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Research Article

Effect of anaerobic interval exercises on selected biomotor and physiological variables among Hockey players

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■ **ABSTRACT**

There are different sports training that aim at improving sports performance through physical, physiological, psychological, social, intellectual and moral aspects thus contributing to development of all-round personality of the sports person. Researchers have proved the need for both high and low-intensity activities is more efficient to ensure the reduction of a greater number of cardiac risk variables, especially for games like Hockey. To find out the effect of anaerobic interval training, the investigator selected 40 intercollegiate level Hockey players which were randomly divided into two groups. One group formed the experimental group and the other group was control group. The experimental group was given anaerobic interval training for six weeks, consisting of speed endurance exercises, fartlek exercises, sprint intervals and stair stepper exercises and the control group was not provided with any experimental treatment. Initial scores on selected bio motor variables, agility and cardio-vascular endurance, physiological variables, resting pulse rate and vital capacity of the subjects were collected using standard tests. The results proved that six weeks anaerobic interval training significantly improved bio motor and physiological variables. It was concluded that anaerobic interval exercises can be imparted to intercollegiate level Hockey players.

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■ **Key Words :** Anaerobic interval training, Speed endurance exercises, Fartlek exercises, Sprint intervals and stair stepper exercises biomotor variables, Agility, Cardio-vascular endurance, Physiological variables, Resting pulse rate, Vital capacity

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Researches have proved that interval workouts are proven to be the fastest, most time-effective way of getting faster. Intervals raise the lactate threshold, improve lactate clearance and lactate tolerance, improve sustained power, and can raise the muscle oxygen consumption (VO_2-max), vastly improving the speed. Athletes often incorporate anaerobic training into their routines to increase the performance. When trained at high levels of intensity, there was increase in anaerobic threshold, which means one can work harder for longer periods of time, all while burning more calories. For this, one should be an experienced exerciser before trying anaerobic training. A beginner wants to work up to anaerobic intervals and stay in his target heart rate zone. And advanced players must add short bursts of high intensity exercise to one or two workouts, a week to boost endurance and burn calories.

Billat (2001) reported that studies of anaerobic interval training can be divided into 2 categories. The first category (the older studies) examined interval training at a fixed work-rate. The second category (the more recent studies) asked the participants to repeat maximal bouts with different pause durations (30 seconds to 4 to 5 minutes). These studies examined the changes in maximal dynamic power during successive exercise periods and characterised the associated metabolic changes in muscle. The studies on the long term physiological effect of supramaximal intermittent exercise have demonstrated an improvement in VO_2 max or running economy. Moreira *et al.* (2008) found an exercise programme that

includes both high and low-intensity activities is more efficient to ensure the reduction of a greater number of cardiac risk variables. Kiviniemi *et al.* (2007) found that cardio-respiratory fitness can be improved effectively by using heart rate variability for daily training prescription.

In view of the above and similar research findings, the research question posed by the investigator in this study, was whether anaerobic interval training could be successfully used for the improvement of biomotor and physiological levels of intercollegiate level Hockey players, which warrants high level of speed, agility, cardiorespiratory fitness and physiological fitness.

The purpose of this study was to find out the effect of anaerobic interval exercises on selected biomotor and physiological variables among intercollegiate Hockey players.

■ METHODOLOGY

Pre and post-test random group research design was followed in this study. The selected subjects, 40 intercollegiate level Hockey players were randomly divided into two groups. One group formed experimental group and the other group was control group. The experimental group was given anaerobic interval training for six weeks, consisting of speed endurance exercises, fartlek exercises, sprint intervals and stair stepper exercises and the control group was not provided with any experimental treatment. Initial scores on selected bio motor variables, agility and cardio-vascular endurance, physiological variables, resting pulse rate and vital capacity of the subjects were collected using standard tests. After the experimental period of six weeks, the subjects were again tested on selected. The difference between initial and final scores formed the effect of anaerobic interval training on selected criterion variables. The obtained data were subjected to statistical analysis using Analysis of Covariance (ANCOVA).

