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INFLUENCE OF CROSS TRAINING ON SELECTED BOI-MOTER ABILITIES AND PHYSIOLOGICAL VARIABLES AMONG HOCKEY PLAYERS

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ABSTRACT

The purpose of the study was to find out the Influence of cross training on selected boi-motor abilities and physiological variables among hockey players. To achieve the purpose of the present study, thirty hockey players those who are studying in intercollegiate hockey players, India were selected as subjects at random and their ages ranged from 18 to 25 years. The subjects were divided into two equal groups of fifteen subjects each. Group I acted as Experimental Group I (cross training), and Group II acted as Control Group. The duration of experimental period was 6 weeks. Analysis of Covariance (ANCOVA) and scheffe's post hoc test was used. Consisting of Jumping jacks, high knees, lunges, butt kicks, burpees, plank, skaters, legs down, skiers and the control group was not provided with any investigational treatment. Initial scores on selected bio-motor, physiological variables, abdominal strength endurance, resting hart rate of the subjects were collected using standard tests. The results proved those six weeks cross training significantly improved bio-motor, physiological variables. It was concluded that cross training can be imparted to intercollegiate level hockey players.

Key words: Training, Jumping, High knees, Lunges, Butt kicks, Burpees, Plank, Skaters, Skiers.

1. INTRODUCTION

Researchers have proved that adding an alternative mode of Cross-training in sports and fitness involves combining exercises to work various parts of the body. Often one particular activity works certain muscle groups, but not others; cross-training aims to eliminate this imbalance.

Cross training is a concept that allows for higher volumes of training without overtraining specific tissues of the body. Repeatedly performing the same movement increases one's risk for overtraining and developing muscular imbalances. Cross training can assist in significantly boosting running performance by reducing running injuries, increasing running efficiency, increasing caloric expenditure, and even improving the body's ability to regulate temperature during training and racing.

In contrast, if cross training is not executed properly, it may hurt performance or the runner themselves by increasing their vulnerability to injury or infection. The greater volume of endurance training also results in a larger volume of plasma retained in the blood. This increased blood volume further enhances the capacity to deliver oxygen to working muscles. Additionally, the increased extra cellular fluid associated with larger plasma volume can be used to help regulate body temperature during intense training by increasing the body's evaporative cooling potential. The increased blood volume will also help preserve hydration during training and racing.

Cross-training effects never exceed those induced by the sport-specific training mode. The principles of specificity of training tend to have greater significance, especially for highly trained athletes. For the general population, cross-training may be highly beneficial in terms of overall fitness. Similarly, cross-training may be an appropriate supplement during rehabilitation periods from physical injury and during periods of overtraining (**Tanaka, 2012).** .

Quinn (2019) explained that cross-training is simply a training routine that involves several different types of exercise. This works more muscle groups, improves agility, and makes it easier to participate in a variety of recreational sports, like skiing. In addition, cross-training reduces exercise boredom, which many people find helps to keep them motivated.

All types of sports decreased the RHR. However, only endurance training and yoga significantly decreased the RHR in both sexes. The exercise-induced decreases of RHR were positively related with the pre-interventional RHR and negatively with the average age of the participants. From this, we can conclude that exercise—especially endurance training and yoga—decreases RHR. This effect may contribute to a reduction in all-cause mortality due to regular exercise or sports **(Reimers, Knapp, and Reimers, 2018)**

Fitness and strength come in many different forms, so mixing and matching your exercises will help improve power and efficiency, by mixing a variety of cardio, strength and stretching into your workout regime you'll be working a mix of muscles and ensuring overall fitness **(https://www.coachmag.co.uk/fitness/7028/five-benefits-of-cross-training)**

The cross training contribute to the increased performance, It Improves Your fitness, prevent injury, It improves posture and co-ordination, It boosts mental strength and recover faster among the experimental group **(Nick , 2020).**

2. METHODOLOGY

Pre and post-test random group research design was followed in this study. The selected subjects, 30 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 cross training for six weeks, consisting of Jumping jacks, high knees, lunges,

butt kicks, burpees, plank, skaters, legs down, skiers and the control group was not provided with any experimental treatment. Initial scores on selected bio-motor and physiological variables, Abdominal Strength Endurance**,** Resting hart rate 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 cross training on selected criterion variables. The obtained data were subjected to statistical analysis using Analysis of Covariance (ANCOVA).

