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Effect of Aerobic and Anaerobic Interval Training on Selected Coordinative Ability among School Kho-Kho Players

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Abstract

The purpose of the study was to assess the effect of aerobic and anaerobic interval training on selected coordinative ability among school Kho-Kho players. To achieve the purpose of the study, forty five school level male Kho-Kho players were chosen as subjects. The age of the subjects were ranged from 15 to 18 years. The selected subjects were randomly assigned into three equal groups of 15 subjects each. Group-I underwent aerobic interval training, group-II underwent anaerobic interval training and group III acted as control. The period of treatment was 3 alternative days in a week for 12 weeks. The data were collected on coordinative ability (rhythmic ability) before and after training. The data collected from the three groups prior to and post experimentation were statistically analyzed to find out the significant difference if any, by applying Paired 'T' test and analysis of covariance (ANCOVA). When the obtained 'F' ratio value in adjusted post test mean was significant the Scheffe's test was applied as post hoc test. As a result of aerobic and anaerobic interval training the chosen coordinative ability (rhythmic ability) was considerably improved. However, anaerobic interval training was much better than aerobic interval training.

Keywords: Aerobic and anaerobic interval training, Coordinative ability and Kho-kho players.

Introduction

Kho-kho ranks as one of the most popular traditional sports in India. It is an amazingly complicated and strategic game. It is a game of speed, stamina, endurance, strength and skill. Dodging and controlled sprinting makes the game exciting. Kho-Kho is a game of the participants` physical fitness, strength, speed and stamina and dodging ability. As the level of performance increases the players attains high degree of physical fitness. The successful participation in any game is directly related to physical fitness. The physical fitness improves in those who take regular physical exercises. Regular participation in games significantly contributes to higher level of performance and greater degree of physical fitness amongst the players.

Interval method is perhaps the most versatile method for improving endurance of various types. In interval method, the exercise is done at relatively higher intensity with intervals of incomplete recovery. In interval method, work should be done with sufficient speed and duration so that the heart rate goes up to 180 beats per minutes. After this there should be a recovery period and when their heart rate comes down to 120-130 beats per minute the work should be started again. The training load in interval method can be controlled by repeatedly checking the heart rate. The effect of interval method is determined by the variable methods, they are as follow as: Speed of work, Duration of work, Duration of recovery, Number of repetitions and Nature of recovery (Singh, 1991).

The aerobic training holds a very conspicuous place in the field of training methods, because it is one of the most powerful methods that ensure and improve the health, endurance and so on. The objective of aerobic training is to develop the energy production system(s) to meet the demands of the event. For continuous exercise, ATP must be re-synthesized at the same rate as it is utilized. Aerobic training has been proved to be best training for endurance, especially so-called "interval-training" has been the subject of many pedagogic and medical paper (Kral, 1964). A sound basis of aerobic endurance is fundamental for all events (Gastin, 2001).
Anaerobic exercise is exercise intense enough to trigger anaerobic metabolism. It is used by athletes in non-endurance sports to promote strength, speed and power and by body builders to build muscle mass. Muscle energy systems trained using anaerobic exercise develop differently compared to aerobic exercise, leading to greater performance in short duration, high intensity activities, which last from mere seconds up to about 2 minutes.(Medbo & Burgers, 1990) Any activity after about two minutes will have a large aerobic metabolic component.

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Aerobic training has numerous health and fitness benefits that can result in improved performance in any sport. Regardless of the sport we play, aerobic training increases our ability to supply oxygen to the muscles and tissues. The focus of aerobic training is to progressively overload the cardio respiratory system and not the musculoskeletal system. Anaerobic exercise is used to build power and muscle mass. Anaerobic conditions leads to greater performance in short duration-high intensity activities. It involves exercise that is intense enough to trigger anaerobic metabolism. It increases the functional capacity for improvement of fitness and energy systems. The applicability of this method of training to improve the coordinative ability are not yet completely known. Consequently, the aim of the present study is to compare the aerobic and anaerobic interval training for differences in their effectiveness on coordinative ability of Kho-kho players.

