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Influence of positional play on select motor fitness components among the male handball players

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Abstract
The purpose of the present study was to find out the positional influence on select motor fitness variables among the male handball players participated in the inter-collegiate level. As samples, the handball players from the teams qualified for pre-quarter at inter-collegiate level tournaments were selected with the purpose of overcome the differences in the performance on variables among the samples. Thus initially 224 players (Back court position = 96, Pivot position = 64 and Wing position = 64) were selected for the present study. In selection of samples, age group was fixed in the range of 18-24 who were hailed from various socio- economic conditions. In the present study, to study how for, the motor fitness components influenced the positional play, based on the nature of the positional play and research studies pertinent factors demanding the performance of players in the particular positions, the following variables were selected. Thus, as motor fitness components speed, agility and explosive power were identified. Hence to study the influence of positional play on motor fitness components among the handball players, as research design comparative research design was employed in this study. For which form the selected samples (N=224) based on status on tournament and voluntary participation using random sampling method further the samples were extracted 30 for Back court position, 30 for Pivot position and 30 for Wing position. Thus totally 90 samples were selected for the final study. The collected data were tested using one way analysis of variance. Further to test the significance of results 0.05 level was chosen as level of significance. Positional play used in the study to find out its significance over the components of speed, agility and explosive power evidencing that each positions shows its dominance on the components. Thus regarding in the performance of speed, pivot positional play found to be better than others. Whereas in the performance of agility, players pertain to backcourt positions and in the performance of explosive power wing position found to be better than others.

Keywords: Speed, agility, explosive power, pivot, back and wing

Introduction
Handball is a team sport dominated by anaerobic based activities. Most of the movements underlie the power related abilities (Hesponhol *et al*., 2012) [1]. With an aim to maximize the scoring chances on offence and to successfully defend their own goal from the opposing team. In fact players in the team sport either has to play offence or defense whereas in the game of handball players have to concentrate on the court invariably offence and defense with the specific positions of back court, wing and pivot. In considering the physical requirements, players in the positions wing and pivot as they execute the ball with quick movements to either during the passing and shooting is composite characteristics of speed, strength and power are highly essential (Barbero *et al*., 2014) [2]. As a back court player, left and right backs hold very similar roles on the handball court. In the offence play left back and right back players are situated in between the left or right wingers and the center players while in attack whereas in thieve play, the left and right backs drop in to become left half and right half, respectively. The exact positions of these can change based on the defensive formation and specific types of defense. Thus in this game the left and right backs have to be some of the most physical players on the team. The left and right backs need to be able to jump over defenders to get shots off because they occupy spaces that are usually more clogged on the court. Anthropometrically these players are ideally taller and are strong enough to get long range shots off. In the game of handball, during the transitional game situations such as individual fast breaks and collective counter breaks coordinative ability of balance is very essential (Srhoj *et al*., 2001) [3].

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Player in the position of center back generally will be the most experienced player on the team. Being the play maker of defense he has to organize the offense into a coherent attack that can get a quality shot off on the goal. The center back must put their players in good position before being able to get them the ball in an advantageous scoring position. In this way, the center back is a good comparison to a point guard in basketball, who also has to direct teammates before finding the right pass to get a shot off. This observation is probably related to the fact that these players need to be more flexible and agility because they usually start and finish the counterattack (Karcher and buchheit 2014) [4]. Being a good center back requires a proactive creative attacking mind, as well as the experience to know how the opposing team might react to certain offensive movements. Backcourt players are taller than their teammates in other playing positions, whereas the wings are smaller and lighter than their teammates (lidija bojic *et al*., 2018). Pronounced longitudinal dimensions, especially body height and large hands, are more important for backs than for wings, whereas a higher speed of movement and reaction is more important for wings (Rogulj *et al*., 2009).

