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Comparative study of selected anthropometric measurements between offensive and defensive inter University female hockey players

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Abstract
The purpose of the study was to compare the selected anthropometric measurements of offensive and defensive inter university female hockey players. Forty eight (N=48) female hockey players, 16 each from Punjabi University Patiala, GNDU Amritsar, and Punjab University Chandigarh were selected as subjects for this study who had participated in North- Zone all India interuniversity hockey championship during session, 2016-2017. Only those hockey players were tested who played at offensive and defensive positions during the championship. Age of the subjects ranged between 18-25 years. All the measurements were taken with standard equipment's. The 't' test was applied to examine the significance of mean differences between interuniversity offensive and defensive female hockey players. From the findings of the study, it was concluded that there were significant differences between offensive and defensive players in mid-thigh girth as the calculated value of 7.10 was greater than the table value of 1.679. But in Biceps skin fold, triceps skin fold, Sub scapular skin fold, Iliac crest skin fold, height, sitting height, Upper arm length, Fore arm length, Hand length, Leg length, Weight, Calf girth, Waist girth, Arm relaxed girth, and Arm flexed girth defensive hockey players did not differ significantly with offensive players as the calculated 't' values of 0.46, 0.17, 0.19, 0.42, 0.44, 0.29, 0.08, 0.41, 0.19, 0.17, 0.008, 0.0002, 0.009, 0.006, 0.0007 respectively were less than the table value of 1.679 required to be significant at 0.05 level.

Keywords: Anthropometric variables, hockey players (Offensive and defensive)

Introduction
Games and sports are not only important for success in academy but it is important for success in every walks of our life. Sports are the sources of recreation. They provide relief and a sense relaxation in a life of monotony of routine marked by miseries, hardships and hurdles. It is very essential to maintain health and physical fitness. All state governments must take initiative steps as to promote it from school levels, currently sports one of their essential subjects in their syllabus. It must not be a co-curricular activity merely. A modern thinker in education now a day's emphasize that they must individual is one, who is physically fit, mentally sound and sharp, emotionally balanced and socially well adjusts.

Anthropometric measurement is also playing an important role in sports. The significant role of anthropometric characteristics in sport performance besides other factors is well known. Requirement of specific physique for good performance in specific sports has been established in different studies. However knowledge of body measurements also helps to coaches and physical educationist to select suitable body characteristics for the specific game. Anthropologists predict the height, weight and body proportion of the children at very young age, which lies on body development index. The body development index takes into account the body structure which increase proportionally with the growth in years by the use of this method one can know whether the growth of child's normal, slow or fast. On the basis of these predictions of growth, they can select suitable player for the particular sports to choose like "right pole in a right hole." They can attain optimum performance without wasting time, money and energy. (Biswas, Swrup 2014) [1]

Statement of the problem
The present study was titled as, "Comparative study of selected anthropometric measurements between offensive and defensive inter university female hockey players."

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Objective of the Study
This study was conducted keeping in view the following Objectives
The find out difference between offensive and defensive players on selected anthropometric variables female hockey players at Interuniversity level.

Methodology and procedure
Selection of Subjects
Forty eight (N=48) female hockey players, 16 each from Punjabi University Patiala, GNDU Amritsar, and Punjab University Chandigarh were selected as subjects for this study who had participated in North- Zone all India interuniversity hockey championship during session, 2016-2017. Only those hockey players were tested who played at offensive and defensive positions during the championship.

Selection of Variables
Following anthropometric variables were selected for the research purpose. These variables are: Biceps skin fold, triceps skin fold, Sub scapular skin fold, Iliac crest skin fold, height, sitting height, Upper arm length, Fore arm length, Hand length, Leg length, Weight, Calf girth, Waist girth, Arm relaxed girth, and Arm flexed girth.

Statistical Analysis
Besides descriptive statistics, data were analyzed by applying 't' test to examine the significance of mean differences, if any, between offensive and defensive players. Computational work of analysis was carried out through SPSS.16 for window software.

Results
The analysis of significance of mean difference between offensive and defensive players have been presented in table I and depicted in figure I
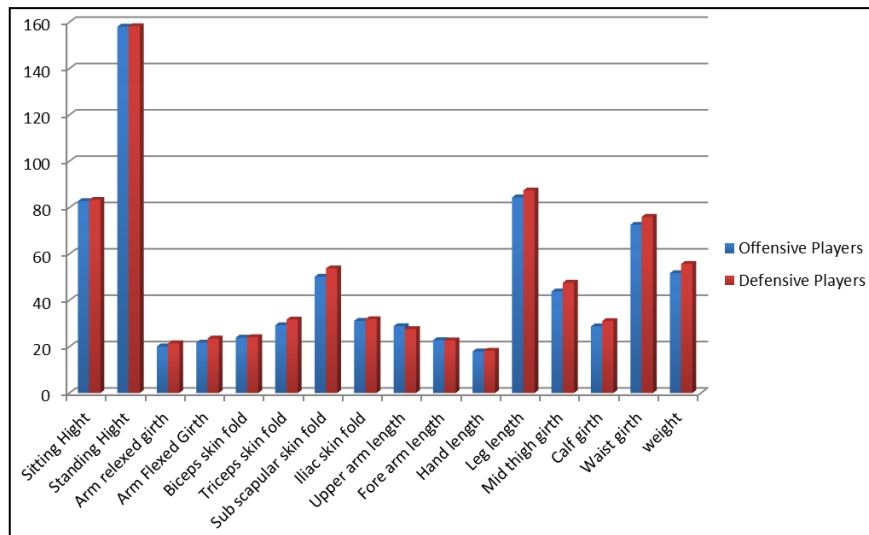
Table I: Significance of Mean Differences between Offensive and Defensive Players in Their Selected Anthropometric Measurements

