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## Effects of aerobic, anaerobic and co-ordination training on selected skills in college level men field hockey players

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### Abstract

Aerobic exercise is an important component in the development and maintenance of fitness. Aerobic fitness reduces the body fat and risk of disease and promotes weight loss. However, there is a controversy regarding the "optimal exercise" technique. In the past, most individuals have been taught to exercise aerobically at the constant percentage of their Heart Rate Reserve (HRR) or Maximal Oxygen intake (VO<sub>2</sub> max). However, recent research suggests that Intermittent Training (IT) may offer some advantages when compared to the Continuous Training (CT) exercise. IT (Intermittent Training) features short bout of either Aerobic or Anaerobic exercise interspersed with short periods of rest. The purpose of the study was to find out the effects of aerobic, anaerobic and co-ordination training on selected skills in college level men field hockey players. To fulfill the purpose of the study, the male Hockey players from Adhiyamaan College of Engineering, Perumal Maniyammai Engineering College and M.G.R Arts & Science College were asked to assemble in a hall. The Researcher explained the proposed research work, nature of the study and subjects involved. All the players volunteered to serve as subjects out of which 80 eighty (N=80) hockey players were selected at random and their age ranged between 18 and 25 years. The subjects were segregated into four equal groups consist of 20 each by adopting random procedure. The researcher did not make any attempt to equate the groups. Three groups served as the experimental groups and one as control group. The experimental group - I underwent Aerobic training and the experimental group-II underwent anaerobic training and the experimental group-III underwent co-ordination training for the period of 12 weeks. At last, the control group did not undergo any training programme. The data was collected from the four groups on the selected variable criteria were analyzed with dependent t-test to find out the significant improvement if any, also used to analysis of covariance (ANCOVA) was also used to find out the significant difference if any, among the experimental groups after the training programs. Since, four groups were compared whenever they obtained F-ratio for the adjusted post- test was found to be significant, the scheffe's post-hoc test was used. The experimental groups namely, aerobic training group, anaerobic training group and co-ordination training group had significantly improved hockey skills, such as dribbling, hitting, pushing.

**Keywords:** Aerobic, anaerobic, co-ordination training

### Introduction

The exercise and rest periods may be as short as 30 seconds or as long as six minutes. IT (Intermittent Training) should not be confused with the traditional technique of interval training because interval training often emphasizes high-intensity Anaerobic activity, whereas intermittent training is primarily designed for the general public and may be Aerobic, Anaerobic or unspecified. In this context, the Researcher has made an attempt to find out the relative Effects of Aerobic, Anaerobic and Co-ordination training on Aerobic exercise is an important component in the development and maintenance of fitness. Aerobic fitness reduces the body fat and risk of disease and promotes weight loss. However, there is a controversy regarding the "optimal exercise" technique. In the past, most individuals have been taught to exercise aerobically at the constant percentage of their Heart Rate Reserve (HRR) or Maximal Oxygen intake (VO<sub>2</sub> max). However, recent research suggests that Intermittent Training (IT) may offer some advantages when compared to the Continuous Training (CT) exercise. IT (Intermittent Training) features short bout of either Aerobic or Anaerobic exercise interspersed with short periods of rest.

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The exercise and rest periods may be as short as 30 seconds or as long as six minutes. IT (Intermittent Training) should not be confused with the traditional technique of interval training because interval training often emphasizes high-intensity anaerobic activity, whereas intermittent training is primarily designed for the general public and may be aerobic, anaerobic or unspecified. In this context, the researcher has made an attempt to find out the relative effects of aerobic, anaerobic and co-ordination training on selected skills in the field hockey.

## Methodology

### Selection of subjects

To fulfill the purpose of the study, the male Hockey players from Adhiyamaan College of Engineering, Perumal Maniyammai Engineering College and M.G.R Arts & Science College were asked to assemble in a hall. The Researcher explained the proposed research work, nature of the study and subjects involved. All the players volunteered to serve as subjects out of which 80 (eighty) Hockey players were selected at random and their age ranged between 18 and 25 years. The subjects were segregated into four equal groups consist of 20 each by adopting random procedure.

### Selection of variables

To assess the change as a result of aerobic, anaerobic and co-ordination training over skills in the game of hockey. The following field hockey skill test were selected as criterion variables such as dribbling, hitting and pushing.

### Testing procedure

The researcher explained the purpose of the training programmes to the subjects who are participating in the study. For the collection of data, the researcher explained the procedure of the test for dribbling, hitting and pushing. The subject had a slanted warm – up prior to the test, they had

been familiarized with the test protocol.

