



Effect of Step Aerobic And Rope Skipping on VO₂ Max on University Girls

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ABSTRACT

The main purpose and objective of the present study was to find out the effect of step - aerobic and rope skipping on VO₂ Max on University girls. For the purpose of this study ninety (90) under graduate girls of Allahabad University was selected as subjects. These girls age ranged from 18 to 22 years. The age of the above selected girls was verified from their respective age records in the University. All the subjects were randomly assigned to two experimental groups (A, B) and the one Control Groups (C) each consisting of thirty subjects. VO₂ Max was assessed at the beginning and after the experimental period of eight weeks in terms of pre-test and post – test scores on the criterion measures. To measure the VO₂ Max Rockport Fitness Walking Test was used. The analysis of co-variance was used as the statistical treatment with the level of confidence at 0.05. It is found that mean difference of Rope Skipping and Step-aerobic: Rope Skipping and Control Group: Step-aerobic and Control Group were found to be significant. The mean change made by the two experimental group showed statistically significant difference amongst them. However the mean change made by the Rope Skipping and Step-aerobic group were significantly greater than the Control Group in the VO₂ max.

KEYWORDS

Step - Aerobic, Rope Skipping, VO₂ Max.

INTRODUCTION:

In the modern scientific age, every field of human endeavor, systematic, objective and scientific procedure is followed in accordance with principles based on experience, understanding and application of the knowledge of science. The field of games and sports is no exception to this. In advanced countries like U.S.A, Germany, Russia, Australia etc. rapid progress in the field of games and sports has taken place their international achievements have been possible due to research, experimentation and application of scientific knowledge in the field of games and sports. Today it is necessary for the physical educators and the coaches to recognize the vital part, science plays an important role in the successful conduct of physical education and athletic programmes, to contribute to the best of one's ability to all aspects of physical education and athletics will require a good understanding of the available scientific knowledge not only will such understanding results in better teams and better programmes of activities but also enable to guard the health of pupils. Then too knowing the reason why to select a particular training programme for accomplishing a specific task scientific knowledge is essential. In today's techno-scientific age, the world has completely changed in all aspects due to discovery and research. In the field of games and sports also, there has been a great change with the help of scientific coaching and training. The athlete are being trained on scientific guidelines with highly sophisticated means for better achievement in their concerned sport to enable the coaches to get optimum performance with minimum expenditure of energy and time. They are being exposed to the exercise and training methods, which have got beneficial effect for achieving higher standard. The main aspect to be emphasized in order to achieve high level of performance is the efficient function of the body. They must function well enough to support the particular activity that the individual is performing since different activities make different demands upon the organism with respect to blood circulation, respiration, metabolic neurological and temperature regulating functions, Physiological fitness is specific to activity VO₂ max is the maximum volume of oxygen that by the body can consume during intense, whole-body exercise, while breathing air at sea level. This volume is expressed as a rate, either litres per

minute (L/min) or millilitres per kg bodyweight per minute (ml/kg/min). Because oxygen consumption is linearly related to energy expenditure, when we measure oxygen consumption, we are indirectly measuring an individual's maximal capacity to do work aerobically. The science of developmental physiology can supply answers to certain important questions regarding the training of children. One such question is: should children perform adult-type endurance training in reduced quantities, or should they be performing a different type of training that is tailored to their physiology? Science suggests the latter is true and that the type and intensity of training that is most effective for developing endurance in the young will be different from that used by adults. Several training studies have been carried out on children to find out what effect a cardiovascular (CV) training programme will have on fitness levels. In general, the research shows that if children follow a 3-5 times a week routine of at least 20 minutes continuous activity for 12 weeks, then improvements in VO₂max of 7-26% are possible. On average, though, and the results of some of the better controlled experiments support this, a child can expect a 10% improvement in VO₂max after following an 'adult-like' CV training programme. The consensus from the research is that children can improve their aerobic fitness but not to the same degree as adults, when following a similar training programme. Modern scientific methods of training players or team place greater responsibility on the coaches and physical educators. They are also responsible for the selection of team taking into consideration the physical and physiological qualities essential for the game. In this study researcher intended to the effectiveness of rope skipping and step - aerobic programme on VO₂ Max of girls of selected age range. This can be useful in the place where the climatic conditions, inadequate space and other facilities do not allow the trainees to adopt other types of training programmes.