3. RESULTS

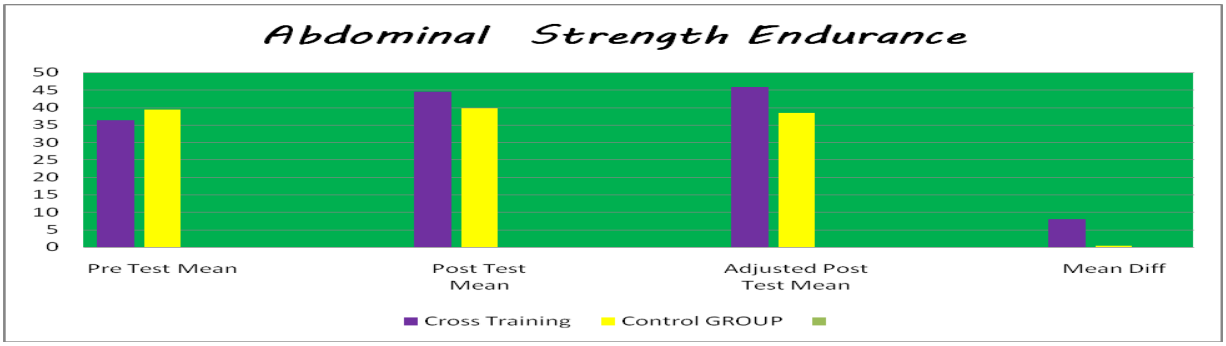

Fig.1 : Treatment effects on different stages

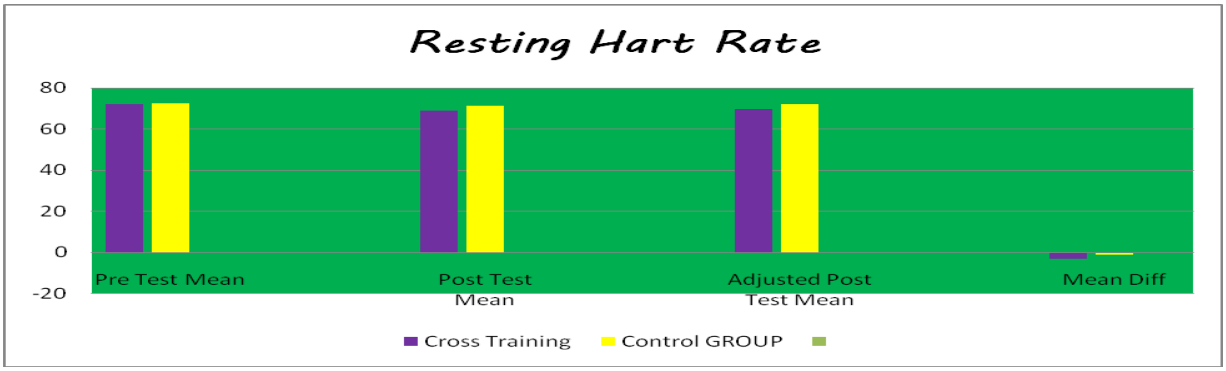

Fig.2 : Treatment effects on different stages

Table 1: Result of analysis of covariance on the bio-motor variables between Experimental and Control group - Abdominal strength endurance

	Cross Training	CONTROL GROUP	SOURCE OF VARIANCE	SUM OF SQUARES	df	MEAN SQUARES	OBTAINED F
Pre Test Mean	36.33	39.27	Between	64.53	1	64.53	2.38
			Within	760.27	28	27.15	
Post Test Mean	44.40	39.73	Between	163.33	1	163.33	5.48*
			Within	834.53	28	29.48	
Adjusted Post Test Mean	45.83	38.31	Between	391.16	1	391.16	92.54*
			Within	114.13	27	4.23	
Mean Diff	8.07	0.46					

Table 2: Result of analysis of covariance on the physiological variables between Experimental and Control group - Resting hart rate

	Cross Training	CONTROL GROUP	SOURCE OF VARIANCE	SUM OF SQUARES	df	MEAN SQUARES	OBTAINED F
Pre Test Mean	72.19	72.31	Between	0.30	1	0.30	0.412
			Within	20.4	28	0.729	
Post Test Mean	69.07	71.24	Between	17.63	1	17.63	21.396*
			Within	23.07	28	0.824	
Adjusted Post Test Mean	69.81	72.07	Between	22.11	1	22.11	172.73*
			Within	3.46	27	0.128	
Mean Diff	-3.1	-1.07					

Table F-ratio at 0.05 level of confidence for 1 and 28 (df) =4.01, 1 and 27(df) =4.01 Indicate significance of values at P=0.05, respectively

4. DISSCUSSION

The results presented in Table 1 and 2 proved that six weeks interval cross training significantly improved the bio-motor and physiological variable Abdominal Strength Endurance**,** Resting hart rate. In this study, the cross training, namely, Jumping jacks, high knees, lunges, butt kicks, burpees, plank, skaters, legs down, Skiers 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 and physiological variables, Abdominal strength endurance**,** resting hart rate, significantly than the control group which was not provided with these cross training. The results of this study are in Agreement with the findings of **Harris et al. (2008).**

5. CONCLUSION

The results of this one study clearly indicated that cross training sessions with different work to rest ratios have different energy demands. The muscular power to develop anaerobic capacity, improved with cross training however, bio-motor, physiological, abdominal strength endurance, resting hart rate showed a significant improvement in this study. Hence, hockey players of intercollegiate level can be safely underwent cross training whenever needed.

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