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## Comparative analysis of different playing positions on the basis of selected anthropometric variables for team handball players

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### Abstract

A comparative analysis was carried out to study two different playing positions on the basis of selected anthropometric variables for team Handball. For the present study 30 male handball players of District level in Gwalior of age  $20 \pm 5$ , subject were selected on the basis of purposive sampling. Independent t test was used to compare two different playing positions on the basis of selected functional variables for team handball. For this six variables as anthropometric variables were used to compare the two different positions i.e. height, lower arm length, forearm length, hand length, humerus bicondylar diameter and weight. After applying independent t test to compare playing positions and selected anthropometric variables it was find the value of t statistics for height is 3.066. This t value is significant as its p- value is 0.005 which is less than 0.05. Thus the null hypothesis of equality of population means of two groups is rejected and same as the value of t statistics for weight is 3.204 this t values is significant as its p- values 0.003 which is less than 0.05. Thus the null hypothesis of equality of population means of two groups is Rejected therefore it may be concluded that height and weight of backcourt players and wingers are significantly differ, further height and weight of backcourt player is higher than wing players in team handball.

**Keywords:** Anthropometric variables, playing positions

### Introduction

Handball is also known as team handball or Field handball. It is a team sport where two different teams of seven players including, each having one goal keeper. With Passing, bounce, jump and fake with a ball trying to throw it in the goal of the opposing team. The basic positions in this game like back court player, wing court player and circle player matters a lot in this sport, therefore to perform various tactics and technique in specific position or zones the players have to be selected and trained accordingly which is certainly very effective or productive outcome of performance in any competitions. Few findings in previous research, the emphasis has been given in selection procedure of players, for particular playing positions, one of the variables that work a lot is the anthropometric characteristics. Where height, girth, diameter, weight and other measurements is been taken and become a criteria for selecting a player for any sports. In handball the selected players according to respective positions matter a lot to score a goal from pre define zones, as to defend the goal the defenders are also been put in such position where it is difficult for attackers to score a goal. Therefore to know the exact differences or not in both these two playing positions (back court and wing court) the author want to compare anthropometric characteristics on selected variables like height, upper arm length, forearm length, hand length, humerus bicondylar diameter and weight. It will help in developing a clear bench mark for others sports to select the players in different positions in their respective sports discipline according to their present performance.

### Methodology

The entire players or subject were found highly fit and further motivated to give the data. The sample comprised of 30 handball players, which further divided into two groups according to their respective positions 15 were back court players and other 15 were wing players of District level in Gwalior. Their age was ranging between 19 to 23 years.

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Six variables as anthropometric variables were used to compare the two different positions i.e. height, lower arm length, forearm length, hand length, humerus bicondylar diameter and weight. For recording data anthropometric rods, steel measuring tape, sliding calliper and weighing machine were used and for comparative analysis the statistical tool was used was independent t- test.

**Administration of test**  
**Standing height**

The subjects were asked to stand on a plane horizontal surface, the head and face were checked for its being in F.H. plane, so that the heel, back and head should touch the wall and through anthropometric rods which was kept in front of subject and the crossbar of the anthropometric was also adjusted thoroughly so that its lower edge touches the head.

**Upper Arm Length**

The subject were asked to flexed arm at 90°, so that ulnar surface of forearm and hand are horizontal and palms facing medially with fingers extended, measurement is taken from acromial landmark to the posterior surface of olecranon process of ulna.

**Fore Arm Length**

The subject measurement was taken toward the distance from the head of radius (upper radial landmark) to the most distal point of the styloid process of radius (or styloid).

**Hand Length**

The subject were asked to open hand in extended and the palm rested in the direction of the longitudinal axis of forearm, then measurement is taken from styloid process at base of thumb to the tip of middle finger.

**Humerus Bicondylar Diameter**

The subject have to flex his arm then through the help of sliding calliper which measures maximum straight distance across the outer most points on the two lateral condyle on the lower end of humerus will be fix and measurement will be taken in cm.

**Weight**

The weight of the subject was taken with the help of calibrated weighing machine in kilogram. Every subject was asked to remove shoes and wear tight shorts with minimum weight.

**Statistical Tool**

The independent t-test, also called the two sample t-test, independent-samples t-test or student's t-test, is an inferential statistical test that determines whether there is a statistically significant difference between the means in two unrelated groups.

**Result**

**Table 1:** Descriptive Statistics for Groups

Group		N	Mean	Std. Deviation	Std. Error Mean
Weight	back court	15	70.93	9.63	2.49
	Wingers	15	60.60	7.95	2.05
Standing height	back court	15	174.73	5.39	1.39
	Wingers	15	168.53	5.68	1.47
Upper arm length	back court	15	35.00	1.89	.49
	Wingers	15	34.47	1.68	.43
Forearm length	back court	15	28.87	1.36	.35
	Wingers	15	28.27	2.43	.63
Hand length	back court	15	22.00	.65	.17
	Wingers	15	21.87	.92	.24
Humrus epicondyle length	back court	15	5.58	.46	.12
	Wingers	15	5.37	.30	.08

Table 1 shows mean and standard deviation of back court players and wingers on selected anthropometric variable. For backcourt players mean and standard deviation are height 174.73±5.39, upper arm length 35±1.89, forearm length 28.87±1.36, hand length 22±0.65, humrus epicondyle length

5.58±0.46 and weight 70.93±9.63 respectively. For wingers mean and standard deviation are height 168.53±5.68, upper arm length 34.47±1.68, forearm length 28.27±2.43, hand length 21.87±0.92, humrus epicondyle length 5.37±0.30 and weight 60.60±7.95 respectively.