In handball, the players of left wing and right wing are having the similar role like the players of left back and right back in attacking and defensive play. Normally, the players in the wing position will be the faster players because they have to get up and down the court quicker. Longer distance gives wing players more opportunity for developing speed. Obviously sprinting skills are particularly crucial for wing players, as they are more involved in fast breaks and counterattacks during a game than the other playing positions (Rogulj *et al*., 2011) [5]. Fastest sprinting was recorded for wing positions, specifically for left wing player, who were significantly faster than all backcourt and pivot positions (Nikola Foretic *et al*., 2021). Results were reported in a study conducted, who found that wing players differed from the other positions, with superior 10-m and 40-m sprinting times (Haugen *et al*., 2019) [6]. The wingers also use wide jumps from the outside of the court to soar into the middle and get even better angles to shoot at the goal from. In the defense play, the wingers drop into the right back and left back positions, respectively. They are responsible for guarding the opposing teams' wingers, attempting to cut off their shooting angles by staying in front of them at all times. Earlier studies also reported that wing player as the most explosive power at the same level as back court player. (Chaouachi *et al*., 2009) [7]. Wings sprinted faster and jumped higher than other players (Thomas *et al*., 2014) [9]. The player in the position of pivot is also known as center forward or circle runner who has the most irreplaceable offensive work to do out of all the field players. His role is very appreciable one since he has to pass and receive the ball from, constantly moving to distract the defense. Pivot being an attacking player has to travel along the opponent's six-meter line. They must work well with their team's center back to initiate attacking strategies and are required to shoot in a range of positions. In defense, they play in front of their team and try to close down the opposition's attacks. Thus the offensive play in the game of handball is highly dominated by the player in the pivot position. Pivots were stronger than wing players. Physically the pivot position players required qualities of strength and agility in addition to control over passes and shots. On defense, the pivot becomes the back center of the defense. In this role, the player is responsible for not getting dragged out of position and keeping as much of their body in between the attackers and the goal as possible to block any incoming shots.

In the present study, positional play was classified into pivot, back court and wing based on their nature of play in the game. The positional play of pivot, backcourt and wing are differed in the degree of motor fitness required. In fact the players in the wing position should have the ability of speed and agility so as to pass and receive the ball while making the score in the game situation whereas the back position players as they have to defend the opponents and assisting the wing players to complete their task successfully. In handball the player in the pivot positional play has to coordinate the back position and wing players. Each positional play has its own demons based on its nature. Specifically in terms of ability related to physical, anthropometrical, physiological and psychological, that enable them to execution of movements efficiently in the game situation (Massuca and Fragoso, 2013) [8]. Thus in the game of handball the players pertain to pivot, back court and wing though they are differed from one another in the nature of play, their need over the motor fitness components more or less similar. Hence to study the influence of positional play on motor fitness components among the handball players the present study was carried out.

Selection of Samples
The purpose of the present study was to find out the positional influence on select motor fitness variables among the male handball players participated in the inter-collegiate level. As samples, the handball players from the teams qualified for pre-quarter at inter-collegiate level tournaments were selected with the purpose of overcome the differences in the performance on variables among the samples. Thus initially 224 players (Back court position = 96, Pivot position = 64 and Wing position = 64) were selected for the present study. In selection of samples, age group was fixed in the range of 18-24 who were hailed from various socio- economic conditions.

Variables
In the present study, to study how for, the motor fitness components influenced the positional play, based on the nature of the positional play and research studies pertinent factors demanding the performance of players in the particular positions, the following variables were selected. Thus, as motor fitness components speed, agility and explosive power were identified. In the game of handball the movements are underlie the movements in the game of basketball specifically passing, shooting and rebounding. All these movements are basically require speed aspects and strength. In nature, the product of strength and speed its explosive power. In such a way, in the game of handball through all players are in need to play during the game both offense and defense player's game to concentrate over their respective positions such as back court, wing and pivot. Each of these positions is differed on the demands of motor fitness components.

Research Design
In the present study, positional play has been served as categorical variable. Positional play was classified into pivot, back court and wing based on their nature of play in the game. Although the positional play of pivot, backcourt and wing are differed in the degree of motor fitness required players of these positions to perform during the game situation invariably their potions so as to maximize their scoring performance. Hence to study the influence of positional play on motor fitness components among the handball players, as research design comparative research design was employed in this study. For which form the selected samples (N=224) based on status on tournament and voluntary participation using random sampling method further the samples were extracted 30 for Back court position, 30 for Pivot position and

30 for Wing position. Thus totally 90 samples were selected for the final study.