■ OBSERVATIONS AND DISCUSSION

The results presented in Table 1 and Fig. 1 proved that six weeks interval anaerobic exercises significantly improved the bio motor variable agility and cardiovascular endurance. The results presented in Table 2 and Fig. 2 proved that six weeks interval anaerobic exercises significantly improved the physiological variables vital capacity and resting pulse rate. In this study, the anaerobic interval exercises, namely, speed endurance exercises, fartlek exercises, sprint intervals and stair stepper were given for six weeks. The number of repetitions the individual was able to sustain for different pause durations and the intensities used in this study, enabled the experimental group subjects to absorb the changes in maximal dynamic power during successive exercise periods which resulted in associated metabolic changes in muscle, which resulted the experimental group to improve the bio motor ability agility and cardio-vascular endurance and altered physiological variables vital capacity and resting pulse rate, significantly than the control group which was not provided with these anaerobic interval exercises. The results of this study is in agreement with the findings of Harris *et al.* (2008), Ingle *et al.*

Table 1: Results of analysis of covariance on the bio motor variables between experimental and control groups

	Experimental group	Control group	Source of variance	Sum of squares	df	Mean squares	Obtained F
Agility							
Pre-test mean	10.90	10.75	Between	0.2	1	0.20	1.04
Std. Dev.	0.47	0.42	Within	7.5	38	0.20	
Post -test mean	10.77	10.80	Between	0.0	1	0.01	0.03
Std. Dev.	0.53	0.41	Within	8.5	38	0.22	
Adjusted post -test mean	7.23	7.40	Between	0.3	1	0.27	6.24*
			Within	1.6	37	0.04	
Mean diff.	0.12	0.05					
Cardio-vascular endurance							
Pre-test mean	1886.8	1871.3	Between	2402.5	1	2402.5	0.1
Std. Dev.	131.4	127.8	Within	638307.5	38	16797.6	
Post -test mean	1976.8	1900.0	Between	58905.6	1	58905.6	5.1*
Std. Dev.	126.2	84.7	Within	438913.8	38	11550.4	
Adjusted post-test mean	1627.9	1559.7	Between	46368.0	1	46368.0	7.0*
			Within	245694.1	37	6640.4	
Mean diff.	90.0	28.8					

Table F-ratio at 0.05 level of confidence for 1 and 38 (df) =4.01, 1 and 37(df) =4.01 . * Indicate significane of values at P=0.05, respectively