### Training procedure

During the training period, the experimental groups underwent their respective training programme three days per week and selected skill training programme for two days per week over twelve weeks. The work lasts from 45 to 60 minutes tentatively including warming up and warming down periods. The training programmes were carried out on a 400 mts track during the morning hours. The subjects underwent the respective programmes as per the schedules under the supervision of the researcher. Attendance was maintained and calculated for all the training groups separately by dividing the total number of training sessions by the number of sessions they attended. All the subjects who are involved in the training programmes, were questioned about their health status throughout the training period.

### Statistical technique

The data collected from the four groups on the selected variable criteria were analyzed with dependent t-test to find out the significant improvement if any, also used to analysis of covariance (ANCOVA) was also used to find out the significant difference if any, among the experimental groups after the training programs. Since, four groups were compared whenever they obtained F-ratio for the adjusted post- test was found to be significant, the scheffe's post-hoc test was used. The level of significance was fixed at 0.05 level of confidence to test the hypotheses.

### Results and findings

The statistical analysis comparing the initial and final means of the effects of aerobic, anaerobic and co-ordination training on selected skills in field hockey of college level hockey players was presented in the following tables.

**Table 1:** Analysis of Covariance among Aerobic, Anaerobic, Co-Ordination Training and Control Group on Dribbling

Test	Aerobic training Group	Anaerobic training Group	Coordination Group	Control Group	Source of Variance	Df	Sum of Squares	Mean Square	F-ratio
Pre-test Mean	6.35	6.28	6.30	6.35	B.G	3	0.08	0.03	0.07
					W.G	76	29.54	0.39	
Post-test Mean	7.05	8.30	9.48	6.43	B.G	3	110.16	36.72	43.93*
					W.G	76	63.52	0.84	
Adjusted Post Mean	7.04	8.31	9.48	6.42	B.G	3	111.50	37.17	46.06*
					W.G	75	60.52	0.81	

\*The table F value degrees of freedom 3 and 76 is 2.72 Significant at 0.05 level of confidence

Table1 shows the obtained 'F' values on pre- test, post -test, adjusted post-test mean of aerobic training group, anaerobic training group, co-ordination training group and control group. The pre -test means on dribbling aerobic training group, anaerobic training group, co-ordination training group and control group were 6.35, 6.28, of Aerobic training group, 6.30 and 6.35 respectively.

The 'F' value observed for the pre-test on dribbling was 0.07. It fails to reach the table value of 2.72 for degree of freedom 3 and 76 at 0.05 level of confidence. Based on the results it was conformed that the mean differences among the groups of aerobic training group, anaerobic training group, co-ordination training group and control group on dribbling before the start of the respective treatments were found to be insignificant. The posttest means on dribbling of aerobic training group, anaerobic training group, co-ordination training group and control group were 7.05, 8.30, 9.48 and

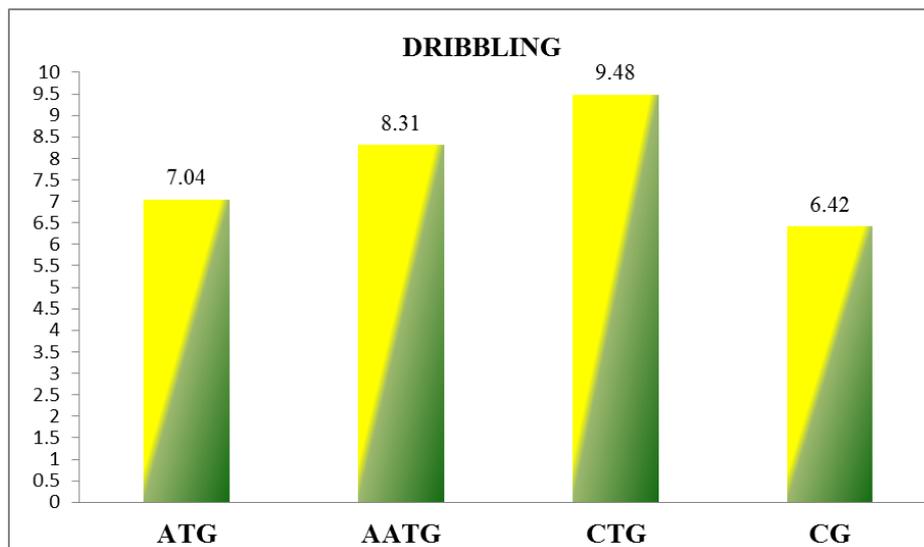
6.43 respectively..

