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## Study of high and low endurance performance hockey players in relation to their skin fold measurements and body composition

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### Abstract

The study highlights the comparison between skin fold and body composition of low and high endurance performance hockey players. The study consisted of 30 high and 30 low endurance hockey players selected as subjects, data was collected through standardized Instruments and after collection of data mean, Standard deviation and t-ratio was used. The results of the study shows that high level endurance performance players found to possess lesser amount of thickness of biceps, triceps, thigh, calf and equal amount of thickness of sub-scapular, supra-illiac skin fold as compared to low endurance performance hockey players. Further, it reveals that high endurance performance hockey players have more body density, fat weight lean body mass and less percentage fat as compared to the low endurance performance hockey players.

**Keywords:** Anthropometry, Endurance, Skin fold measurement, Body composition.

### Introduction

Physical education and sports area is becoming more competitive and innovative with the help of science and technology. The physical educationists and scientists are working hard to develop suitable methods & techniques to enhance the level of performance. The large numbers of young people are coming in contact with scientific coaching & training for better performance in games and sports instead of orthodox methods. Modern coaching methods are improved by the application of results of research in all the allied sciences such as Anthropometry, Biomechanics, and Physiology of exercise, Sports medicine and Sports psychology. Therefore better performance can be achieved with the combined efforts of sports persons, coaches, scientists & Psychologists etc.

Maya (2007) [3]. on the basis of her main findings explained that higher level female volleyball players appeared to be older in age taller in height, having better arm and leg length, body weight skin fold and diameters etc. on the basis of her results she state that the general trend of improvement of overall volleyball performance of higher level volley ball players from inter college to intervarsity and state to national. This gradual increase shows that high level players have better creative their being concepts and adjustments according to the higher level of competition. Further, her results also reveals that high level female volleyball players belonging to national, interuniversity had more conditioned body and physiological parameters like good and controlled blood pressure, better respiratory rate and breath holding, Which are contributing factors in their physiological, physical fitness than the lower groups.

Anthropometry consists of making external measurements of human body and the relation of these external measurements can be used up rise of the body built, nutritional status and postures, Meyers [4]. 1974.

Donald (1974) [2]. Anthropometric variables are the dimensions of the structure of human body taken at specific sites to give measure of length, width and girth.

Skin fold is a fold consisting of two layers of skin and subcutaneous structure, which can be picked up with the help of thumb. The thickness of the fold will depend on the amount of stored fat and can be measured with an instrument called Skin fold caliper.

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The body composition generally refers to the type and amount of tissues, which make up the body. The most accepted model is two components scale- lean body mass and fat body weight.

**Material and Methods**

To find out the appropriate results of the study 30 low and 30 high endurance performance male hockey players were selected as sample of the study (age 14-17 years). Various anthropometrics measurements like skin fold measurements at different sites (i.e. biceps, triceps, suprailliac, thigh and calf skin fold) were taken by skin fold caliper and weight was taken as per the techniques of Weiner and louries (1969). Body density obtained from the formula given by Dernin and Reliman’s equation(1967), Percentage of body fat was estimated by applying the formula of Siri’s(1956), Fat weight was calculated by the formula of Durnin and Reliman and lean body mass was estimated by using again Durnin and Reliman’s formula. William Yoest (2008) concluded that age, height, lean body mass and body surface area did not significantly limit performance in Ohio State University Step Test. However, body composition representing body fat

limited the performance of college men only. In adolescence scores in the step test improved longer percentage of lean body tissue.

Sady *et al.* (2006) compared the body composition and physical dimensions of 23 young, experienced wrestlers with 23 school children. Standard densitometry and anthropometric techniques of each group. The wrestlers were 4 kg. Lighter (P 0.05) and had a smaller per cent fat than the comparison, group 13.3±0.6% and 20.0+ 1.13% respectively). The weight difference between groups was due to the larger fat weight of the comparison group since lean weight differed by only 0.8 kg. Fat differences were circumferences of the composition group, were noted in diameters. It was concluded that compared to other children, young experienced wrestlers had similar skeletal structures and lean body weight. The comparison group possessed more body fat.

**Statistical Design**

In order to achieve the objective of the present study, the investigator has applied t-test to made comparison between low and high endurance performance hockey players.

**Table 1:** Mean Scores, SD, SED and t-ratio of skin fold measurement of low and high endurance performance hockey players.

S. No.	Variables	High		Low		Sed	t-ratio
		Mean (mm.)	S.D	Mean (mm.)	S.D		
1.	Biceps	4.03	1.45	4.77	1.52	0.27	2.71*
2.	Triceps	5.57	1.43	6.4	1.8	0.29	2.86*
3.	Subscapular	5.3	1.07	5.77	2.19	0.31	1.49
4.	Suprailliac	4.77	1.84	5.07	1.67	0.32	0.94
5.	Thigh	8.00	2.07	9.47	2.28	0.39	3.69*
6.	Calf	6.3	1.57	7.53	1.96	0.33	3.79*

\*Significant at 0.05, Level of Confidence = 2.00.

