Comparative Assessment of Motor Fitness among different Positional Field Hockey Players

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Abstract: *The performance of a player depends on the body structure, the level of physical fitness and the quality of skills acquired accordingly to the nature and situation of the game. The most successful player is one who can combine all the above qualities and reproduce effectively in the competition. The prime purpose of this study was to compare the motor fitness among different positional field Hockey Players. To accomplish this factor twenty (N = 20) male hockey players belonging to Manipur Hockey, Imphal were selected. Subjects were further divided into goalkeeper, fullback, halfback and forward. The motor fitness variables namely Back strength, Grip strength, Agility, Explosive strength and Speed were chosen. The data was collected through the administration of the standardized test to assess motor fitness among different Positional field Hockey Players. The one way ANOVA was used in 0.05 levels of significance. The results revealed significant difference was found only in agility and vertical jump motor fitness components among different Positional field Hockey Players.*

Key Words: *Motor fitness, Back strength, Grip strength, Agility, Explosive strength and Speed.*

1. INTRODUCTION:

Field hockey is a sport with a long history that has undergone quite rapid and radical changes within the past two decades. Today hockey is essentially a team game and has developed into a fast and highly skilful one. The game includes short bursts of speed with rest pauses or slow movements in between for a period of four quarters of 15 minutes with a rest of 2 minutes in between the first two and last two quarter and 15 minutes half break. The players have to be very alert and active during the play. It is not only the speed of movement, but also the tactics of movement that counts. The player has to perform number of zigzag movements and straight runs with high speed, in accordance with the requirements of the game. Hockey like football involves positional play where the role of players is very specific. The speed of the ball requires the players to be alert, quick, agile and having well developed coordination, neuromuscular control and postural reflexes. The synthetic surface in hockey calls for speed, stamina and strength. A very high level of physical fitness is demanded of a player to exploit his individual skills to the full. 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. Hockey is a team sport in which positional play has a considerable importance. Team games are sports where size, shape, body composition and fitness all play an important part in providing distinct advantage for specific playing positions particularly at the highest levels of performance where there is a high degree of player specialization.

2. METHODOLOGY:

Subjects: For the purpose of the study four positional groups have been taken for the present study. A total of twenty (n=20) i.e. Goalkeepers (05), Fullbacks (05), Halfbacks (05) and Forwards (05) hockey players were selected as subjects for the study. These subjects belong to different Club which participated in State Hockey League, Manipur and there age ranging from 19 to 25 year.

Selection of Variables

MOTOR ABILITIES	TEST/ INSTRUMENTS
Back Strength	Dynamometry
Grip Strength	Dynamometry
Agility	6 X 10 m Shuttle Run
Explosive Strength	Vertical Jump
Speed	30 m Run (Standing Start)

Criterion Measures:

The criterion measure chosen for testing were:

1. Back strength recorded in kilograms
2. Grip strength recorded in kilograms

3. Agility recorded in seconds
4. Explosive strength recorded in centimetres
5. Speed recorded in seconds

The tests used to assess the motor abilities viz, dynamometry, 6 x 10 m shuttle run, vertical jump and 30 meter run (standing start) were all standard tests.

3. STATISTICAL ANALYSIS:

One Way Analysis of Variance (ANOVA) has been used to test the significant differences between averages of different positions (goal keepers, full back, half backs and forwards). When the differences were found to be significant, Scheffe's Post Hoc test was applied to find out the significant differences between the group means.