Tools used in the study
In measuring the variables such as speed, agility and explosive power, standardized test items, such as 20 mts dash, agility T test, and Standing broad jump were used. The test items used to measure the variables are well established and reliable one.

Collection of Data
The need and nature of the research work were explained clearly to the samples used in the study, with the purpose get the quality is data. Following this having their voluntary participation and with the assistance of research scholars selected samples were tested on the performance of speed, agility and explosive power using standard test items in this study.

Thus the data for the present study were collected. The collected data were tested using one way analysis of variance. Further to test the significance of results 0.05 level was chosen as level of significance. The obtained results are as follows.

Table 1: Descriptive statistics

Variables	Positional play	Number of Subjects	Mean	Std. Deviation
Speed	Pivot	30.00	6.19	0.31
	Back position	30.00	6.45	0.34
	Wing	30.00	6.41	0.35
	Total	90.00	6.35	0.35
Agility	Pivot	30.00	13.82	0.43
	Back position	30.00	13.35	0.39
	Wing	30.00	13.64	0.43
	Total	90.00	13.60	0.46
Explosive Power	Pivot	30.00	1.76	0.23
	Back position	30.00	1.80	0.22
	Wing	30.00	1.94	0.28
	Total	90.00	1.84	0.25

Table shows the descriptive measures on motor fitness components of Handball players pertaining to varied positions namely pivot, back positions and wing are as follows. The mean and standard deviation of components of motor fitness variables are: Speed (6.19, +0.31 pivot), (6.45, 0.34 Back position), and (6.41, 0.35 wing), Agility (13.82, 0.43 pivot), (13.35, 0.39 Back position) and (13.64, 0.43 wing), Explosive power (1.76, 0.23 pivot), (1.80, 0.22 Back position) and (1.94, 0.28 wing).

Table 2: Analysis of Variance on Speed among the Positional play

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.21	2.00	0.60	5.40	0.01
Within Groups	9.74	87.00	0.11		
Total	10.95	89.00			

*significant at 0.05 level

Table reveals that the obtained 'F' value was 5.40. The observed 'F' value (5.40) was found to be significant at 0.05 level. It was infer that the mean difference among the positional play of pivot, back position and wing on speed is statistically significant.
Following the results of significant mean difference among the varied positions of handball players namely pivot, back position and wing to find out the group which is the source for such a significant mean difference as post –hoc test,
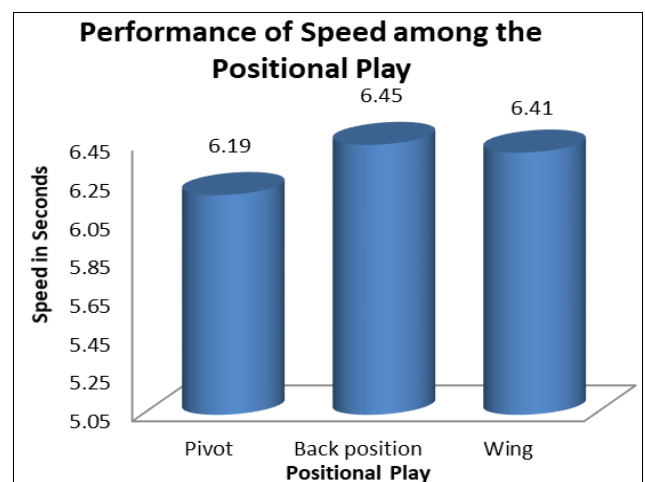
Bonferroni test was applied. The results of this are given in the table as follows.

Table 3: Post-hoc test on Speed among the Positional play

Pivot	Back position	Wing	Mean Difference	Sig
6.19	6.45	-	0.26	0.01
6.19	-	6.41	0.22	0.03
-	6.45	6.41	0.04	1.00

*significant at 0.05 level

The results (Table- 4.1) of Bonferroni test explained that significant mean differences exists between the pair of pivot and back position(0.26), Pivot and Wing(0.22), other than the pair of back position and wing(0.04). Besides it was observed that handball players pertaining to pivot position were found to be better performance in speed (6.19) when compared to Back court position and wing position of handball players (6.45 and 6.41). Further when comparing the mean differences existing between the remaining pair of Back position and Wing, (0.26, $p< 0.01$, 0.22, $p< 0.03$, 0.04, p> 1.00) no significant mean differences the found on the performance of speed and found to be similar.