Methodology

Selection of the Subjects

To achieve the purpose of the study, forty five male Kho-Kho players from various schools in Perampalur District, Tamilnadu state, India were selected as subjects. The age of the subjects ranged from 15 to 18 years. They were divided into three groups of fifteen subjects each. Group-I underwent aerobic interval training, group-II underwent anaerobic interval training and group-III acted as control.

Selection of Variables

In this experimental study aerobic and anaerobic interval training were selected as independent variables and the rhythmic ability was selected as dependent variable. The rhythmic ability was assessed by conducting rhythmic sprint test.

Training Programme

During the training period, the experimental groups underwent their respective training thee days per week for twelve weeks. The experimental group-I performed aerobic interval running and experimental group-II performed anaerobic interval training. The subjects of aerobic and anaerobic interval training groups performed proposed repetitions and sets, alternating with active recovery between repetition and complete rest between set based on work-rest ratio. The subject's training zone was computed using Karvonen formula and it was fixed at 65%HRmax to 90%HRmax for both aerobic and anaerobic interval training groups. The training intensity was progressively increased once in two weeks.

Statistical Technique

The data collected from the three groups prior to and post experimentation on selected dependent variable was statistically analyzed by applying paired 't' test and analysis of covariance (ANCOVA). Since three groups are involved, whenever the obtained 'F' ratio for adjusted post test means was found to be significant, the Scheffe's test is applied as post hoc test to determine the paired mean differences. In all the cases level of confidence was fixed at 0.05 for significance.

Result

The descriptive analysis of the collected data on rhythmic ability of experimental and control groups are presented in table-I.

Table 1
Descriptive Analysis of the Data on Rhythmic Ability

Variables	Group	Testing Period		Obtained 't' Ratio	Magnitude of Changes
		Pre test Mean &SD	Post test Mean & SD		
Rhythmic ability	Aerobic Interval	2.95±0.027	2.84 ±0.024	17.57*	3.61%
	Anaerobic Interval	2.94±0.025	2.74±0.0.23	24.15*	6.79%
	Control	2.94±0.029	2.95±0.030	0.65	0.18%

Table Value for 14 degrees of freedom is 2. 15
**Significant at 0.05 level of confidence*

Table 1 also shows that the obtained 't' values 17.57 and 24.15 respectively of the aerobic and anaerobic interval training groups on rhythmic ability are higher than the table value (2.15) required for significants at .05 level for 14 degrees of freedom. It exposed that significant mean differences existed between the pre and post test scores of aerobic as well as anaerobic interval training groups on rhythmic ability. Due to the effect of aerobic and anaerobic interval training 3.61% and 6.79% of changes on rhythmic ability was found.

The data collected during the pre and post test period among aerobic and anaerobic interval training groups and control group on rhythmic ability was statistically analyzed by analysis of covariance and the obtained results are presented in table –2.

Table 2
Analysis of Covariance on Coordinative Ability of Experimental and Control Groups

Variable	Aerobic Interval Group	Anaerobic Interval Group	Control Group	SoV	Sum of Squares	df	Mean Squares	Obtained 'F' ratio
Rhythmic ability	2.84	2.74	2.95	B	0.32	2	0.16	278.70*
				W	0.02	41	0.001	

The required table value for significance at 0.05 level of confidence with degrees of freedom 2 and 41 is 3.23.

The adjusted post-test means on rhythmic ability of aerobic interval, anaerobic interval training and control groups are 2.84, 2.74 and 2.95 respectively. The obtained 'F' ratio value of 278.70 of adjusted posttest data on rhythmic ability is greater than the table value of 3.23 required for significance at 0.05 level of confidence with degrees of freedom 2 and 41. The result of the study shows that, significant differences exist among the adjusted post-test means of aerobic interval, anaerobic interval training and control groups on rhythmic ability. Since the 'F' ratio was found to be significant, the Scheffe's post hoc test has been applied to find out the significant paired mean differences, and it is presented in table 3.