4. RESULTS:

Table 1. Descriptive Statistics of Motor Fitness among Different Positional Field Hockey Players

Variables	Groups	N	Mean	Std. Deviation	Std. Error
Back Strength	Goalkeeper	5	1.60	7.54	3.37
	Fullback	5	1.58	9.21	4.11
	Halfback	5	1.60	19.46	8.70
	Forward	5	1.55	15.90	7.11
	Total	**20**	**1.58**	**12.96**	**2.90**
Grip Strength Right	Goalkeeper	5	49.60	5.86	2.62
	Fullback	5	51.20	3.96	1.77
	Halfback	5	49.20	7.79	3.48
	Forward	5	53.20	6.65	2.97
	Total	**20**	**50.80**	**5.93**	**1.33**
Grip Strength Left	Goalkeeper	5	52.20	4.82	2.15
	Fullback	5	51.80	4.92	2.20
	Halfback	5	51.80	7.29	3.26
	Forward	5	52.20	2.49	1.11
	Total	**20**	**52.00**	**4.75**	**1.06**
Agility	Goalkeeper	5	14.56	.29	.12
	Fullback	5	14.16	.744	.33
	Halfback	5	13.77	.566	.25
	Forward	5	13.46	.443	.19
	Total	**20**	**13.99**	**.648**	**.145**
Vertical Jump	Goalkeeper	5	44.55	.938	.420
	Fullback	5	56.88	7.98	3.57
	Halfback	5	48.40	2.28	1.02
	Forward	5	49.79	6.78	3.03
	Total	**20**	**49.91**	**6.73**	**1.50**
Speed	Goalkeeper	5	4.33	.117	.053
	Fullback	5	4.12	.126	.056
	Halfback	5	4.20	.178	.079
	Forward	5	4.13	.163	.073
	Total	**20**	**4.20**	**.161**	**.036**

Table 1 shows the descriptive statistics of motor fitness of back strength (goal keeper) is 1.60 ± 7.54, fullback is 1.58 ± 9.21, halfback 1.60 ± 19.46 and forward 1.55 ± 15.90.

- Whereas descriptive statistics of motor fitness of grip strength right (goal keeper) is 49.60 ± 5.86; fullback is 51.2 ± 3.96, halfback 49.20 ± 7.79 and forward 53.20 ± 6.65.
- Whereas descriptive statistics of motor fitness of grip strength left (goal keeper) is 52.20 ± 4.82; fullback is 51.80 ± 4.92, halfback 51.80 ± 7.29 and forward 52.20 ± 2.49.
- Whereas descriptive statistics of motor fitness of agility (goal keeper) is 14.56 ± .29; fullback is 14.16 ± .744, halfback 13.77 ± .566 and forward 13.46 ± .443.
- Whereas descriptive statistics of motor fitness of Vertical Jump (goal keeper) is 44.55 ± .938; fullback is 56.88 ± 7.98, halfback 48.40 ± 2.28and forward 49.79 ± 6.78.
- Whereas descriptive statistics of motor fitness of Speed (goal keeper) is 4.33 ± .117; fullback is 4.12 ± .126, halfback 4.20 ± .178 and forward 4.13 ± .163 respectively.

Table 2. Analysis of Variance of Motor Fitness among different Positional Field Hockey Players

Variables		Sum of Squares	df	Mean Square	F	Sig.
Back Strength	Between Groups	98.15	3	32.72	.169	.916
	Within Groups	3092.40	16	193.28		
	Total	3190.55	19			
Grip Strength Right	Between Groups	49.60	3	16.53	.427	.736
	Within Groups	619.60	16	38.73		
	Total	669.20	19			
Grip Strength Left	Between Groups	.800	3	.267	.010	.999
	Within Groups	427.20	16	26.70		
	Total	428.00	19			
Agility	Between Groups	3.37	3	1.13	3.91	**.029***
	Within Groups	4.61	16	.288		
	Total	7.98	19			
Vertical Jump	Between Groups	398.31	3	132.77	4.59	**.017***
	Within Groups	462.86	16	28.93		
	Total	861.17	19			
Speed	Between Groups	.143	3	.048	2.17	.132
	Within Groups	.352	16	.022		
	Total	.496	19			

0.05 level of significance (3, 16= 3.24)

Table-2 reveals that there was a significant difference found in agility (F= 3.91, P=.029) and vertical jump (F= 4.59, P=.017) motor fitness components among different Positional Field Hockey Player as calculated value were found greater than the tabulated F value at .05 level of significance, while insignificant difference was found in rest of the motor fitness components namely back strength, grip strength right, grip strength left and speed of motor fitness among different position of hockey player as calculated value of all components were found lower than the tabulated F value at .05 level of significance. Since the significant difference was found in two variables namely agility and vertical jump further LSD Post Hoc test was applied and shown in table 3 & 4.

