

EFFECTS OF AEROBIC TRAINING AND JUMP ROPE TRAINING ON FLEXIBILITY OF OVERWEIGHT CHILDREN

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ABSTRACT: *Objective: The objective of the present study to know the effects of aerobic training and jump rope training on flexibility of overweight children.*

Methods: Thirty overweight children between 11 to 15 years were selected as subjects at random. The selected subjects were from different classes who studied at different schools in and around at Karaikudi. They were assigned to experimental group-1, experimental group-2 and control group. The experimental group-1 and experimental group-2 received aerobic training (n=10, AT) and jump rope training (n=10, JRT) respectively for six weeks, five days a week. Flexibility measured by the sit and reach test score recorded in centimetres.

Results: After 6 weeks, the aerobic training and jump rope training groups demonstrated significant improvement by 0.3% and 0.4% respectively rather than the control group.

Conclusion: The nature of flexibility greater improved in jump rope training than the aerobic training.

Key Words: 1. Aerobic training 2. Jump rope training 3. ANCOVA 4. Flexibility

INTRODUCTION:

Aerobic exercises include brisk walking, jogging, swimming, cross country skiing, hopping, and skipping. By doing aerobics, the whole body is used and major muscle groups including legs, trunk and arms get involved. In aerobic exercise the heart rate increases substantially, but never reaches its maximum level. The heart is always able to deliver sufficient oxygen rich blood to muscles so that they can derive energy from fat and glycogen aerobically. Aerobic exercises build stamina for sports and are the most important form of exercise for health, since it increases the efficiency of heart, circulation and muscles.

Aerobic exercise is the keystone of fitness by doing aerobics it increases the capillary network in the body. (Sathiaveni, D, 2009) Aerobic metabolism is the way your body creates energy through the combustion of carbohydrates, amino acids, and fats in the presence of oxygen. Combustion means burning, which is why this is called burning sugars, fats, and proteins for energy. Aerobic metabolism is used for the sustained production of energy for exercise and other body functions. Examples of exercises that use aerobic metabolism include walking, running, or cycling with sustained effort. (Wendy Burngardner, 2018) The sports and fitness potential of rope jumping has emerged from the dark gyms used by boxers, material artists, wrestlers and other athletes to discover and eked out its benefits. Today, rope jumping is often featured prominently as part sports training and fitness programs because it has proven itself as a valuable technique that provides a wide range of benefits and competitive advantages. Sports training benefits include increased speed, power, agility and explosiveness. Fitness benefits included weight loss, increased cardiovascular and anaerobic conditioning, and improved balance and coordination. (Lee, 2010)

METHODOLOGY:

The study was formulated as pre and post test random group design, in which thirty subject were randomly assigned into three equal groups. Thirty overweight children between 11 to 15 years were selected as subjects at random. The selected subjects were from different classes who studied at different schools in and around at Karaikudi. They were assigned to experimental group-1, experimental group-2 and control group. The experimental group-1 and experimental group-2 received aerobic training (n=10, AT) and jump rope training (n=10, JRT) respectively for six weeks, five days a week. Flexibility measured by the sit and reach test score recorded in centimeters. During training, the experimental groups underwent their respective training as per schedule given below. Control group maintained normal activities.

STATISTICAL ANALYSIS:

The collected pre and post data was critically analyzed with apt statistical tool of analysis of co-variance (ANCOVA), for observed the significant adjusted post-test mean difference of three groups. The Scheffe's post hoc test was used to find out pair-wise comparisons between groups. To test the hypothesis 0.05 level of significant was fixed in this study.

TRAINING APPROACHES**Training Schedule for experimental group I (Aerobic training)****Cardio Respiratory Training Zone:**

The optimum cardio respiratory zone is found between the 70 and 85 percent training intensities. However, individuals that have been physically inactive or are in the poor or fair cardio respiratory fitness categories should use 60 % intensity during the first few weeks of the exercise programme (Heyward 2002).As far as this study the intensity was fixed 30% to 40% of target heart rate.

Estimation of Maximal Heart Rate:

The subjects training heart rate were measured through the maximal heart method invented by Karvonen formula, i.e., (MHR-AGE)

Experimental Group-I- Aerobic Training (AT)

WEEKS	Intensity	Distance	Set	Recovery In-between Sets
1-2 WEEKS	30% (THR-100bpm)	1 km	2	-
3-4 WEEKS	35% (THR-110bpm)	1.5 km	2	5 min.
5-6 WEEKS	40% (THR-120bpm)	2 km	2	-

The duration of the training in the first instance was 1 to 2 weeks; with 30% intensity and distance covered being one kms. The duration of the next was three to four weeks. The distance covered was 1.5 Kms and the intensity was 35%. Finally it was five to six weeks duration. The distance covered was one to one and half Kms and the intensity recorded was 40%.

Training Schedule for experimental group II (Jump rope drills)

Week 1 and 2: During the period the subjects performed the selected skipping drills. Totally 3 sets was given. They advised to perform only forty seconds of each drills. The 1 minute duration was allowed in between exercise. The 5 minutes was allowed to take rest in-between the set.