The 'F' value observed for the post-test on dribbling was 43.93. It was greater than the table value of 2.72 for degree of freedom 3, 76 at 0.05 level of confidence. Since the observed F-value on adjusted posttest means among the groups namely aerobic training group, anaerobic training group, co-ordination training group and control group on dribbling was highly significant as the value was higher than the required table value of 2.72. Thus the results obtained proved that the training on dribbling produced significant improvement among the experimental groups. The adjusted post- test mean on dribbling of aerobic training group, anaerobic training group, co-ordination training group and control group were 7.04, 8.31, 9.48 and 6.42 respectively.

The 'F' value observed for the adjusted post-test on dribbling was 46.06. It was greater than the table value of 2.72 for degree of freedom 3, 75 at 0.05 level of confidence. Since the

observed F-value on adjusted post -test mean among the groups namely aerobic training group, anaerobic training group, co-ordination training group and control group on dribbling was highly significant as the value was higher than

the required table value of 2.72. Thus the results obtained proved that the training on dribbling produced significant improvement among the experimental groups.



**Fig 1:** Adjusted Mean Values Of Aerobic Training Group, Anaerobic Training Group, Co-Ordination Training Group And Control Group On Dribbling

**Table 2:** Analysis of Covariance among Aerobic, Anaerobic and Coordination Training and Control Group on Hitting

	Aerobic Training Group	Anaerobic Training Group	Coordination Training Group	Control Group	Source of Variance	Df	Sum of Square	Mean Square	F - Value
Pre Test Mean	9.55	9.45	9.50	9.35	Between	3	0.44	0.15	0.33
					Within	76	33.45	0.44	
Post Test Mean	10.50	11.80	13.10	9.45	Between	3	150.44	50.15	33.74*
					Within	76	112.95	1.49	
Adjusted Post Mean	10.46	11.81	13.08	9.50	Between	3	146.72	48.91	34.29*
					Within	75	106.96	1.43	

\*The table F value degrees of freedom 3and 76 is 2.72 Significant at 0.05 level of confidence

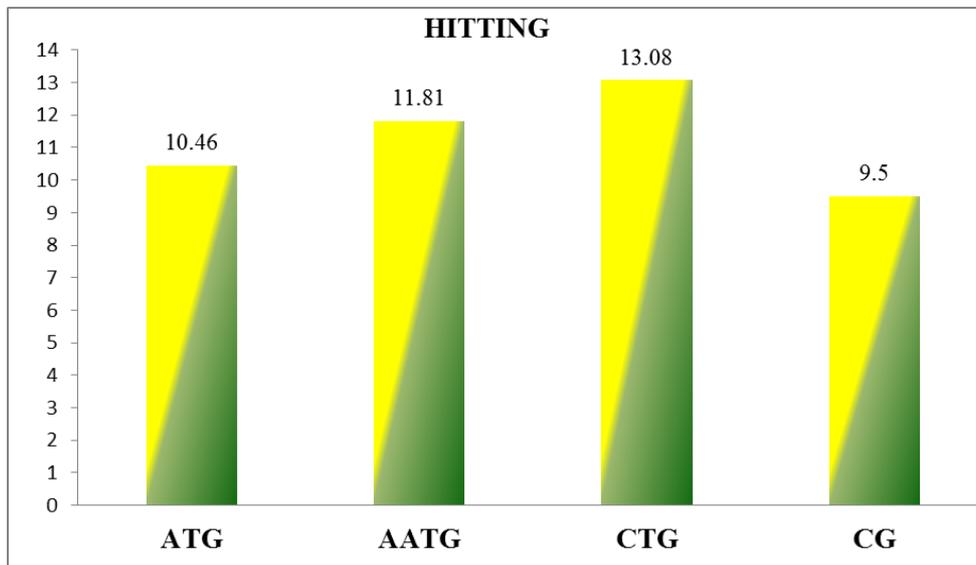
Table 2 shows the obtained ‘F’ values on pre- test, post- test, adjusted post-test mean of aerobic training group, anaerobic training group, co-ordination training group and control group. The pretest mean on hitting of aerobic training group, anaerobic training group, co-ordination training group and control group were 9.55, 9.45, 9.50 and 9.35 respectively.