**Table 2:** T-table for the data on Selected Anthropometric Variables

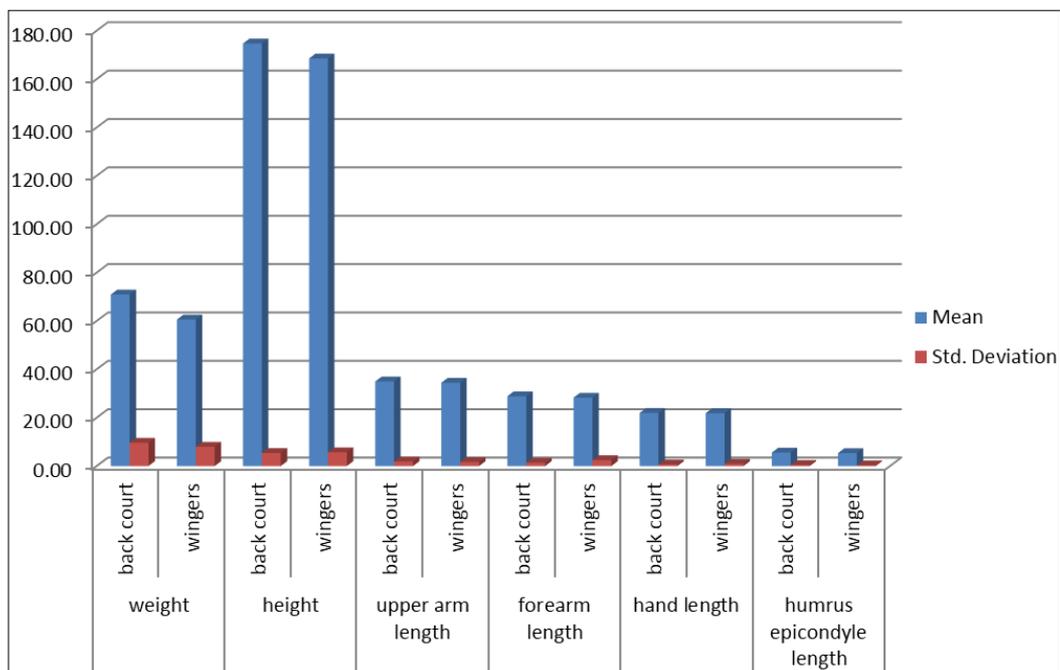
		Levene's Test for Equality of Variances		t-test for Equality of Means			
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference
Standing height	Equal variances assumed	.000	.989	3.066	28	.005	6.20
Upper arm length	Equal variances assumed	.291	.594	.816	28	.421	.53
Forearm length	Equal variances assumed	7.152	.012	.834	28	.411	.60
Hand length	Equal variances assumed	6.362	.018	.459	28	.650	.13
Humrus epicondyle length	Equal variances assumed	6.877	.014	1.502	28	.144	.21
Weight	Equal variances assumed	.771	.387	3.204	28	.003	10.333

It can be seen from table 2 that the value of t statistics for height and weight are 3.066 and 3.204 respectively. These t values are significant as their p- value are standing height (0.005) and weight (0.003) which is less than 0.05. Thus the null hypothesis of equality of population means of two groups

is rejected and it may be concluded that height and weight of backcourt players and wingers is significantly differ further height and weight of backcourt player is greater than wingers. In case of upper arm length, forearm length, hand length and humrus epicondyle length the t- statistics were 0.816, 0.834,

0.459 and 1.502 respectively. *t* values found insignificant as *p*-value were upper arm length (0.421), forearm length (0.411), hand length (0.650) and humrus epicondyle length (0.144) which were greater than 0.05. Thus null hypothesis of

equality of population means of two groups is failed to be rejected and it may be concluded that upper arm length, forearm length, hand length and humrus epicondyle length are same in backcourt players and wingers.



**Fig 2:** Graphical representation of mean and standard deviation of selected Anthropometric variables of backcourt players and wingers.

### Discussion and conclusion

In this study the outcome is that, height and weight plays major role for being a backcourt player as compared to wing player. Perhaps other variables also play an equal role but in this study the other selected variable did not show any significant difference. So it can be concluded that height and weight of backcourt player significantly greater than the wing player. It will also give direction to other sports discipline to compare different position with respective anthropometric characteristics. So where height, girth, diameter, weight and other measurements is been taken and become a criteria for selecting a player for any sports, as the author desired to compare anthropometric characteristics on selected variables like height, upper arm length, forearm length, hand length, humerus bicondylar diameter and weight. Which will definitely developing a clear bench mark for others sports to select the players in different positions in their respective sports discipline.

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