METHODOLOGY:

Ninety (90) under graduate girls of Allahabad University was selected as subjects. These girls age ranged from 18 to 22 years. The age of the above selected girls was verified from their respective age records in the University. All the subjects were randomly assigned to two experimental groups (A, B) and the one Control Groups (C) each consisting of thirty

subjects. The experimental treatments were also assigned to the group at random. The A, B was treated as experimental groups and was administered progressive training programme of Rope Skipping and Step-aerobic respectively for eight weeks. The group 'C' was served as Control Group and continue attending the University but did not participate in any kind of training programme. VO₂ Max was assessed at the beginning and after the experimental period of eight weeks in terms of pre-test and post – test scores on the criterion measures. The necessary data was collected with standardized procedure by administering Rockport Fitness Walking Test. The necessary work was done before the start of the test. All the tests were administered and explained to the subjects categorically and left no ambiguity. Any doubts of the subjects raised were clarified before taking the test, but no special training

was given to the subjects. The girls were assembled on the track for the Rockport fitness walking test. Weight was taken and after that all the important instruction was given to them. On command “go” the subject started walking and tried to cover the distance of 1600 mt. as fast as possible after completing the distance the time was recorded in the second and heart rate was taken by the scholar to measure the Vo₂ max. The formula used to calculate VO₂ max was: $132.853 - (0.0769 \times \text{Weight}) - (0.3877 \times \text{Age}) + (6.315 \times \text{Gender}) - (3.2649 \times \text{Time}) - (0.1565 \times \text{Heart rate})$ Where: Weight was in Kg., Female = 0 ,Time was expressed in minutes and 1/10th of the second ,Heart rate was in beats/minute ,Age was in years. To find out the effects of Rope Skipping and Step-aerobic on VO₂ max the analysis of co-variance was used as the statistical treatment with the level of confidence at 0.05.

RESULTS:

TABLE-1

ANALYSIS OF COVARIANCE OF THE MEAN OF TWO EXPERIMENTAL GROUPS AND CONTROL GROUP IN VO₂ MAX

Group				Sum of Square	df	Mean Square	F-ratio
	Rope Skipping (A)	Step-aerobic (B)	Control Group (C)				
Pre-test Mean	44.23	42.87	43.06	A 32.69 W 2166.7	2 87	16.35 24.91	0.656
Post-test Mean	49.2	46.3	43.23	A 534.28 W 2020.72	2 87	267.14 23.23	11.50*
Adjusted Post-test mean	48.47	46.78	43.23	A 378.52 W 390.4	2 86	189.26 4.56	41.59*

Significant at 0.05 level of confidence, N=90, A= among mean variance, W= Within group variance, F-ratio needed for significance at 0.05 level of confidence = 3.11

The critical difference for adjusted post-test means was applied to find out which of the difference between the paired adjusted final means were statistically significant. Difference between the paired adjusted final means are shown in table 2.

TABLE-2

PAIRED ADJUSTED MEANS & DIFFERENCE BETWEEN MEANS FOR TWO EXPERIMENTAL GROUPS AND THE CONTROL GROUP IN VO₂ MAX

Mean			Diff between Means	Critical diff for Adjusted mean
Rope Skipping	Step-aerobic	Control group		
48.47	46.78		1.69*	0.86
48.47		43.23	5.24*	0.86
	46.78	43.23	3.55*	0.86

It is evident from table 2 that the mean difference of Rope Skipping and Step-aerobic: Rope Skipping and Control Group: Step-aerobic and Control Group were found to be significant at 0.05 levels. The mean change made by the two experimental group showed statistically significant difference amongst them. However the mean change made by the Rope Skipping and Step-aerobic group were significantly greater than the Control Group in the VO₂ max.

DISCUSSION:

The analysis of data using analysis of covariance revealed that two experimental groups trained by Step-aerobic and Rope skipping exercise, showed significant changes in the VO₂ max. Rope Skipping had showed higher physiological change in

concerned with VO₂ max followed by Step-aerobic. There was no change found in Control group because the Control group was not edged in any type of systematic physical activity as the other two experimental groups were. And eight week was not enough duration to bring any physiological changes as per the growth and development was concerned.

The better performance of experimental group as compared to the control group may be due to the fact that the experimental groups have undergone a systematic and progressive training programme (thrice a week) for duration of eight weeks whereas control groups did not participated in any kind of formal training. It is an established fact that regular training/conditioning of optimum intensity brings some specific physiological adaptive changes in various parameters namely, cardiovascular system, muscular system and body composition. The Rope Skipping group showed better adaptation in their Vo₂ max, than that of Step-aerobic and Control Group. The effect of Rope skipping inducted higher physiological changes probably its movement was more recreational and may be due to fact that Skipping obviously involve almost the entire parts of body to that of Step-aerobic. The Rope Skipping group also achieved better development because Rope Skipping types of exercise were motivating to the subjects and they were very familiar with this type of activity also.

CONCLUSION:

Eight weeks of participation of different modes Step-aerobic and Rope Skipping of training produced higher VO₂ max of experimental subjects. Eight weeks of participation in different modes of training namely, Rope Skipping and Step-aerobic were effective in bringing change in VO₂ max. Between two modes of training Rope Skipping exercise followed by Step – aerobic achieved the highest development in Vo₂ max.

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