

Research Paper

A COMPARATIVE STUDY ON AEROBIC AND ANAEROBIC CAPACITY OF HAND BALL PLAYERS

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ABSTRACT

The purpose of the study was to compare aerobic and anaerobic capacity of handball players. 120 handball players in which 40 national level, 40 state level and 40 district level players were taken for the study. To evaluate aerobic capacity of handball players Cooper's 12 minutes run/walk test was administered to entire sample. To find out the anaerobic capacity of handball players Sargent jump was selected. To compare handball players (national, state and district) statistical technique one-way analysis of variance has been administered. Result found that the national players have shown more aerobic capacity as compare to district and state level players beyond .01 level of significant. National level players once again showed more anaerobic capacity compare to other groups at .01 level.

INTRODUCTION:

Handball, a popular game throughout the world, was introduced in Germany by a gymnastics teacher, Max Heiser, in 1917. The game was primarily devised for girls and played 11-a-side on a football field. There are, however, authentic reports of a similar game, "Hand-bald" being played in Denmark as early as 1904.

The growing popularity of handball is not only due to the fact that it is a healthy competitive sport, but also due to the simple rules and even simpler equipment needed: a ball, two goals and a small playing field (not forgetting, of course, the seven players needed in a team.)

The aerobic or oxygen system releases energy for ATP production from the breakdown mainly of carbohydrates and fats, and sometimes of protein, to carbon-dioxide and water. Although the oxygen system yields by far the most ATP it requires several series of complex chemical reactions with carbohydrates, in the first series of reactions called aerobic glycolysis, glycogen is broken down to pyruvic acid; then in the Krebs cycle, carbon-dioxide is produced and electrons, in the form of hydrogen atoms, are removed. In the final series of reactions, hydrogen atoms (electrons) are "transported" to the oxygen we breathe, water is formed, and ATP is synthesized.

Overall performance capacity of an athlete depends upon the optimum utilization of the aerobic and anaerobic phases of energy metabolism. Energy for short sprint type activities, such as the 100 yard dash, can be derived exclusively via anaerobic routes. Extended activities, such as distances running, must have energy provided primarily via aerobic routes because of their higher efficiency and because of the necessity of preventing the lactic acid accumulation of anaerobic glycolysis. The relative roles played by the two systems depend upon the amount of oxygen supplied to the cell.

Even though physical performance is evaluated in terms of body composition, aerobic, anaerobic capacity and physiological suppleness, these qualities depend upon the

capacity of the organism to manage the energy required for working under continuous supply of oxygen for energy metabolism or energy metabolism with delayed supply of oxygen during recovery stage and certain conditions of neural transmission. The capacity for prolonged physiological functioning demanding cardio-vascular endurance depend upon aerobic capacity i.e. energy metabolism under continuous supply of oxygen to the organism. Intensive burst of activities i.e. executing high load work with explosive action and of short duration of item, such as, kicking the football faster and for explosive take-off in jumps, throwing and implement etc., depend upon the anaerobic capacity i.e. efficiency in energy production in the absence of oxygen supply, through the oxygen would be taken up later during the recovery period after the cessation of activity.

Thus, it was hypothesized that handball players represented in national, state and district level tournament will show significant difference on aerobic and anaerobic capacity. For the testing of above hypothesis following methodology has been adopted.

METHODOLOGY

To conduct the study following methodological steps has been taken into consideration:

Selection of Subjects

120 male handball players were selected for the purpose of this study. Among 120 male handball players 40 players each who had represented District, State and National level were selected. The age of the players were ranged between 18 to 26 years.

Measures

1. Aerobic Capacity

Aerobic capacity was measured by using Cooper's 12 minute run/walk test to the nearest 25 meters.

2. Anaerobic Capacity

Anaerobic Capacities was measured by using Sargent jump test to the nearest Centimeter.

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RESULT AND DISCUSSION

To collect the data 12 minutes Cooper's run/walk test and Sargent jump was administered to entire sample. The measurement of the test was recorded by the respective units. To compare handball players represented national, state and district level tournaments one way analysis of variance has been applied. Result presented below in table number 1.