Week 3 and 4

During the period the subjects performed the selected skipping drills. Totally 3 sets was given. They advised to perform only fifty seconds of each drills. The 5 minutes was allowed to take rest in-between the set.

Week 5 and 6

During the period the subjects performed the selected skipping drills. Totally 3 sets was given. They advised to perform only sixty seconds of each drills. The 5 minutes was allowed to take rest in-between the set.

1-2 -weeks

Activity	Repetition	Sets	Rec- in between repetition	Rec- in between sets
High step	Each 40 sec	3	1 min	5 min
Alternate –foot step				
Forward straddle				
The bounce step				
Bell jump				
Forward shuffle				
Back ward shuffle				
Half twist				
Full twist				
X foot cross				
Arm side swing				
Arm crossover				

3-4 -weeks

Activity	Repetition	Sets	Rec- in between repetition	Rec- in between sets
High step	Each 50 sec	3	1 min	3 min
Alternate –foot step				
Forward straddle				
The bounce step				
Bell jump				
Forward shuffle				
Back ward shuffle				
Half twist				
Full twist				
X foot cross				
Arm side swing				
Arm crossover				

5-6 -weeks

Activity	Repetition	Set s	Rec- in between repetition	Rec- in between sets
High step	Each 60 sec	3	1 min	3 min
Alternate –foot step				
Forward straddle				
The bounce step				
Bell jump				
Forward shuffle				
Back ward shuffle				
Half twist				
Full twist				
X foot cross				
Arm side swing				

TABLE I
THE RESULTS OF ANALYSIS OF COVARIANCE ON FLEXIBILITY OF DIFFERENT GROUPS
 (Scores in centimetres)

Test Conditions		G1-AT	G2-JRT	G 3-CG	SV	SS	Df	MS	'F' Ratio
Pre test	Mean	12.00	12.40	12.70	B	2.47	2	1.23	0.91
	S.D.	1.26	1.11	0.90	W	36.50	27	1.35	
Post test	Mean	15.00	16.00	12.00	B	86.67	2	43.33	32.58*
	S.D.	1.18	1.26	0.77	W	36.00	27	1.33	
Adjusted post test	Mean	15.20	15.98	11.82	B	94.89	2	47.44	49.41*
					W	25.04	26	0.96	

* Significant at .05 level of confidence. The required table value for test the significance was 3.35, and 3.37, with the df of 2 and 27, 2 and 26.

RESULTS OF FLEXIBILITY

The pre test mean and standard deviation on flexibility scores G1, G2, and G3 were 12.00±1.26, 12.40±1.11, and 12.70±0.90 respectively. The obtained pre test F value of 0.91 was lesser than the required table F value 3.35. Hence the pre test means value of aerobic training; jump rope training and control group on flexibility before start of the respective treatments were found to be insignificant at 0.05 level of confidence for the degrees of freedom 2 and 26. Thus this analysis confirmed that the random assignment of subjects into three groups were successful.

The post test mean and standard deviation on flexibility scores G1, G2, and G3 were 15.00±1.18, 16.00±1.26 and 12.00±0.77 respectively. The obtained post test F value of 32.58 was greater than the required table F value of 3.55. Hence the post test means value of aerobic training and jump rope training on flexibility was found to be significant at 0.05 level of confidence for the degrees of freedom 2 and 27. The results proved that aerobic training and jump rope training were produced significant improve rather than the control group of the sample populations.

The adjusted post test means on flexibility scores of G1, G2 and G3 were 15.20, 15.98 and 11.82 respectively. The obtained adjusted post test F value of 49.41 was higher than the required table F value of 3.37. Hence the adjusted post test means value of aerobic training and jump rope training on flexibility was found to be significant at 0.05 level of confidence for the degrees of freedom 2 and 26. The results confirm that aerobic training and jump rope training on flexibility were produced significant difference among the groups. In order to find out the superiority effects among the treatment and control groups the Scheffe's post hoc test were administered. The outcomes of the same are presented in the table II.

TABLE -II
SCHEFFE'S POST HOC TEST MEAN DIFFERENCES ON FLEXIBILIY AMONG THREE GROUPS
 (Scores in centimetres)

G1-AT	G2-JRT	G3-CG	Mean Differences	Confidence Interval Value
15.20	15.98		0.78*	0.25
15.20		11.82	3.38*	0.25
	15.98	11.82	4.16*	0.25

