	0.01
Hockey Players HRT	20	Visual	0.28	0.08	0.02
		Audio	0.29	0.09	0.02
Hockey Players FRT		Visual	0.31	0.07	0.02
		Audio	0.32	0.07	0.01

Table 1 reveals that the means (M) and standard deviations (SD) of HRT for soccer players on visual and audio signals were 0.29 ± 0.05 and 0.38 ± 0.10 respectively. It also reveals that the means (M) and standard deviations (SD) of FRT for soccer players on visual and audio signals were 0.24 ± 0.03 and 0.29 ± 0.06 respectively. Table 1 further reveals that the means (M) and standard deviations (SD) of HRT for hockey players

on visual and audio signals were 0.28 ± 0.08 and 0.29 ± 0.09 respectively. It also reveals that the means (M) and standard deviations (SD) of FRT for hockey players on visual and audio signals were 0.31 ± 0.07 and 0.32 ± 0.07 respectively.

The graphical representation of means of hand and foot reaction ability on visual and audio signals for soccer and hockey players is shown in figure 1.

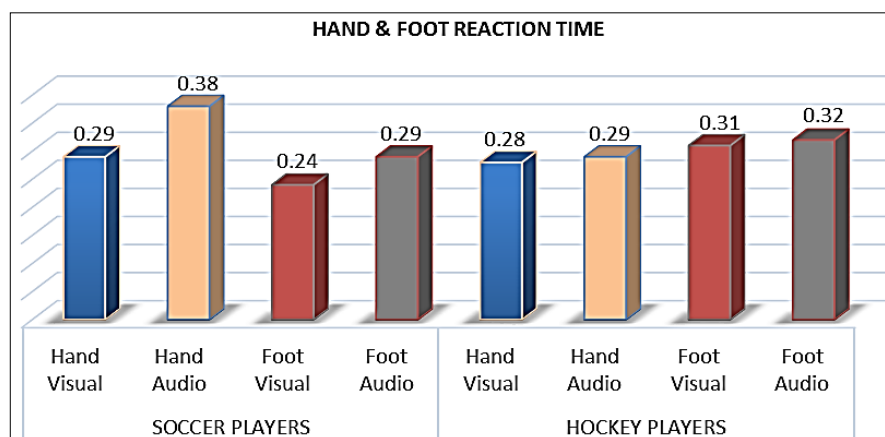


Fig 1: Means comparison of HRT and FRT on visual and audio signals

The t-test analyses between the respective means of Hand and Foot Reaction ability on visual and audio signals for soccer

and hockey players are presented in table 2.

Table 2: Analysis of hand and foot reaction ability between soccer and hockey players

Variables	MD	t	df	Sig.
HRT	Visual	0.02	38	0.464
	Audio	0.09	38	0.005
FRT	Visual	-0.06	38	0.001
	Audio	-0.03	38	0.120

*Significant at 0.05 level of confidence, $t_{0.05}(38) = 2.024$

Table 2 reveals that there were significant mean differences between soccer and hockey players in HRT and FRT on audio and visual signals as the respective obtained value of $t=2.99$ and $(-)-3.92$ were greater than the critical value of $t=2.024$. However, no significant means differences were found in HRT and FRT on visual and audio signals as the respective

obtained value of $t=0.74$ and $(-)-1.59$ were lesser than the critical value of $t=2.024$.

The analyses of variance (ANOVA) among the means of HRT and FRT on visual and audio signals between soccer and hockey players are presented in table 3.

Table 3: Analysis of variance hand and foot reaction ability of soccer and hockey players

Variable	Groups	Sum of squares	df	Mean square	F	Sig.
HRT	Between	0.144	3	0.048	6.979*	0.000
	Within	0.523	76	0.007		
FRT	Between	0.067	3	0.022	6.831*	0.000
	Within	0.247	76	0.003		

*Significant at 0.05 level of confidence, $F_{0.05}(3,76)=2.73$

Table 3 reveals that there were the significant differences among the respective means of HRT and FRT on visual and audio signals between soccer and hockey players as the obtained value of $F = 6.979$ and 6.831 respectively were

greater than the critical value of $F=2.73$.