\*\*Significant at 0.01, Level of Confidence = 2.66

Table No. 1 sr. No. 1 depicts the mean scores and standard deviations of skin fold measurements of high and low endurance performance of hockey players. The mean score of biceps of high performance players is 4.03 mm. and SD 1.45 and the mean score of low endurance performance of hockey players is 4.77 and SD 1.52. The t-ratio 2.71, which is significant at 0.01 level of confidence. It means that there is significant difference between the thicknesses of biceps of high and low endurance performance of hockey players.

Table No. 1 Sr. No. 2 depicts that the mean score of triceps of high endurance performance players is 5.57mm SD. 1.43 and the mean score of low endurance of hockey players is 6.4 mm SD 1.8. The t-ratio is 2.86, which is significant at both the level of confidence. It means that there exists significant difference between the thickness of triceps of high and low endurance performance of hockey players.

Table No. 1 Sr. No. 3 shows that the mean score of sub-scapular skin fold of high performance players is 5.3mm. SD 1.07 and the mean score of low endurance of hockey players is 5.77mm SD 2.17. The t-ratio is 1.49, which is not significant at both the levels of confidence. It means there is no significant difference between thicknesses of sub scapular

of high and low endurance performance of hockey players.

Table No. 1 Sr. No. 4 depicts that the mean scores of supra-iliac skin fold high performance players is 4.77mm SD 1.84 and the mean score of low endurance performance of hockey players is 5.07mm SD 1.67. The t-ratio is 0.94, which is not significant. It means there is no significant difference between the thicknesses of supra-iliac of high and low endurance performance of hockey players.

Table No. 1 Sr. No. 5 reveals that the mean score of thigh skin fold high performance players is 6.3mm SD 1.57 and the mean score of low endurance of hockey players is 7.53 mm. and SD 1.96. The t-ratio is 3.69, which is significant at both level of confidence. It means that there is significance difference between the thicknesses of thigh skin fold of high and low endurance performance of hockey players.

Table No. 1 Sr. no 6 shows that the mean score of calf skin fold of high performance players is 6.3mm. SD is 1.57 & the mean score of low endurance of hockey players is 7.5mm .SD 1.96. The t-ratio is 3.79, which is significant at both the levels of confidence. It means there is significant difference between the thicknesses of calf skin fold of high and low endurance performance of hockey players.

**Table 2:** Mean Scores, SD, SED and t-ratio of Body Composition scores of High and Low endurance performance hockey players.

S. No.	Variables	High		Low		Sed	t-ratio
		Mean (mm.)	S.D	Mean (mm.)	S.D		
1.	Body Density	1.07	.007	1.06	.008	.001	3.00**
2.	Fat Percentage	12.25	2.743	13.55	3.24	0.55	2.39*
3.	Fat Weight	5.99	1.77	5.46	1.88	0.33	1.60
4.	Lean Body Mass	42.72	6.41	34.59	5.89	1.12	7.24**

\*Significant at 0.05, Level of Confidence = 2.00.

\*\*Significant at 0.01, Level of Confidence = 2.66

Table No. 2 sr. No. 1 depicts the mean scores and standard deviations of body composition variables of high and low endurance performance of hockey players. The mean score of body density of high performance players is 1.07 mm. and SD .007 and the mean score of low endurance performance of hockey players is 1.06mm. And SD. 008. The t-ratio 3.00, which is significant at both level of confidence. It means that there is significant difference between the measurements of body density of high and low endurance performance of hockey players.

Sr. No. 2 reveals that the mean score of fat percentage of high endurance performance players is 12.25 mm, SD. 2.74 and the mean score of low endurance of hockey players is 13.55 mm. and SD 3.24. The t-ratio is 2.39, which is significant at 0.05 level of confidence. It means that there exists significant difference between the fat percentage of high and low endurance performance of hockey players.

Sr. No. 3 shows that the mean score of fat weight of high performance players is 5.99kg SD 1.77 and the mean score of low endurance of hockey players is 5.46kg SD 1.88. The t-ratio is 1.60, which is not significant at both the levels of confidence. It means there is no significant difference between fat weights of high and low endurance performance of hockey players.

Sr. No. 4 depicts that the mean scores of lean body mass of high performance players is 42.72kg SD 6.41 and the mean score of low endurance performance of hockey players is 34.59kg SD 5.89. The t-ratio is 7.24, which is significant at both the levels of confidence. It means there is a significant difference between the mean scores of lean body mass of high and low endurance performance of hockey players.

### Findings & Conclusions

From the analysis of data, it is evident that skin fold measurements of biceps, triceps and thigh of the high endurance performance of hockey players have less thickness as compared to the low endurance performance hockey players. It implies that the high level endurance performance players have less thickness as compared to the low performance players. It is because of high level endurance players have more experience and playing from last four to five years and also well trained but low endurance performance hockey players are new and less practice experience than high performance players and less thickness of skin fold of high performance of the players.

Further, it is found that body composition of the high endurance performance hockey players are found to possess more body density, fat weight and lean body mass as compared to low endurance performance hockey players and the percentage fat is less in high endurance performance players. It implies that the high endurance hockey players have less percentage fat as compared to low endurance performance hockey players.

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