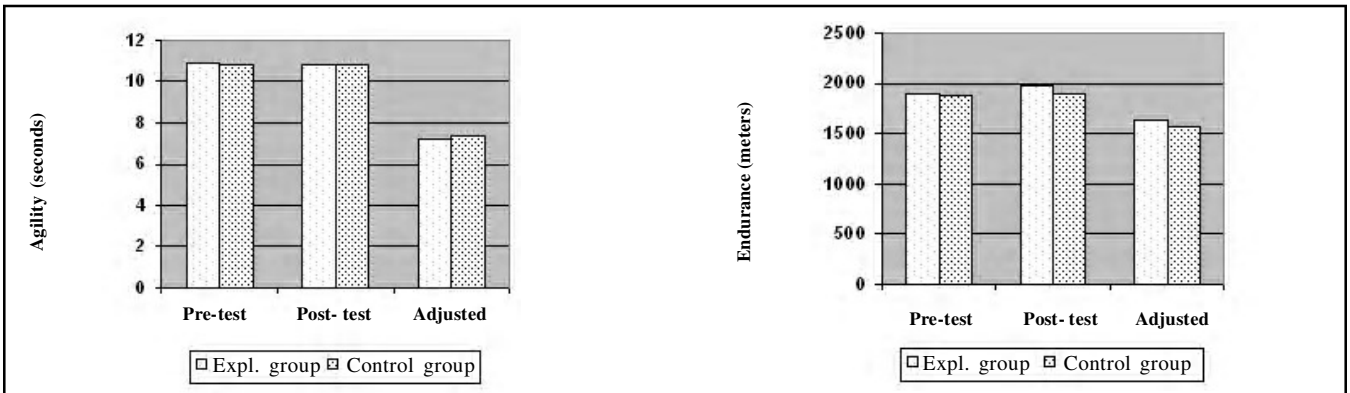

Fig. 1 : Treatment effects on different stages

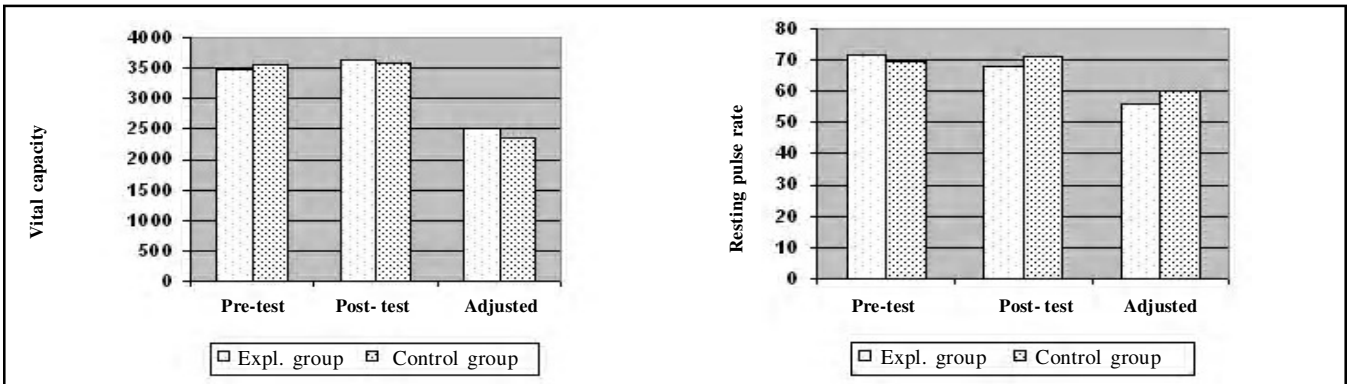

Fig. 2 : Treatment effects on different stages

Table 2: Results of analysis of covariance on the physiological variables between experimental and control groups

	Experimental group	Control group	Source of variance	Sum of squares	df	Mean squares	Obtained F
Vital capacity							
Pre-test mean	3470.00	3557.50	Between	76562.5	1	76562.50	
Std. Dev.	452.89	455.46	Within	7838375.0	38	206273.03	0.37
Post-test mean	3636.25	3570.50	Between	43230.6	1	43230.63	
Std. Dev.	475.00	444.67	Within	8043738.8	38	211677.34	0.20
Adjusted post-test mean	2504.68	2351.11	Between	233543.7	1	233543.73	
			Within	148661.6	37	4017.88	58.13*
Mean diff.	166.25	13.00					
Resting pulse rate							
Pre-test mean	71.40	69.40	Between	40.0	1	40.00	
Std. Dev.	1.54	2.26	Within	141.6	38	3.73	10.73*
Post-test mean	67.80	70.90	Between	96.1	1	96.10	
Std. Dev.	2.59	2.65	Within	261.0	38	6.87	13.99*
Adjusted post-test mean	55.98	60.05	Between	128.9	1	128.92	
			Within	228.0	37	6.16	20.92*
Mean diff.	-3.60	1.50					

Table F-ratio at 0.05 level of confidence for 1 and 38 (df) =4.01, 1 and 37(df) =4.01 . * Indicate significance of values at P=0.05, respectively

(2006) and Thompson *et al.* (2007) who found functional training programme resulting in significant improvements in speed and several components of functional fitness. The anaerobic interval training would thus, increase the power out put and oxygen consumption and as documented by Vogler *et al.* (2007) and Fry (2004), these contribute to the increased performance, improved vital capacity and stabilized resting pulse rate among the experimental group.

Conclusion :

The anaerobic interval exercise intensities cannot be described as maximal. This interval training performed above the minimal velocity associated with VO_2 max. The muscular endurance, maximal oxygen consumption (VO_2max), muscular power, improved with anaerobic interval exercise training however, agility, cardio-vascular endurance, vital capacity and resting pulse rate showed a significant improvement in this study. Hence, Hockey players of intercollegiate level can be safely underwent anaerobic interval exercises whenever necessary.

■ REFERENCES

Billat, L.V. (2001). Interval training for performance: a scientific and empirical practice. Special recommendations for middle- and long-distance running. Part II: anaerobic interval training. *Sports Med.*, **31**(2):75-90

Fry, A.C. (2004). The role of resistance exercise intensity on muscle fibre adaptations. *Sports Med.,* **34**(10):663-679.

Harris, N.K. (2008). Squat jump training at maximal power loads vs. heavy loads: effect on sprint ability. *J. Strength Cond. Res.,* **22**(6):1742-1749.

Ingle, L. (2006). The effect of a complex training and detraining programme on selected strength and power variables in early pubertal boys. *J. Sports Sci.,* **24**(9):987-997.

Kiviniemi, A.M. (2007). Endurance training guided individually by daily heart rate variability measurements. *Eur. J. Appl. Physiol.,* **101**(6):743-751.

Moreira, M.M. (2008). Effects of aerobic and anaerobic exercise on cardiac risk variables in overweight adults. *Arq. Bras. Cardiol.*, **91**(4):200-206, 219-226.

Thompson, C.J. (2007). Functional training improves club head speed and functional fitness in older golfers. *J. Strength Cond. Res.,* **21**(1):131-137.

Vogler, A.J. (2007). Physiological responses to exercise on different models of the concept II rowing ergometer. *Internat J. Sports Physiol Perform.,* **2**(4):360-370.

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