The ‘F’ value observed for the pre-test on hitting was 0.33. It fails to reach the table value of 2.72 for degree of freedom 3 and 76 at 0.05 level of confidence. Based on the results it was conformed that the mean differences among the groups of aerobic training group, anaerobic training group, co-ordination training group and control group on hitting before the start of the respective treatments were found to be insignificant. The post - test mean on hitting of aerobic training group, anaerobic training group, co-ordination training group and control group were 10.50, 11.80, 13.10 and 9.45 respectively.

The ‘F’ value observed for the post-test on hitting was 33.74. It was greater than the table value of 2.72 for degree of freedom 3 and 76 at 0.05 level of confidence. Since the

observed F-value on adjusted post- test mean among the groups namely aerobic training group, anaerobic training group, co-ordination training group and control group on hitting was highly significant as the value was higher than the required table value of 2.72. Thus the results obtained proved that the training on hitting produced significant improvement among the experimental groups. The adjusted post- test means on hitting of aerobic training group, anaerobic training group, co-ordination training group and control group were 10.46, 11.81, 13.08 and 9.50 respectively.

The ‘F’ value observed for the adjusted post-test on hitting was 34.29. It was greater than the table value of 2.72 for degree of freedom 3, 75 at 0.05 level of confidence. Since the observed F-value on adjusted post- test mean among the groups namely aerobic training group, anaerobic training group, co-ordination training group and control group on hitting was highly significant as the value was higher than the required table value of 2.72. Thus the results obtained proved that the training on hitting produced significant improvement among the experimental groups.



**Fig 2:** Adjusted Mean Values Of Aerobic Training Group, Anaerobic Training Group, Co-Ordination Training Group And Control Group On Hitting

**Table 3:** Analysis of Covariance among Aerobic, Anaerobic and Co-Ordination Training and Control Group on Pushing

Test	Aerobic Training Group	Anaerobic Training Group	Coordination Training Group	Control Group	Source of variance	DF	Sum of Squares	Mean Squares	F-ratio
Pre Test Mean	9.10	9.45	9.50	9.35	B.G	3	1.90	0.63	1.33
					W.G	76	36.30	0.48	
Post Test Mean	9.95	11.35	12.80	9.50	B.G	3	133.50	44.50	28.25*
					W.G	76	119.70	1.58	
Adjusted Post Mean	9.98	11.34	12.78	9.50	B.G	3	127.51	42.50	26.75*
					W.G	75	119.15	1.59	

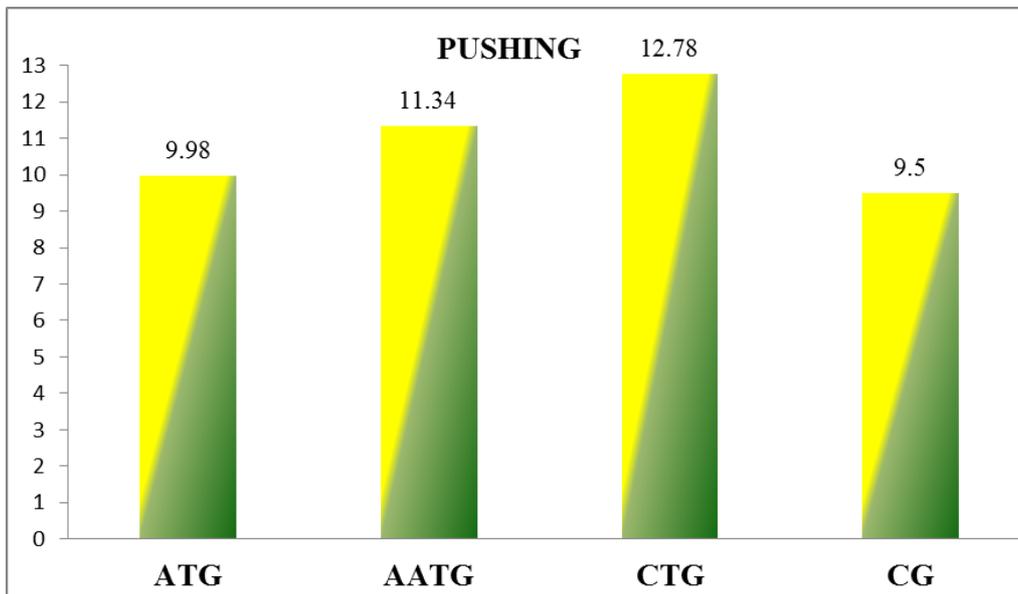
\*The table F value degrees of freedom 3 and 76 is 2.72 Significant at 0.05 level of confidence