Table 3. Post Hoc Test for Agility among Goalkeepers, Fullbacks, Half Backs and Forwards Players

Dependent Variable	(I) GRP	(J) GRP	Mean Difference (I-J)	Std. Error	Sig.
Agility	Goalkeeper	Fullback	.400	.339	.256
		Halfback	.786*	.339	**.034***
		Forward	1.09*	.339	**.005***
	Fullback	Halfback	.386	.339	.272
		Forward	.694	.339	.058
	Halfback	Forward	.308	.339	.378

* The mean difference is significant at the 0.05 level.

Table 3 shows that goalkeepers had significant different in agility with half back and forward hockey players at 0.05 level of significance. Whereas no significant difference was found between goalkeepers & fullback hockey players, fullback & halfback hockey players, fullback & forward hockey players and halfback & forward hockey players. A comparison of agility of goal keepers, half backs, full backs and forwards of men hockey is presented graphically in graph 1.

Graph-1: Comparison of Agility of Goalkeepers, Fullbacks, Halfbacks and Forward Position of hockey players

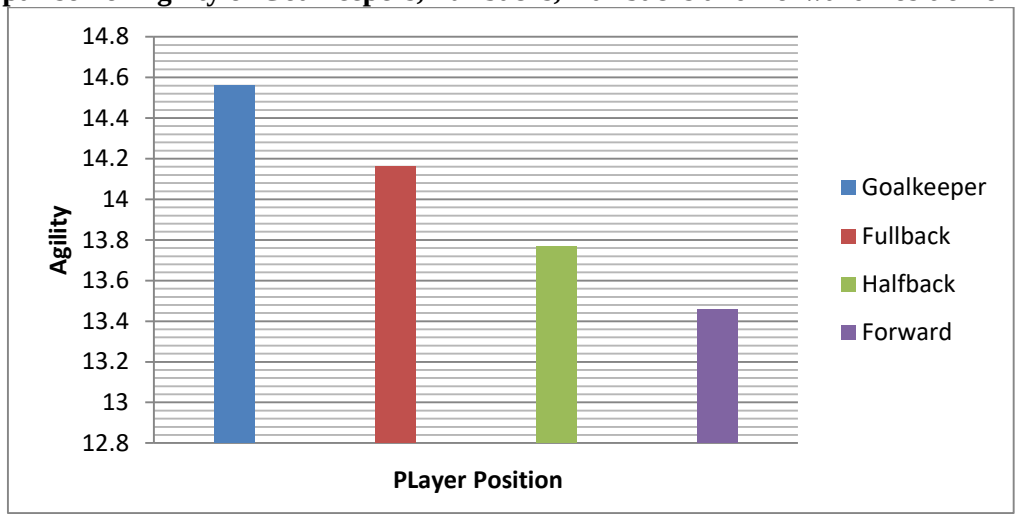


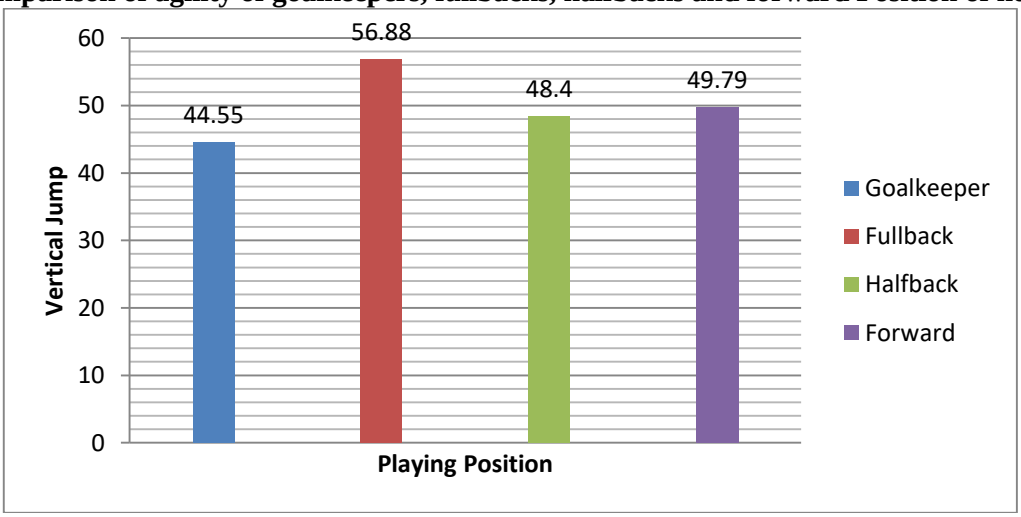
Table 4. Post Hoc Test for Vertical Jump among Goalkeepers, Fullbacks, Half Backs and Forwards Players

Dependent Variable	(I) GRP	(J) GRP	Mean Difference (I-J)	Std. Error	Sig.
Vertical Jump	Goal Keeper	Full Back	12.34*	3.40	**.002***
		Halfback	-3.85	3.40	.273
		Forward	-5.24	3.40	.142
	Fullback	Halfback	8.47*	3.40	**.024***
		Forward	7.08	3.40	.054
	Halfback	Forward	-1.39	3.40	.688

* The mean difference is significant at the 0.05 level.

Table 4 shows that significant difference was found in vertical jump between goalkeepers & fullbacks hockey players and halfback & fullback hockey players at 0.05 level of significance. Whereas no significant difference was found between goalkeepers & halfback hockey players, goalkeepers & forward hockey players, fullback & forward players and halfback & forward hockey players. A comparison of agility of goal keepers, half backs, full backs and forwards of men hockey is presented graphically in graph 2.

Graph-2: Comparison of agility of goalkeepers, fullbacks, halfbacks and forward Position of hockey players



6. DISCUSSION:

The results of the present study suggest that agility of forward hockey players were found higher than halfback hockey players and goalkeepers. It was also seen that halfback hockey player's agility was better than goalkeepers. It may provide insight into the physical qualities important for success in that position, while also providing a greater understanding of the factors limiting performance for those players. The forward players in field hockey require

tremendous speed and agility in order to dodge, penetrate into the shooting circle, dive and deflect or to shoot the ball into the goal with variations in skill. Hence they have shown high degree of agility than other positional players. Forwards have also exhibited more agility than fullbacks and halfbacks as the basic duties fullbacks and halfbacks are more confine in defensive play and more conscious and hold more responsibility in execution of delay strokes.

Further it was also found that fullback hockey players vertical jump performance was better than halfback hockey players and goalkeepers. Defence is indeed one of the most important attribute of any sport. Add to it the fact that there is no provision for an off-side in field hockey rules and regulations, and defense becomes one of the most crucial aspects of the game. The primary responsibility of the defense is to ensure that the opposition team can't create any scoring opportunities for their attackers. A fullback therefore, has to be tall so that it is easy for him to tackle, intercept or clear the ball.

Finding of current study are in contradictory of previous studies results, demonstrating that forwards need to have a higher ability to reach higher than midfielders (Wisloeff, 1998; Salvo, 2007). While Wassmer and Mookerjee (2002) found no differences in player position and the physical parameters they tested, this study found that goalkeepers and midfielders produced low scores for vertical jump. Explosive power perhaps is an area to improve in this sample of players.

7. CONCLUSION:

Study concluded that there was a significant differences found in agility (F= 3.91, P=.029) between halfbacks and forwards hockey players at 0.05 level of significance and vertical jump (F= 4.59, P=.017) between goalkeepers & fullbacks hockey players and halfback & fullback hockey players at 0.05 level of significance. While insignificant difference was found in rest of the variables namely back strength, grip strength right, grip strength left and speed of motor fitness among different position of hockey player respectively.

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