TABLE - 1-ONE WAY ANALYSIS OF VARIANCE FOR COOPER'S 12 MIN RUN/WALK TEST (METERS) OF DIFFERENT LEVEL OF HANDBALL PLAYERS

S.O.V	DF	SS	MSS	F- Ratio	Required F - Ratio
Between Group	2	5231885.43	2615942.72	40.21*	3.08
Within Group	117	7611859.37	65058.63		

*Significant at 0.05 level of confidence.

In table number 1, comparison on aerobic capacity (Cooper's 12 minutes run/walk test) among national, state and district level handball players has been reported. Result found that 'F' ratio 40.21 found to be statistically significant beyond .01 level. Thus it can be said that handball players represented national, state and district level tournaments has been found significantly differ on aerobic capacity with each other. Above mention 'F' ratio shown that handball players represented national, state and district level tournament has been found to be significantly differ but this 'F' ratio not shown actually which two groups have significantly differ with each other. For this post HOC test of significance has been administered and result presented in table number 2.

Table - 2-L. s. d. Post- HOC Test of Significance for COOPER'S 12 MIN. RUN/WALK TEST (METERS) OF DIFFERENT LEVEL OF HANDBALL PLAYERS

BETWEEN GROUPS	DISTRICT LEVEL	STATE LEVEL	NATIONAL LEVEL	M. D.	C. D.
	2219.38	2275.00		55.62	112.98
			2687.50	468.12*	
		2275.00	2687.50	412.50*	

*Significant at 0.05 level of confidence.

Above mentioned table reported that the district level handball players have covered 2219.38 meter distance from allotted 12 minutes. State level handball players have covered 2275 meter and national level handball players have covered 2687.50 meter distance from their allotted time. After the examination of above mentioned table it was found that state level handball players and national level handball players (412.50) have been differ significantly from each other. District and national level handball players also found significantly differ (468.12) with each other. But district level and state level handball players not shown any significant difference with each other.

To compare anaerobic capacity of handball players Sargent jump has been taken for the study. To compare state, national and district level handball players on anaerobic capacity one way analysis of variance was administered and result presented in table number 3.

Result presented in table number 3, showed that the 'F' ratio 15.96 has been found to be statistical significant. Thus it can be said that the handball players represented national, district and state level tournament have found significantly differ on anaerobic capacity.

TABLE - 3-ONE WAY ANALYSIS OF VARIANCE FOR SARGENT JUMP (CENTIMETRES) OF DIFFERENT LEVEL OF HANDBALL PLAYERS

S.O.V	DF	SS	MSS	F- Ratio	Required F - Ratio
Between Group	2	708.87	354.44	15.96*	3.08
Within Group	117	2598.60	22.21		

*Significant at 0.05 level of confidence.

From above mentioned table it can be said that handball players represented national, state and district level tournament have shown significant difference with each other, but actually which two groups have shown significant difference not found from above table. For this purpose post HOC test of significance has been applied and result reported in table number 4.

Table - 4-L. s. d. Post- HOC Test of Significance for SARGENT JUMP (CENTIMETRES) OF DIFFERENT LEVEL OF HANDBALL PLAYERS

BETWEEN GROUPS	DISTRICT LEVEL	STATE LEVEL	NATIONAL LEVEL	M. D.	C. D.
	40.05	41.10		1.05	2.08
			45.65	5.60*	
		41.10	45.65	4.55*	

*Significant at 0.05 level of confidence.

Anaerobic capacity was measured by Sargent jump. From the table number 4, it was found that the mean of district level handball players is 40.05, the mean of state level handball players is 41.10 and the mean of national level handball players is 45.65. Above mentioned result shown that district level and national level handball players have found to be significantly differ (5.60) with each other. State level and national level handball players also found significantly differ 4.55 with each other. District and state level handball players have not shown any significant difference with each other.

CONCLUSIONS:

Within the limitations of the present study the following conclusions were drawn:

1. The national level handball players have shown more aerobic capacity than the state and district level players.
2. The national level handball players have found superior on anaerobic capacity compare to district and state level players.

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