Table 3 shows the obtained ‘F’ values on pre- test, post- test, adjusted post-test mean of aerobic training group, anaerobic training group, co-ordination training group and control group. The pre -test mean on pushing of aerobic training group, anaerobic training group, co-ordination training group and control group were 9.10, 9.45, 9.50 and 9.35 respectively. The ‘F’ value observed for the pre-test on pushing was 1.33. It fails to reach the table value of 2.72 for degree of freedom 3, 76 at 0.05 level of confidence. Based on the results it was conformed that the mean differences among the groups of aerobic training group, anaerobic training group, co-ordination training group and control group on pushing before the start of the respective treatments were found to be insignificant. The post- test mean on pushing of anaerobic training group, anaerobic training group, co-ordination training group and control group were 9.95, 11.35, 12.80 and 9.50 respectively.

The ‘F’ value observed for the post-test on pushing was 28.25. It was greater than the table value of 2.72 for degree of freedom 3, 76 at 0.05 level of confidence. Since the observed

F-value on adjusted post- test means among the groups namely aerobic training group, anaerobic training group, co-ordination training group and control group on pushing was highly significant as the value was higher than the required table value of 2.72. Thus the results obtained proved that the trainings on pushing produced significant improvements among the experimental groups. The adjusted post- test mean on pushing of aerobic training group, anaerobic training group, co-ordination training group and control group were 9.98, 11.34, 12.78 and 9.50 respectively.

The ‘f’ value observed for the adjusted post-test on pushing was 26.75. it was greater than the table value of 2.72 for degree of freedom 3, 75 at 0.05 level of confidence. Since the observed f-value on adjusted posttest means among the groups namely aerobic training group, anaerobic training group, co-ordination training group and control group on pushing was highly significant as the value was higher than the required table value of 2.72. Thus the results obtained proved that the training on pushing produced significant improvement among the experimental groups.



**Fig 3:** Adjusted Mean Values Of Aerobic Training Group, Anaerobic Training Group, Co-Ordination Training Group And Control Group On Pushing

### Conclusion and Recommendation

Aerobic exercise is an important component in the development and maintenance of fitness. According to this study the research scholar investigated to find out this study aerobic, anaerobic and coordination training better improvement in field hockey skills. The experimental groups namely, aerobic training group, anaerobic training group and co-ordination training group had significantly improved hockey skills, such as dribbling, hitting and pushing. Significant differences in achievement were found among aerobic training group, anaerobic training and co-ordination training group all the selected criterion variables such as dribbling, hitting, pushing, The co-ordination training group was found to be better than the aerobic training group and anaerobic training group in developing dribbling, hitting, pushing. The present study, it may be concluded that the hockey Skills such as dribbling, hitting, pushing, were improved by co-ordination training group. Hence, Trainers and Physical Educators could adopt such training to improve Co-ordination training group among their athletes. A similar study may be conducted by selecting on physiological and other performance factors as criterion variables.

### References

1. Carl will gosses. The Curriculum in Physical Education. New Jersey: pretince Hall Inc. 1979, 35,
2. Clarke Harison H, David H. Clarke. Application of Measurements of Physical Education, (6<sup>th</sup> ed) Englewood Cliffs, New Jershy: Prentice Hall, Inc, 1987.
3. Dubey .H.C. Sports Series Hockey, New Delhi: Discovery Publishing House, 26-62.
4. Fox, Edward L. Sports Physiology, Philadelphia: Saunders College Publishers, 1984.
5. Bishop D *et al.*, Predictors of repeated – sprint ability in elite female hockey players, Journal of science and medicine in sports. 2003; 6(2):199-209,
6. Chamari K *et al.*, Endurance training and testing with the ball in young elite soccer players, British journal of sports medicine, 2005; 39(1):24-8,
7. Durocher JJ *et al.*, Sports specific assessment of lactate there hold and aerobic capacity throughout a collegiate hockey season, applied physiology and Nutritional metabolism. 2008; 33(6):1165-71,

8. Astorino TA *et al.*, Changes in physical fitness parameters during a competitive field hockey season, Journal of Strength Conditioning Research. 2004; 18(4):350-4.
9. Bhanot JC, Sidhu LS. Maximal anaerobic power in Indian national hockey players, British journal of sports medicine. 1983; 17(1):34-9,
10. Bogdamis GC *et al.*, Effect of two different shot – term training programs on the physical and technical abilities of adolescent basketball players, Journal of science and medicine in sports. 2007; 10(2):79-88.