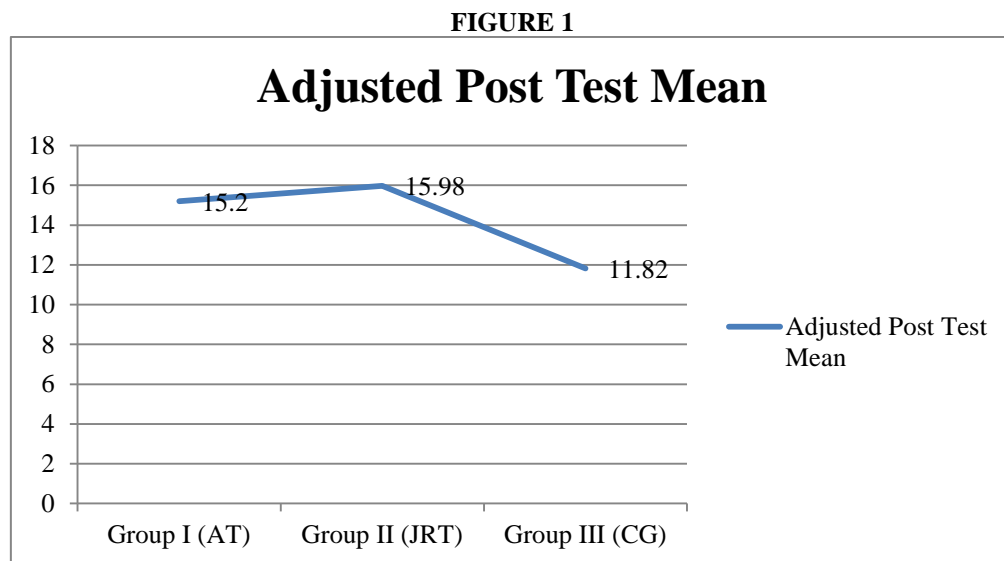
* Significant at .05 level of confidence.

Result of Scheffe's post hoc test on flexibility

Table II shows the paired mean differences of aerobic training, jump rope training and control group on flexibility. The paired wise comparisons results as follows. **First comparison: Group 1 and Group 2:** The pair wise mean difference of group 1 and group 2 values 0.78 was higher than the confidential value of 0.25. Hence the first comparison was significant. The results of this comparison clearly proved that both training have produced significantly different improvements on flexibility. **Second comparison: Group 1 and Group 3:** The pair wise mean difference of group 1 and group 3 values 3.38 was higher than the confidential value of 0.25. Hence the second comparison was significant. The results of this comparison clearly proved that aerobic training have produced greater improvements on flexibility than the

control group. **Third comparison: Group 2 and Group 3:** The pair wise mean difference of group 2 and group 3 values 4.16 was higher than the confidential value of 0.25. Hence the third comparison was significant. The results of this comparison clearly proved that jump rope training have produced greater improvements on flexibility than the control group.

The adjusted post test mean deference of experimental and control group value graphically represented in the figure1



DISCUSSION ON FLEXIBILITY

After analyzing the statistical end results the researcher found that the selected training groups have significantly improved the nature of flexibility from the base line to post interventions. The pre to post intervention was present as follows. The aerobic training group from pre (12.00+1.26), to post (15.00+1.18) and jump rope training group from pre (12.40+1.11) to post (16.00+1.26) have significantly changed the pre to post results. The present study demonstrates an increase in flexibility performance of 0.03% and 0.04% for aerobic and jump rope training group respectively. The result of this study prove that the nature of flexibility increased significantly over the six weeks training period for aerobic training and jump rope training when comparing control group. However, the jump rope training group would produce better improvement than the other training namely aerobic training. Further the aerobic training also produces better improvement on flexibility than the control group. The control group did not show any significant changes on flexibility.

In sit and reach test observations, two experimental groups increased the flexibility significantly pre to post testing. The jump rope training group showed the greatest improvement in flexibility than the aerobic training group and control group. The results of the present study were demonstrated positive effect of selected flexibility of overweight children. This findings support, in line with the result of the following earlier findings. A study effect of aerobic exercise programme on health related physical fitness components of middle aged women showed that the flexibility improved over a 12 weeks of aerobic training. (Shahana A, Nair US, Hasrani SS, 2010). In another study, effects of aerobic exercise on improving health related physical fitness components of Dilla university sedentary female community revealed that the aerobic exercise improved the flexibility. (Mathewos Hoses, Sangeeta Rani, Shemelis Rekoninne, 2013). In a research Jumping Rope Intervention on Health-Related Physical Fitness in Students with Intellectual Impairment demonstrated flexibility was improved due to the jump rope intervention. (Chen, Chao-Chien Lin, Yi-Chun, 2012) In a research, effects of 12-week circuit weight training and aerobic exercise on body composition, physical fitness, and pulse wave velocity in obese collegiate women demonstrated that the 12 weeks of aerobic training produced the improvement in flexibility among the obese collegiate women. (Hyun-Joo Kang Yang Sun Lee, Doo-Soon Park, Duk-Ho Kang, 2011) A study on comparison of two aerobic training methods (running vs rope jumping) on health-related physical fitness in 10 to 12 years old boy examined that the aerobic training produced a significant improvement on flexibility. (Hamid Arazi, Aliakbar Jalali-Fard, Hamzeh Abdinejad, 2016)

CONCLUSION:

The results of this study indicate the nature of flexibility significantly improved over six weeks training period for aerobic training and jump rope training.

The jump rope training was better in flexibility than the aerobic training and control group. The aerobic training produces less improvement on flexibility.

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