Fig 1: Performance of speed among the positional play

Table 3: Analysis of Variance on Agility among the Positional play

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.45	2.00	1.72	9.89	0.00
Within Groups	15.16	87.00	0.17		
Total	18.61	89.00			

*significant at 0.05 level

Table reveals that the obtained 'F' value was 9.89. The observed 'F' value (9.89) was found to be significant at 0.05 level. It was infer that the mean difference among the positional play of pivot, back position and wing on agility is statistically significant. Following the results of significant mean difference among the varied positions of handball players namely pivot, back position and wing to find out the group which is the source for such a significant mean difference as post –hoc test, Bonferroni test was applied. The results of this are given in the table as follows.

Table 4: Post-hoc test on Agility among the Positional play

Pivot	Back position	Wing	Mean Difference	Sig
13.82	13.35	-	0.47	0.00
13.82	-	13.64	0.18	0.27
-	13.35	13.64	0.29	0.02

*significant at 0.05 level

The results (Table- 4.1) of Bonferroni test explained that significant mean differences exists between the pair of back position and pivot (0.47), back position and Wing (0.29), other than the pair of pivot position and wing (0.18). Besides it was observed that handball players pertaining to back court position were found to be better performance in agility (13.35) when compared to pivot position and wing position of handball players (13.82 and 13.64). Further when comparing the mean differences existing between the remaining pair of pivot and Wing position, no significant mean differences the found on the performance of agility and found to be similar.
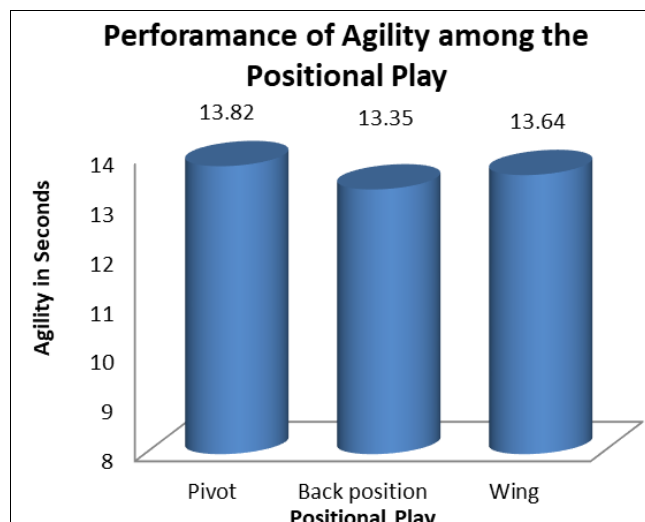

Fig 2: Performance of Agility among the Positional Play

Table 5: Analysis of Variance on Explosive Power among the Positional play

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	0.51	2.00	0.25	4.19	0.02
Within Groups	5.27	87.00	0.06		
Total	5.78	89.00			

*significant at 0.05 level

Table reveals that the obtained 'F' value was 4.19. The observed 'F' value (4.19) was found to be significant at 0.05 level. It was infer that the mean difference among the positional play of pivot, back position and wing on explosive power is statistically significant.

Following the results of significant mean difference among the varied positions of handball players namely pivot, back position and wing to find out the group which is the source for such a significant mean difference as post –hoc test, Bonferroni test was applied. The results of this are given in the table as follows.

Table 6: Post-hoc test on Agility among the Positional play

Pivot	Back position	Wing	Mean Difference	Sig
1.76	1.80	-	0.04	1.00
1.76	-	1.94	0.17	0.02
-	1.80	1.94	0.14	0.11

The results (Table 4.2) of Bonferroni test explained that significant mean differences exists between the pair of pivot and back court position other than the pair of Pivot and back court position, back position and wing.