S.R. No.	Group	Variables	Mean	SD	'T'
1	Offensive Players Defensive Players	Height	158.06 158.26	4.56 6.15	0.44
2	Offensive Players Defensive Players	Sitting Height	82.78 83.31	2.79 3.86	0.29
3	Offensive Players Defensive Players	Biceps Skin Fold	23.91 24.08	7.75 6.04	0.46
4	Offensive Players Defensive Players	Triceps Skin Fold	29.25 31.66	9.47 8.49	0.17
5	Offensive Players Defensive Players	Sub Scapular Skin Fold	50.16 53.75	15.74 12.88	0.19
6	Offensive Players Defensive Players	Iliac Skin Fold	31.12 31.83	15.45 11.05	0.42
7	Offensive Players Defensive Players	Upper Arm Length	28.81 27.56	3.35 2.86	0.08
8	Offensive Players Defensive Players	Fore Arm Length	22.79 22.69	1.27 1.71	0.41
9	Offensive Players Defensive Players	Hand Length	17.95 18.22	0.96 1.15	0.19
10	Offensive Players Defensive Players	Leg Length	84.40 87.38	14.83 4.34	0.17
11	Offensive Players Defensive Players	Mid-Thigh Girth	43.82 47.57	2.94 3.30	7.10*
12	Offensive Players Defensive Players	Calf Girth	28.73 31.05	2.14 2.13	0.0002
13	Offensive Players Defensive Players	Waist Girth	72.59 76.02	5.52 4.12	0.009
14	Offensive Players Defensive Players	Arm Relaxed Girth	20.09 21.43	1.51 2.04	0.006
15	Offensive Players Defensive Players	Arm Flexed Girth	21.73 23.54	1.60 2.06	0.0007
16	Offensive Players Defensive Players	Weight	51.70 55.70	3.65 6.97	0.008

$T_{0.05}$ (46) = 1.679

The examination of table 1 reveals that there were no significant differences between offensive and defensive interuniversity level female hockey players on Biceps skin fold, triceps skin fold, Sub scapular skin fold, Iliac crest skin fold, height, sitting height, Upper arm length, Fore arm length, Hand length, Leg length, Weight, Calf girth, Waist girth, Arm relaxed girth, Arm flexed girth as the calculated 't' value of 0.46, 0.17, 0.19, 0.42, 0.44, 0.29, 0.08, 0.41, 0.19, 0.17, 0.008, 0.0002, 0.009, 0.006, 0.0007 respectively were less than the table value of 't' = 1.679. However offensive and defensive interuniversity level female hockey players differed significantly on mid-thigh girth, as the 't' value of 7.10 was greater than the table value of 1.679 required to be significant at 0.05 level in which defensive players showed more girth as compared to offensive female hockey players.

Fig 1: Shows mean difference in selected anthropometric measurements between offensive and defensive players

Discussion

The hypothesis that there would be significant differences in selected anthropometric measurements between offensive and defensive female hockey players has been partially rejected because there were insignificant difference between offensive and defensive female hockey players as respect to their Biceps skin fold, triceps skin fold, Sub scapular skin fold, Iliac crest skin fold, height, sitting height, Upper arm length, Fore arm length, Hand length, Leg length, Weight, Calf girth, Waist girth, Arm relaxed girth, and Arm flexed girth. Whereas in case of mid-thigh girth defensive female hockey players differed significantly with offensive female hockey players. The defensive players showed more girth in case of mid-thigh as compared to the offensive players, because of the nature of offensive players position throughout the game offensive players cannot stand idly in a particular place. They have to move up and down frequently for the possession of ball and for scoring purpose.

Conclusions

On the basis of the results following conclusions were drawn:

1. It was concluded that offensive female hockey players did not differ with defensive players in Biceps skin fold, triceps skin fold, Sub scapular skin fold, Iliac crest skin fold, height, sitting height, Upper arm length, Fore arm length, Hand length, Leg length, Weight, Calf girth, Waist girth, Arm relaxed girth, and Arm flexed girth.
2. Female offensive hockey players differed in mid-thigh girth with offensive hockey players.

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