Table 3
Scheffe's Test for the Differences between the Adjusted Post Test Paired Means on Coordinative Ability

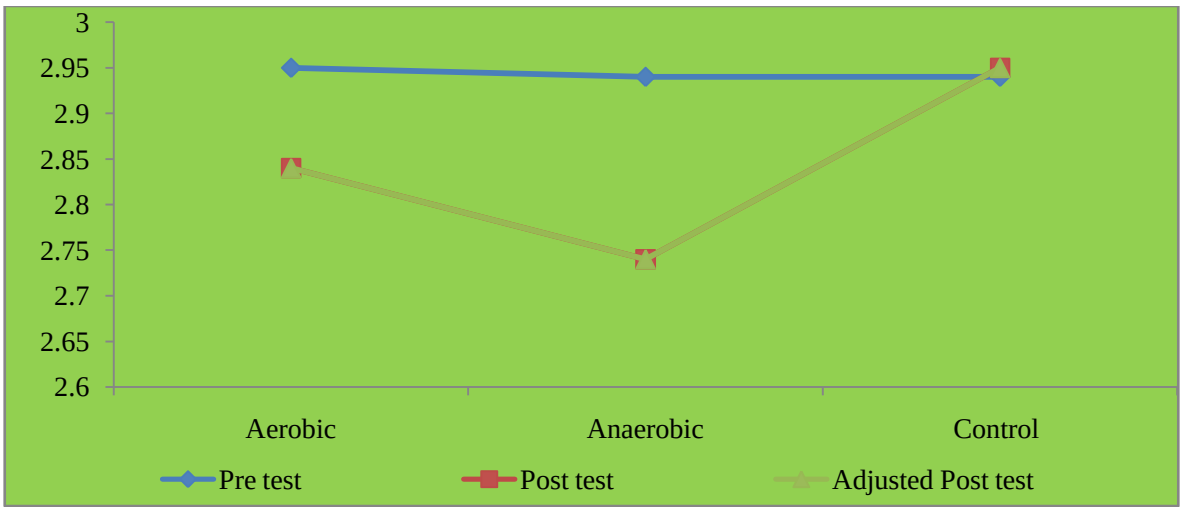
Variable	Adjusted Post Test Mean			Mean Differences	Confidence Interval
	Aerobic Interval Group	Anaerobic Interval Group	Control Group		
Rhythmic ability	2.84	2.74		0.10*	0.03
	2.84		2.95	0.11*	0.03
		2.74	2.95	0.21*	0.03

**Significant at .05 level.*

Table-III shows that the adjusted post test mean differences between aerobic and anaerobic interval training groups, aerobic interval training and control groups, and anaerobic interval training and control groups on rhythmic ability are 0.10, 0.11 and 0.21 respectively. The values are greater than the confidence interval value 0.03, which shows significant difference at .05 level of confidence.

It reveals that both aerobic and anaerobic interval training groups have significantly improved the rhythmic ability of the kho-kho players. However, anaerobic interval training was significantly better than aerobic interval training in improving rhythmic ability.

Figure I
Diagram showing the Adjusted Post Test Mean Values of Experimental and Control Groups on Rhythmic Ability



Discussion

Coordinative abilities are important for all the activities and are optimally developed in childhood (Bos, 2001). Coordination can be defined as the ability of fast and exact control and regulation of movements, it denotes body mind relationship. Participation in physical activity is very important to increase the coordinative abilities. Coordination is often used as an indicator of objective motor behaviour, since it contributes strongly to the explanation of total motor performance (Mechling, 1999).

Sebastian and Srinivasan (2016) concluded that the space orientation ability is the most dominating variable for kho-kho players. Bisht and Mardikar (2017) found significant difference among the sportsmen of semi-contact and non-contact sports in relation to differentiation ability. Shantanu (2016) found significant difference between cricket players and softball players on the sub variables i.e. reaction ability, orientation ability and differentiation ability. Simrat, *et al*., (2015) examined coordinative abilities of volleyball players. The results showed that the state level volleyball players had significantly better rhythmic ability than the district level volleyball players. Hence, in order to maintain optimal training levels and take advantage of the potential benefits, it is suggested that aerobic and anaerobic interval training sessions not be missed by the Kho-kho players.

Conclusion

As a result of aerobic and anaerobic interval training the rhythmic ability was considerably improved. However, anaerobic interval training was much better than aerobic interval training. In improving rhythmic ability 3.63% and 6.79% of improvement were found in aerobic and anaerobic interval training groups.

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