Besides it was observed that handball players pertaining to wing position were found to be better performance in explosive power (1.94) when compared to pivot position of handball players (1.76 and 1.80). Further when comparing the

mean differences existing between the remaining pair of pivot Back position and Wing no significant mean differences the found on the performance of explosive power.
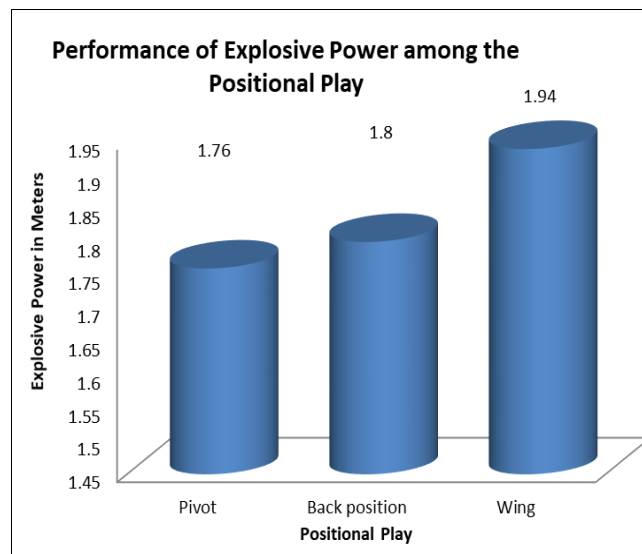

Fig 4: Performance of explosive power among the positional play

Discussion on findings

Results from the one way analysis of variance, explained that positional play has significant impact on motor fitness components such as speed, agility and explosive power among the male handball players. Following this to study the sources for such significant mean difference on motor fitness components among the positional play post-hoc test was applied. The results of post hoc test are as follows. In comparing the performance of on motor fitness components such as speed, agility and explosive power among the positional play. In the performance of speed, players belong to pivot positions were found to be better than the players of back court position and wing position, whereas components the performance of speed between the player of back court and wing position they were found to be similar. Considering the performance of speed among the positional play the dominance of pivot position is discussed as follows. Pivot positional play required more speed in comparison with the other position. Since pivot players need to follow the ball wherever it goes especially while using the single pivot formation. Pivot is the one to start the game after each successive defense of the opponents and also pivot must run back and front to both sides with in the defense while ball is passing from right wing to left wing. By observing many teams it is noted that pivot players are capable of tapping more balls during a defense then other players. This additional ability is acquired from their performances during an offence where the pivot need to screen the defense player and also need to collect the ball from back position at same time after playing repeatedly, they develop their speed of playing the game in comparison with the others. Following this, in the performance of agility, players belong to back court positions were found to be better compared to the players of pivot position and wing position. Besides, in analyses the positional play between pivot and wing position, the performance of agility was found to be similar. Regarding the explosive power, results on influence of positional play was favoured to the players of wing position compared to pivot position. Where as in the performance on explosive power between the positional play of pivot and back position and back position and wing no significance variations was observed.

Back position has more agility then other players. During an offence back players has more chance to face one on one with the defense player where he needs to perform a quick movement such as feints or rotate. While shooting from the 9 meter or outside, the defense, the back players need a quick hand action to get a successive goal when compared to the wing. Since he is far away from the goal post while the wing players has less goal post area visible for a successive goal. The players with more agility has more chance in making a successful offence.

Wing position has more explosive power. In an offence in handball match the wing positions has less area to perform in comparison with the other. Which in general increase the explosive power while repeatedly playing the game. The goal post area visible to the wing player depends on how far he was traveling during a jump also he needs to check the goal keepers movement while attempting a wing shot. Hence, the player must spend more amount of energy in a short time in order to make a successful attempt. The player with more explosive power has more chance of making a successful goal in the wing position.

Conclusion
Positional play used in the study to find out its significance over the components of speed, agility and explosive power evidencing that each positions shows its dominance on the components. Thus regarding in the performance of speed, pivot positional play found to be better than others. Whereas in the performance of agility, players pertain to backcourt positions and in the performance of explosive power wing position found to be better than others. Thus, from the results it was concluded that the nature of the positional play in which the physical and motor fitness associated with the fundamental skills executed by players may be the significant source. Thus, in sum it was further concluded that the positional play has its own entity in the performance related parameters among the players.

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