To determine the paired mean differences among the games, the Scheffe post-hoc test was employed and presented in table 4.

Table 4: Paired means differences among the games

Variable	Mean				MD	Sig.	Critical Diff.
	Soccer Visual	Soccer Audio	Hockey Visual	Hockey Audio			
HRT	0.29	0.38			0.09*	0.009	0.026
	0.29		0.28		0.01	0.946	
	0.29			0.29	0.00	1.000	
FRT	0.24	0.29			0.05*	0.117	0.018
	0.24		0.31		0.07*	0.008	
	0.24			0.32	0.08*	0.001	

*Significant at 0.05 level of confidence

It is evident from the above table that the paired means comparisons through the post-hoc test, there were significant differences in HRT and FRT between the visual and audio signals as $MD=0.09>0.026$ and $MD=0.05>0.018$ respectively in case of soccer. Further, it was found the significant differences in FRT between the soccer and hockey players on visual signals, visual and audio signals as $MD=0.07>0.018$

and $MD=0.08>0.018$ respectively. However, no significant differences were found in HRT between soccer and hockey players in case of visuals, visual and audio signals as the $MD=0.01<0.026$ and $MD=0.00<0.026$ respectively. The paired means differences of HRT and FRT on visual and audio signals are graphically represented in figure 2.

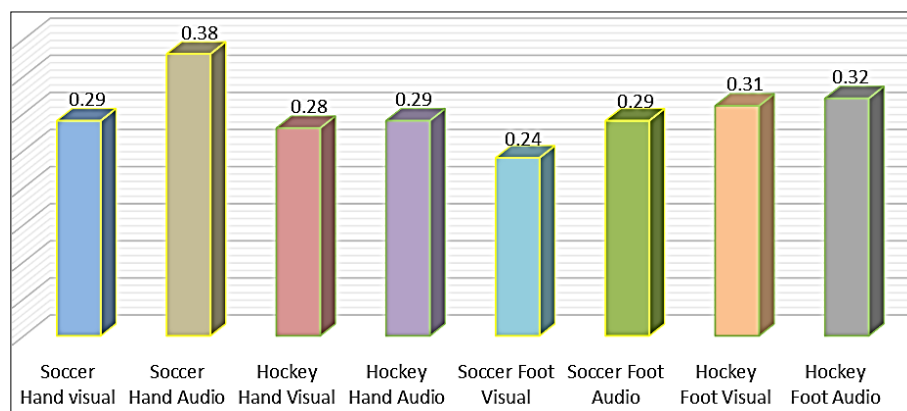


Fig 2: Paired mean differences of HRT and FRT between soccer and hockey players

Discussion

The objective of the study was to compare the reaction ability of between the soccer players and hockey players. The t-test analysis revealed that there were significant differences between soccer and hockey players in HRT and FRT on audio and visual signals respectively. However, no significant differences were found in HRT and FRT on visual and audio signals respectively. The ANOVA also revealed that there were significant differences among the means of HRT and FRT on visual and audio signals between the soccer and

hockey players. Further, the Scheffe post-hoc test was employed to determine the paired mean differences between the games. As a result, there were significant differences in HRT and FRT between the visual and audio signals in case of soccer. Further, it was found the significant differences in FRT between the soccer and hockey players on visual signals, visual and audio signals. However, no significant differences were found in HRT between soccer and hockey players in case of visuals, visual and audio signals.

Conclusion

The Significant difference was found between soccer and hockey players in hand and foot reaction abilities on audio and visual signals respectively and the hypothesis were accepted. However, no significant difference was found in hand and foot reaction abilities on visual and audio signals respectively, and the hypothesis was rejected. The means comparisons had shown that hockey players had better hand reaction ability and soccer players achieved better foot reaction ability.

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